WHITE PAPER NO. 6A – COMMENTS ON THE API PANEL REPORT

Response to a Document by Appleton Papers, Inc.

ECOSYSTEM-BASED REHABILITATION PLAN – AN INTEGRATED PLAN FOR HABITAT ENHANCEMENT AND EXPEDITED EXPOSURE REDUCTION IN THE LOWER FOX RIVER AND GREEN BAY

December 20, 2001

This Document has been Prepared by

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ABSTRACT

During the comment period, multiple comments were received from public and private entities both for and against capping alternatives for the Lower Fox River. Appleton Papers, Inc. (API) provided funding to assemble a panel of university professors and scientists to evaluate the *Proposed Remedial Action Plan, Lower Fox River and Green Bay* (Proposed Plan) (WDNR and EPA, 2001) for the Lower Fox River and Green Bay. The Appleton Paper, Inc. Panel (referred to as "the API Panel") completed a report entitled *Ecosystem-Based Rehabilitation Plan – An Integrated Plan for Habitat Enhancement and Expedited Exposure Reduction in the Lower Fox River and Green Bay* (referred to herein as the "Panel Report") dated January 17, 2002 (The Johnson Company, 2002) that was submitted as part of the comments during the public response period. The Panel Report contended that the Agencies' proposed contaminated sediment removal plan would be limited by water quality discharge issues, and that risk reduction could be better achieved by capping areas of contaminated sediments within the Lower Fox River. They further purported that the capping would also result in habitat enhancement.

This White Paper is one in a series of papers that focuses on evaluating the claims of the Panel Report. Specifically, it presents an evaluation of the API Panel cap design conducted by Dr. Michael Palermo, P.E. Dr. Palermo is an internationally recognized expert in capping design and implementation. His resume is attached to this White Paper.

The White Paper finds, in general, that the Panel Report paints any overly optimistic picture for capping, and overly pessimistic one for dredging. The overall findings contained in this White Paper showed that the Panel Report did not present a rationale for its selection for total cap thickness, the basis for a design for the chemical isolation component, consolidation-induced advection, potential mixing of contaminated sediments and cap material, and constraints on capping in shallow-water areas. This White Paper analysis also concludes even a total cap thickness of 12 inches seems nonconservative; and capping could be a component of the remedy, but not the sole remedy for any reach.

GENERAL COMMENTS

- The Panel Report contains useful information for considering potential capping and dredging remedies for this Site. For example, the discussion of the Lower Fox River discharge characteristics as compared to other rivers in the region and the use of a map format for displaying shear stress for flood events are both useful in placing erosion potential and the need for cap armor in perspective. Also, the discussion of potential constraints on dredging related to river assimilative capacity provide needed insight for the Agencies in considering less restrictive requirements or waivers, as appropriate.

- The overall recommendations in the Panel Report rely on projections of the Surface-Weighted Average Concentration (SWAC) reductions for both a full dredging remedy and a full capping remedy. But such a direct comparison is based on many assumptions, some of which are inappropriate. For example, areas proposed for capping are based on a 5 parts per million (ppm) Remedial Action Level (RAL) (proposed by the API Panel for reasons of engineering efficiency), while those assumed for dredging are based on the 1 ppm RAL in the Proposed Plan (WDNR and EPA, 2001) (chosen based on the *Baseline Human Health and Ecological Risk Assessment for the Lower Fox River and Green Bay, Wisconsin, Remedial Investigation and Feasibility Study* [BLRA] [RETEC, 2002]). A direct comparison of SWAC reduction rates for two alternatives with differing action levels is inappropriate when those action levels drive the timeline for completion of the respective actions.

- In general, the Panel Report seems to paint an overly optimistic picture for capping and an overly pessimistic picture for dredging. The rate at which dredging is assumed to occur is severely hampered by an assumed constraint on river assimilative capacity, which would likely not be imposed on a major remedial project. In contrast, the implementation of capping is assumed to be essentially flawless in its execution and effectiveness, and potential constraints on capping which are mentioned in the Panel Report are described as non-problems.

- I generally agree with one theme evident throughout the Panel Report, that capping is a technically feasible remedy approach for the Lower Fox River. However, there are several technical and institutional constraints on the application of capping at this Site that the Panel Report does not fully consider. Based on my review, capping could be a component of a remedy, but could not be the sole remedy for any reach. A combination of some capping and dredging is likely the most efficient remedy.

- Technical issues for capping not fully considered in the Panel Report include: the rationale in selecting total cap thickness, the basis of design for the chemical isolation component, consolidation-induced advection, potential mixing of contaminated sediments and cap material, and constraints on capping in shallow water areas. A detailed design effort for any selected capping remedy should address these and all pertinent design considerations. While the Panel Report considers some design issues, the information on cap design is not clearly presented and there is insufficient information offered to verify the proposed design with respect to all the issues.

- The Panel Report has not addressed fully institutional/regulatory constraints associated with capping, such as capping Toxic Substances Control Act (TSCA) materials, lake bed grants, riparian owner issues, deed restrictions, fiduciary responsibility, and long-term liability.

- Additional details on further evaluation of an *in-situ* capping alternative for the project is presented in *White Paper No. 6B – In-Situ Capping as a Remedy Component for the Lower Fox River* (Palermo, et al., 2002).

SPECIFIC COMMENTS

Specific comments follow, grouped by general category and referenced to page and section.

Site Characterization

Page 6 – Conceptual Model – Flood Flow Conditions: The Panel Report states on page 6 that since the flood flow volume per unit drainage area and the ratio of flood to average discharge for the Lower Fox River is low compared to other rivers in the region, the erosive forces due to floods would be comparatively low. The general comparisons of discharge characteristics are useful in placing the hydrodynamic characteristics of the Lower Fox River in a broader context. But the clear-cut statement that erosive force on the Lower Fox River is low is not supported by the information provided on flow ratios. Erosive force is a function of shear stress, and shear stress is a function of this particular Site geometry, sediment characteristics, and given flow events.

Page 17 – Hydrologic Characteristics: On page 17, the statement is made that a flow increase does not translate to a velocity increase and to a shear increase (exactly the point I wanted to make for page 6). But the text here goes further by stating that shear stress applied to Lower Fox River sediments is lower relative to similar rivers. This may be true, but the data are not presented to support this statement. Are data on bottom velocities and/or shear stresses during flood stage available for all the rivers in the region? The bottom line is the need to evaluate erosion potential for this River, and this should be evaluated based on the anticipated shear stresses on this River for selected design events. The Panel Report presents such information in Appendix A, based on the *Review of USEPA FIELDS Analysis of Bed Elevation Changes in the Lower Fox River* (Limno-Tech, 2002) modeling effort. The map format presented in Appendix A is a very useful method to depict modeling results. However, I understand there is disagreement on the appropriate modeling approach. WDNR has also conducted modeling, and there are substantive differences in how the two models interpret shear stress and resuspension. Limno-Tech's model predicts negligible shear stress, while WDNR's model predicts a far greater stress and resuspension. These differences must be resolved prior to the design phase.

Dredging

Page 8 – Constraints on Dredging: The need to treat and discharge water from a conventional hydraulic dredging operation is described on page 8 as a major constraint for a dredging remedy. However, even if such constraints were imposed to some degree, several dredging and transport approaches are available which would greatly limit the need for water treatment. These options include: (1) mechanical removal, with barge transport to shore, passive drainage, and truck to disposal/treatment; and (2) mechanical removal, with hydraulic reslurry (either at the dredging site or at onshore facilities),

hydraulic transport to disposal/treatment, with recirculation of carrier water (this requires dual pipelines). There could be other possible options. Such approaches may be somewhat more expensive than conventional hydraulic dredging with direct pipeline transport, but the cost savings over water treatment may be significant and technical constraints regarding assimilative capacity would be overcome.

Page 10 – Assumed Duration of Dredging: Figure 19 is dramatic, however, it is based on many assumptions. For example, the stated time of 60 years to complete a dredging remedy is, in my opinion, an unreasonable assumption. The length of time for dredging, as portrayed on this figure, is based on assumptions regarding the need for water treatment and the assimilative capacity of the River. But for a major remedial project such as this, the agencies would be strongly motivated to consider a less restrictive requirement or an outright waiver of such constraints. The net benefits of a remedy would be weighed against the short-term impacts of necessary discharges of treated water.

Capping

Page 9: The statement is made that the areas with highest concentration would be capped first. This approach may not be advisable for the Operable Units (OUs) 1, 3, and 4 reaches since areas capped early would be susceptible to sediment transport from uncapped upstream areas, resulting in potential re-contamination. Once sources are controlled, it is usually best to sequence the remedy actions from upstream to downstream for a riverine site. The capping of higher concentration areas first may be a more viable approach for the lower portion of OU 4 since it is subject to seiche.

Page 9: The statement is made that TSCA-level sediments would be capped. While I agree that a cap could likely be designed to be protective of such sediments, technical considerations are not the only considerations. A capping remedy may not meet the regulatory requirements of TSCA. I understand that EPA Region 5 has taken the position that capping TSCA sediments would not be acceptable.

Page 13: The concept of a Long-Term Stewardship Plan is a sound idea. Such a plan would tend to diffuse the common objections to capping remedies regarding the need for protection in perpetuity. However, the viability of the plan would depend on many details yet to be described. For example: how would the financial aspects be handled, would dams be maintained under the plan, how would potential dam removals be handled, would any needed institutional controls be enforced under the plan, etc.?

Page 45 – Areas for Active Remediation: Table 5 shows the acreages by reach for the areas proposed for capping. These areas presumably correspond to those shown on Figures 7 through 9. Although the Panel Report acknowledges that WDNR has selected 1 ppm as the action level (see page 67), the areas proposed for capping on Figures 7 through 9 appear to correspond to a surficial concentration of 5 ppm. It is unclear if the comparisons of dredging versus capping in the Panel Report consider this basic difference in areas for active remediation. For example, did the projections of dredging times as described in the Panel Report assume that dredging would occur in areas of 1 ppm, while capping would occur for 5 ppm areas?

Page 47: The statement that remediation should proceed only as long as it is continuing to reduce the SWAC is not consistent with the concept of an action level nor with an objective of mass removal, which would address future risks to exposure of now-buried high-PCB sediments. Note that the concept of a SWAC is a metric to measure the success of a remedy once it is completed. Also, the premise of continuing active remediation only as long as reductions in SWAC are apparent relies on natural attenuation to bring concentrations below the cleanup levels. The rates at which this would occur as projected in the Panel Report rely on model projects by Limno-Tech. However, I understand that recent data collected for OU 1 indicate that natural attenuation may not be occurring at the rates suggested in the Panel Report.

Cap Designs

Proposed Cap Design: The rationale on the proposed cap designs is scattered between several sections in the Panel Report and is therefore somewhat difficult to follow. And there is no clear discussion of the overall rationale in selecting proposed cap thicknesses and material properties. I have tried to compare the information presented in the Panel Report with the EPA *In-Situ* Cap (ISC) guidance (Palermo et al., 1998a).

Page 64 – Total Cap Thickness of 12 inches: Section 5.1.1 is titled Bioturbation, but bioturbation is only one process mentioned here. The depth of bioturbation in freshwater systems is usually limited to a few inches, plus any caps on the Fox River would be designed for erosion resistance (likely armored), so bioturbation is not the overriding process. This section actually presents the Panel Report's rationale for selecting 12 inches as "a basic cap thickness." But the basis for that selection is technically inappropriate. The Panel Report references EPA (1994) (the EPA *Assessment and Remediation of Contaminated Sediments [ARCS] Remediation Guidance* document, page 53) as a justification for a 12-inch cap thickness for chemical isolation. However, chemical isolation is only one of several processes that should be considered in cap design. Further, the basis in EPA (1994) for a 12-inch minimum cap thickness for chemical isolation is based on an early study by Sturgis and Gunnison (1988), but this study is not applicable for evaluation of long-term chemical migration of contaminants due to diffusion (see Palermo et al., 1998, page 37, for more details on this). Note that Palermo et al. (1998) effectively supersedes the EPA (1994) document with respect to cap design.

The total thickness of a cap, and the composition of the cap components, should be based on an evaluation of all the pertinent processes for the Site and the ability of the design to achieve the intended functions of the cap. Some of the processes for design of cap components can be evaluated rigorously with models, etc. But others require engineering judgment. Cap design is evolving as we gain more experience across the range of project conditions. For cap design, the conservative "layer cake approach" has usually been taken (i.e., we have not assumed dual functions for the same cap component). The argument could be made that, for an armored cap, the erosion protection layer may also act effectively as the bioturbation component. But, in my judgment, a total cap thickness of 12 inches seems non-conservative for a major site like the Lower Fox River.

Figures 7 through 9 – Cap Design for Specific Areas: The proposed design varies considerably by area capped as shown on Figures 7 through 9. The specification of a specific design by reach or area is a viable approach, but there is no rationale presented for the specific area designs in these figures. Appendix A of the Panel Report presents a tabulation of gravel/sand particle sizes needed for resistance to erosion, and these sizes correspond to the surface layer by area as shown on the figures. However, there is no explanation or rationale for the overall designs by area presented on the figures.

A major common thread for all the area-specific designs is a 12-inch total thickness (see comment above). Another common thread for most of the designs is a 3-inch fine sand layer, which is presumably intended to be the chemical isolation layer. However, several of the areas show a design of only 12 inches of coarse sand. A coarse sand would normally have little or no fine fraction, therefore little or no adsorptive capacity for chemical isolation. If an additive such as activated carbon were used to boost adsorptive capacity, there would be a high potential for separation from a coarse sand during placement. The design for these areas therefore seems non-protective from the standpoint of chemical isolation.

Page 33: The Panel Report states here that a cap thickness of 2 to 6 inches is needed for physical isolation from benthos. The Panel Report further states that 6 to12 inches is a typical minimum cap thickness to "provide a safety factor, ensure cap layer remains stable even if there is significant heterogeneity in placement thickness, and to protect the overlying water from migration of contaminants through the cap." These statements essentially propose that a thin cap is a common design approach. However, most *in-situ* remediation caps which have been designed are greater in thickness than the 6 to 12 inches mentioned here.

Page 33 – Operational Cap Thickness Component: The Panel Report mentions unevenness of cap thickness as a consideration for cap design. But the potential for mixing of cap material with the contaminated sediments is an additional process not considered in the Panel Report. The degree of mixing is dependent on the method and rate of placement of the cap material as well as the physical/engineering properties of the cap material and contaminated sediments. The degree of mixing based on past experience has usually been on the order of a few inches. The potential for mixing should be considered in selecting an appropriate operational cap thickness component as well as in evaluations of cap effectiveness for long-term chemical isolation.

Page 64, Section 5.1.2 – Cap Design for Chemical Isolation: This section describes use of the contaminant flux model provided in the EPA ISC guidance document. The bottom-line results regarding flux reductions are presented, but no details are provided on the various model parameters used. What was the assumed total organic carbon (TOC) content and porosity of the cap isolation layer? Were evaluations performed for an average scenario for PCB concentrations and sediment physical properties for all reaches, or a worst-case scenario? The answers to such questions should be provided at least in summary form. The report states that model results showed a 500-fold reduction in flux to the overlying water for a 6-inch cap with 2-inch effective cap thickness. Presumably,

these results were factored into the designs shown on Figures 7 through 9, but no information on this is presented.

Although reduction in flux is an important consideration, the cap design should be based on evaluations of the maximum long-term PCB concentration in the upper portion of the cap. Such evaluations would determine if the post-capping SWACs remain below the target levels, essentially in perpetuity, for a given cap design. All pertinent processes to include consolidation-induced advection and cap/sediment mixing should be considered in the evaluations. A combination of the United States Army Corps of Engineers (USACE) PSDDF and RECOVERY models have been used for such evaluations and should be considered for this Site.

Page 65: The report states that there is no indication of potential seepage (advection) due to groundwater flow, and so this was not considered in the model runs. However, the process of consolidation-induced advection will occur, and should be considered in the cap design.

Page 73 – Shear Stress and Armor Design: Statement is made here and on page 77 that the calculated particle sizes for the cap surface layer were multiplied by a 3.0 safety factor, but these statements are in conflict with that on page 75 that the shear stress for the 100-year flood was multiplied by a 3.0 factor. Page A-1 of the report states that the safety factor was applied to the shear stress, so statements on pages 73 and 77 should be corrected.

Page 76 – Ice Scour and Shallow Water Constraints: Statement is made that spring ice flows could gouge sediment in shallow areas, but that little of the proposed cap area is along the shallow bank areas, so the cap would not be compromised. This statement does not adequately consider what are likely significant technical constraints on application of capping in shallow water areas. WDNR has indicated that ice scour could be a constraint on cap placement in water depths of 3 feet or less. In addition, the habitat conditions to discourage carp indicate that a minimum water depth of 3 feet should be maintained. Long-term lake level changes (from +5 to -1 feet) should be accounted for in designing for these restrictions for OU 4. Therefore, no cap should be constructed within OUs 1 and 3 with a surface above -3 feet chart datum, and no cap should be constructed within OU 4 with a surface above -4 feet chart datum. Assuming that a 1-foot-thick cap, as proposed in the report, would be the final design (note that final design could result in a greater thickness), no area with a bottom elevation less than -5 feet chart datum could be capped without prior dredging to meet these depth constraints. The areas shown for cap placement on Figures 7 through 9 show what appears to be substantial areas proposed for capping near and all the way to the shoreline, indicating significant overlap with the -5-foot datum. Significant dredging would therefore be required prior to placing even a 1-foot cap in shallow water areas. All the time projections, reductions in SWAC, etc., described in the report, do not consider these constraints related to shallow water areas.

Appendix A-1: This appendix presents more detail on the proposed armor layer gravel sizes. Maps are presented showing distributions of shear stress for the 100-year flood

event. The graphical presentation of shear stress in map format is a useful tool to visualize how the variation in armor layer design can be incorporated into a cap design.

REFERENCES

EPA, 1994. *Assessment and Remediation of Contaminated Sediments (ARCS) Program Remediation Guidance Document*. EPA-905-B-94-003. Prepared for the Great Lakes National Program Office, United States Environmental Protection Agency, Chicago, Illinois. October.

Limno-Tech, 2002. *Review of USEPA FIELDS Analysis of Bed Elevation Changes in the Lower Fox River*. Limno-Tech, Inc. January.

Palermo, M. R., J. E. Clausner, M. P. Rollings, G. L. Williams, T. E. Myers, T. J. Fredette, and R. E. Randall, 1998a. *Guidance for Subaqueous Dredged Material Capping*. Technical Report DOER-1. United States Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi. Website: http://www.wes.army.mil/el/dots/doer/pdf/doer-1.pdf.

Palermo, M. R., J. Miller, S. Maynord, and D. Reible, 1998b. *Assessment and Remediation of Contaminated Sediments (ARCS) Program Guidance for In-Situ Subaqueous Capping of Contaminated Sediments*. EPA 905/B-96/004. Prepared for the Great Lakes National Program Office, United States Environmental Protection Agency, Chicago, Illinois. Website: http://www.epa.gov/glnpo/sediment/iscmain

Palermo, M. R., T. A. Thompson, and F. Swed, 2002. *White Paper No. 6B – In-Situ Capping as a Remedy Component for the Lower Fox River*. Wisconsin Department of Natural Resources, Madison, Wisconsin. December.

RETEC, 2002. *Final Baseline Human Health and Ecological Risk Assessment for the Lower Fox River and Green Bay, Wisconsin, Remedial Investigation and Feasibility Study*. Prepared for Wisconsin Department of Natural Resources by The RETEC Group, Inc., Seattle, Washington and Pittsburgh, Pennsylvania. December.

Sturgis, T., and D. Gunnison, 1988. *A Procedure for Determining Cap Thickness for Capping Subaqueous Dredged Material Deposits*. Environmental Effects of Dredging Technical Note, EEDP-01-9. United States Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

The Johnson Company, 2002. *Ecosystem-Based Rehabilitation Plan – An Integrated Plan for Habitat Enhancement and Expedited Exposure Reduction in the Lower Fox River and Green Bay*. Prepared for the Appleton Paper, Inc. Panel by The Johnson Company, Inc. January 17.

WDNR, 2002. *White Paper No. 2A – Evaluation of New Little Lake Butte des Morts PCB Sediment Samples*. Wisconsin Department of Natural Resources, Madison, Wisconsin and United States Environmental Protection Agency, Region 5, Chicago, Illinois. December.

WDNR and EPA, 2001. *Proposed Remedial Action Plan, Lower Fox River and Green Bay*. Wisconsin Department of Natural Resources, Madison, Wisconsin and Green Bay, Wisconsin and United States Environmental Protection Agency, Region 5, Chicago, Illinois. October.

TECHNICAL QUALIFICATIONS AND CONTRIBUTIONS OF ENGINEERING AND SCIENTIFIC PERSONNEL

Updated September 2001

Dr. Michael R. Palermo, Research Civil Engineer, DB V (GS-15)
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1. Education:

A. Universities attended and degrees:

Mississippi State University
- Attended 1966-1971
- Cooperative Education Program, Vicksburg District 1967-1971
- Courses at WES Graduate Institute 1972-1977
- BS Civil Engineering 1971
- MS Civil Engineering 1977
- Major: Civil Engineering, Soil Mechanics
- Minor: Engineering Geology

Vanderbilt University
- Attended 1978-1979 (WES Long-Term Training)
- PhD Environmental and Water Resources Engineering 1984
- Major: Environmental and Water Resources Engineering
- Minor: Mathematics

B. Other training:

Military training and service:

Graduate of Engineer Officer Basic Course, Ft. Belvoir, VA, 1972 (Commandant's List)
Graduate of Engineer Officer Advanced Course, Ft. Belvoir, VA, 1976
Attained rank: Major, Corps of Engineers, USAR
Previous assignments with 412th Engineer Command, Vicksburg, MS.:
- Assistant Installation Services Engineer, Assistant Construction Engineer, Aide-de-Camp, RR/EEO Officer, Soils Engineer, and Executive Officer, HQ Co.

Instructor, Soils and Geology, U.S.Army Engineer School, Ft.Belvoir, VA.
Staff Engineer, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, MS.

Short Courses:

GE FORTRAN Programming - 1972
Intro to Series 6000 Programming - 1973
Intro to Finite Element Method - 1974
Non-Linear Analysis by Finite Element Method – 1974
Earthquake Analysis of Embankments - 1974
Finite Element Analysis of U-Frame Locks - 1974

Soil-Structure Interaction - 1974
Environmental Engineering and Ecology - 1975
Management Seminar in Value Engineering - 1975
Supervision and Group Performance - 1977
Sanitary Engineering Seminar - 1977
Water Quality Management - 1978
Dredging Technology Symposium - 1980
Dredging Engineering Symposium - 1981
Instructor Training Course, Ft. Belvoir, VA - 1981
Dredging Engineering Shortcourse - 1982
Seminar Consolidation of Fine-Grained Waste Materials - 1982
Seminar for ASCE Specialty Conference Chairmen - 1983
Dredging Technology Symposium - 1985
Nuclear Radiation Safety Shortcourse - 1989

2. Government Service:

A. Service Computation Date: 27 October 1967

B. Began Working at WES: 15 December 1974

C. Date Promoted to Present Grade: 1 January 1995

3. Professional Registration:

Registered Professional Engineer
State of Mississippi, 1975 to present, #6624

4. Professional or Technical Societies/ Organizations and interactions with academia:

A. Professional or Technical Societies/ Organizations:

1. Current membership:
International Navigation Association (PIANC)
Western Dredging Association (WEDA)

Inactive membership:
American Society of Civil Engineers (ASCE)
Society of American Military Engineers (SAME)
Society of Wetland Scientists
Vicksburg Engineers Club
Chi Epsilon (Honorary Civil Engineering Fraternity)

2. Election or appointment as an officer:

Vice-President, Vicksburg Chapter, SAME, 1980

3. Membership on committees or panels:

Program Committee Chairman, Mississippi Section ASCE, 1980
Session Chairman, ASCE Water Forum 81 Specialty Conference, 1981

Steering Committee, ASCE Dredging 84 Specialty Conference, 1983
Session Chairman, ASCE Dredging 84 Specialty Conference, 1984
Subcommittee Chairman, Marine Transportation and the Environment,
Transportation Research Board, 1991 to 1995
Associate Editor, Journal of Dredging, Western Dredging Association, 1998

4. Attendance at national and international meetings of non-governmental societies and organizations or serving as an instructor for non-government training courses:

National/ International meetings:

ASCE Specialty Conference on Dredging and Its Environmental Effects, Mobile, AL, 1976
ASCE National Environmental Engineering Conference, Nashville, TN, 1977
Ninth World Dredging Congress, Vancouver, BC, Canada, 1980
ASCE Water Forum 81 Specialty Conference, San Francisco, CA, 1981
Delegate to 7th US/Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, New York, NY, 1981
ASCE Dredging 84 Specialty Conference, Clearwater, FL, 1984
US-Netherlands Meeting on Dredging and Related Technology, Charleston, SC, 1984
International Joint Commission on the Great Lakes, Forum on Confined Dredged Material Disposal Facilities, Toronto, Canada, 1985
Eleventh World Dredging Congress, Brighton, United Kingdom, 1986
Eighth Annual Meeting of the Western Dredging Association, Baltimore, MD, 1986
Tenth Annual Meeting of the Western Dredging Association, Metarie, LA, 1988
Participant and Rapporteur at Marine Board, National Research Council Symposium on Contaminated Marine Sediments, Tampa, FL, 1988
Twelfth World Dredging Congress, Orlando, Florida, 1989
ASCE Ports 89 Specialty Conference, Boston, MA, 1989
Delegate to 14th U.S./Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, Yokohama, Japan, 1990
Participant Transportation Research Board National Meeting, 1991
Twelfth Annual Meeting, Western Dredging Assn, Las Vegas, NV, 1991
Thirteenth Annual Meeting, Western Dredging Assn, Mobile, AL, 1992
Society of Wetland Scientists, Annual Meeting, New Orleans, LA, 1992
ASCE Water Forum 92, Balitmore, MD, 1992
International Environmental Dredging Symposium, Buffalo, NY, 1992
14th Annual Meeting, Western Dredging Association, Atlantic City, NJ, 1993
15th Annual Meeting Western Dredging Association, San Diego CA, 1994
ASTM Symposium Remediation of Contaminated Sediments, Montreal Canada, 1994
16th Annual Meeting Western Dredging Association, New Orleans, 1996
14th World Dredging Congress, Amsterdam, The Netherlands, 1995
PIANC Working Group PEC-1, Open Water Disposal Management, 1996-1998
17th Annual Meeting Western Dredging Association, Charleston, 1997
EPA National Conference on Contaminated Sediments Management and Treatment, 1997
International Workshop on Beneficial Uses of Dredged Material, Baltimore, 1997
International Conference on Contaminated Sediments, Rotterdam, 1997
Delegate US Japan Meeting on Management of Bottom Sediments Containing Toxic Substances, Kobe, Japan 1998
15th World Dredging Congress, Las Vegas, 1998
PIANC Working Group PEC 5, Confined Disposal of Dredged Material, 1998 to present
International Workshop on Remediation of Marine Sediments, Sandefjord, Norway, 2000, 2001

Instructor for non-government training courses:

Lecturer at Dredging Engineering Shortcourse, Texas A&M University, annual basis
Lecturer at International Program for Port Planning and Management, Louisiana State University and University of New Orleans, annual basis
Lecturer at Coastal Engineering for the Great Lakes Shortcourse, Univ of Wisconsin, 1991
Lecturer at Contaminated Sediment Remediation Shortcourse, Univ of Wisconsin, annual basis

B. Interactions with academia:

1. Rank/ Position

Adjunct Faculty Member, Hinds Community College
Adjunct Professor, Mississippi State University
Visiting Assistant Professor, Texas A&M University

2. Classes taught:

Undergraduate:
Hinds Community College,
TCE 1111, Intro to Civil Engineering Technology
TCE 2183, Intro to Environmental Engineering Technology

Graduate:
Mississippi State University,
CE 8913, Dredging and Dredged Material Disposal, 1987
CE 8803, Intro to Environmental Engineering I, 1991
Texas A&M University,
OCEN 688, Marine Dredging, 1990, 1993, 1995

3. Service on PhD/MS Committees

Texas A&M University
Clifford L. Truitt, Doctor of Engineering, Ocean Engineering, 1987
Anthony J. Risko, MS Ocean Engineering, 1994
Gregory L. Williams, PhD Ocean Engineering, 1996-2001

4. Service on PhD Qualifying Committees

5. Service on Academic Boards

Member and Co-Chairman of the Advisory Committee, Hinds Community College, Engineering Technology Program, 1982 to 1994
Advisory Board for Coastal Engineering Education Program, Texas A&M University

5. Participation in committees, panels, meetings, conferences, or symposia:

A. Attendance at Government sponsored national meetings and/or membership on Government sponsored technical committees, panels, and instructor for government sponsored training, etc:

Committees/ panels:

Program Planning Group for the Environmental Effects of Dredging Programs, 1982 to present
WES Study Team for Planning the Environmental and Water Quality Operational Studies (EWQOS) Program, 1976
Program Control Group for the EWQOS Program, 1977-1979
Coordinator and Chairman for Confined Dredged Material Disposal Workshop, 1981
Review Committee for the Corps of Engineers National Waterways Study, 1980-1981
Corps of Engineers Environmental Advisory Board Meeting, 1983
Corps of Engineers-EPA Technical Working Group on RCRA and Dredged Material, 1985
Corps of Engineers-EPA Oakland Harbor Review Panel, 1988
National Workshop on Dredging Impacts on Sea Turtles, 1988
Value Engineering Study Panel, Marathon Battery Superfund Project, 1988
Workgroup Leader for National Corps Workshop on Wetlands, 1989
Corps of Engineers Contaminated Sediments Workshop, 1989
Washington Department of Ecology Workshop on Development of Confined Dredged Material Disposal Standards, 1989
Corps/American Association of Port Authorities Workshop on Long Term Management Strategies for Dredged Material Disposal, 1989
Value Engineering Study Panel, Bayou Bonfouca Superfund Project, 1990
Corps/EPA National Ocean Disposal Coordinators Meeting, 1990.
American Association of Port Authorities Seminar on Dredged Material, 1990
USACE Water Quality Seminar, 1990
San Diego Bay Symposium, 1990
EPA/USACE Workgroup, Dredged Material Ocean Testing Manual, 1991-1993
National Symposium for Long Term Management Strategies, 1991
EPA/USACE National Ocean Disposal Coordinators Meeting, 1991
NOAA National Workshop on Contaminated Sediment Remediation, 1991
USACE/EPA Workgroup on Technical Framework for Dredged Material Disposal Alternatives, 1991-1992
EPA/USACE Workgroup, Dredged Material Inland Testing Manual, 1991-1993
National Zebra Mussel Control Workshop, Nashville, TN 1992
EPA/USACE National Ocean Disposal Coordinators Meeting, 1993
Coastal Engineering Research Board Meeting, Mobile Al, 1993
Coordinator for National Wetlands Engineering Workshop, St. Louis MO, 1993
Flemish Government Contaminated Sediments Workshop, Gent Belgium, 1994
Dredged Material Beneficial Uses Workshop, Philadelphia, PA, 1994
Interagency Review Team, Manistique Harbor Superfund Site, 1994
Cooperative Research and Development Agreement with ERM Hong Kong Inc. 1996
EPA Contaminated Aquatic Sediments Remedial Guidance Workgroup, 1997 to present
Ross Island Interagency Technical Advisory Committee, State of Oregon, 1998 to present
Housatonic Superfund Technical Advisory Board, Region 1 EPA, 1998 to present
EPA Remediation Techologies Development Forum, 1998 to present
EPA Forum on Managing Contaminated Sediments at Hazardous Waste Sites, 2001

Instructor for government sponsored training courses:

Instructor in Soils and Geology, U.S. Army Engineer School, Ft. Belvoir, VA, 1981 to 1984
Lecturer at Corps of Engineers PROSPECT courses on Dredged Material Management, Deep Draft Navigation, and Tidal Hydraulics, as needed basis
Lecturer at EPA/USACE Dredged Material Management Seminars, annual basis

B. Membership on Government committees:

USACE Committee on Tidal Hydraulics, 1995 to present
Non Technical:
Chairman of WES Automated Products Advocates Team 1991-1992.
Chairman Technical Evaluation Committee for Task Order Contract on Environmental Engineering for Dredged Material Disposal 1992.
AE Selection Board for WES Engineering and Construction Services Division 1992.

6. Honorary, scientific or engineering societies:

Beta Chi Epsilon (Honorary Civil Engineering Fraternity), Mississippi State University, 1970
Chi Epsilon (Honorary Civil Engineering Fraternity), Mississippi State University, 1971

7. Special recognition or awards:

Director's Award, EPA Office of Emergency and Remedial Response for work on Manistique Harbor Superfund Interagency Review Team, 1996.

Commander and Director's Research and Development Achievement Award, 1990

Special Commendation for Exemplary Performance, 1973 Flood Fighting Operations, Chief of Engineers, 1973

Adopted Suggestion, 1974

Sustained Superior Performance Awards: 1976, 1980

Significant Accomplishment Awards: 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989

Quality Step Increases: 1993, 1994

Letters of Commendation:

District Engineer, Vicksburg District, 1970
District Engineer, Vicksburg District, 1971
Division Engineer, Lower Mississippi Valley Division, 1974
Director, Waterways Experiment Station, 1975
Commander and Director, Waterways Experiment Station, 1978
District Engineer, Norfolk District, 1981
District Engineer, Savannah District, 1982
Executive Director, Society of American Military Engineers, 1983
Chief of Engineers, 1983
Maryland Environmental Service, 1984

Chief, Dredging Division, Water Resources Support Center, 1985
Chief, WES Environmental Laboratory, 1985
District Engineer, Seattle District, 1985
Director, Water Resources Support Center, 1986
District Engineer, Seattle District, 1986
Division Engineer, North Pacific Division, 1986
Division Engineer, North Pacific Division, 1987
District Engineer, San Francisco District, 1988
Sacramento District, 1988
National Research Council, 1988
Chief, WES Hydraulics Laboratory, 1990
Environmental Protection Agency, Region I, 1990
HQ US Army Corps of Engineers, 1990
HQ Environmental Protection Agency, 1990
HQ US Army Corps of Engineers, 1991
HQ US Army Corps of Engineers, 1992
HQ US Army Corps of Engineers, 1993
Asst Director, R&D, HQ US Army Corps of Engineers, 1993
Executive Secretary, Coastal Engineering Research Board, 1993
EPA Office of Emergency and Remedial Response, 1996
Black and Veatch, 1996
District Engineer, Norfolk, 1996
Director of Civil Works, 1998
USACE Project Delivery Team Excellence Award, 2001.

8. New designs, techniques, inventions, or patents etc. that advance the state of the art in areas of specialization:

Developed techniques for restoration of capacity of dredged material disposal sites through beneficial uses of dredged material.

Developed engineering design guidelines for marsh creation using dredged material.

Developed concepts and approaches for management of confined dredged material disposal sites to increase capacity by dewatering and consolidation.

Developed technique and laboratory test protocol for predicting the chemical quality of effluent discharged from confined dredged material disposal areas.

Developed techniques for design of dredged material disposal areas for solids retention and initial storage.

Responsible for developing comprehensive engineering design guidance for dredging and dredged material disposal in the Corps Engineer Manual 1110-2-5020 series.

Principal on team that developed the Corps Management Strategy and Decision Making Framework for disposal of contaminated sediments.

Principal on team that developed technical guidance for implementation of Corps regulatory programs for dredged material disposal (ocean and U.S. waters).

Developed USACE technical guidance for subaqueous capping of contaminated dredged material.

Developed engineering design sequence for wetland enhancement and restoration projects.

Developed EPA technical guidance for in-situ capping of contaminated sediments.

9. Known projects/investigations, etc. that other researchers are conducting that are the result of my work:

Use of elutriate test procedures for prediction of contaminant release due to dredgehead operation.

Development of expert systems for dredging design applications under the Automated Dredging and Disposal Alternatives Management System (ADDAMS).

Development of comprehensive management and decisionmaking strategies for dredging and disposal of contaminated and non-contaminated sediments.

Development of wetland engineering guidance for substrate development, hydrology and vegetation establishment and computer-assisted procedures for wetland restoration projects.

10. Narrative description of significant examples of team work.

A. Within the laboratory community.

1974-1982. WES team leader for development of techniques for evaluation of dredged material consolidation and dewatering processes. These efforts involved coordination and technical supervision of teams from WES Geotechnical Laboratory and Environmental Laboratory.

1983-1986. Provided technical supervision for research and field studies on sediment resuspension characteristics of dredges. This study involved field monitoring teams from the WES Hydraulics and Environmental Laboratories.

1985-1986. Co-developer of Management Strategy for Disposal of Dredged Material. Technical team was composed of representatives for all Environmental Laboratory Divisions.

1985-1987. WES PI and study manager for Everett Homeport project for U.S. Navy, involving evaluation of open water capping and confined disposal alternatives for contaminated sediments. Study team composed of representatives from Environmental, Hydraulics, and Geotechnical Laboratories.

1986 to 1994. WES PI for subaqueous capping task area of the Dredging Research Program. This effort was managed by the Coastal Engineering Research Center and involved cooperative work with CERC researchers.

1990-1992. WES PI for Long Term Management Strategy for US Navy in lower Chesapeake Bay. Study involved EL and CERC researchers.

1991 to 1994. Acting as WES PI for Wetlands Engineering work unit of the WRP, providing technical supervision of research tasks performed by HL, GL, and EL researchers.

1992 to 1995. WES PI and Study Manager for Montrose Sediment Remediation project. Providing technical coordination and supervision of a team of over 15 WES engineers and scientists from EL, HL, CERC, and GL.

1994 to present. WES PI and Study Manager for Montrose In-Situ Capping studies in support of EPA Superfund program. Providing technical coordination and supervision of a team from EL, CHL, and GL.

1995 to 1999. WES Technical Team Leader for studies in support of the Dredged Material Management Plan for the Port of New York and New Jersey. Providing technical coordination and supervision of a research team from EL, CHL, and GL.

1997 to present. Focus Area Manager for Contaminated Sediments research under the Dredging Operations and Environmental Resarch (DOER) program.

1997. Study team member for USACE R&D Return on Investments (ROI) study, with team members from WES, Construction Engineering Research Laboratory, Cold Regions Research and Engineering Laboratory, and Topgraphic Engineering Center.

B. Outside the laboratory community

1991-1992. Chairman for EPA/USACE workgroup on development of the Technical Framework for Environmental Evaluation of Dredged Material Management Alternatives. This workgroup was composed of representatives of several EPA HQ offices, EPA Regions, USACE HQ, and USACE Divisions and Districts.

1994 to 1997. WES PI for EPA research on guidelines for in-situ capping as a remediation technique for contaminated sediments. Providing technical coordination and supervision of a research team from Lousiana State University and WES.

1997-1998. Member of Permanent International Association of Navigation Congresses, Permanent Environmental Committee Working Group PEC1, responsible for development of international guidelines for management of open water placement of dredged material.

1998. Manager for study of disposal alternatives development for Multiple User Disposal Site (MUDS) study funded by the State of Washington through the USACE Seattle District, involving efforts by Washington Dept of Ecology, private consultants, and Washington Ports Association.

Current. Member of Permanent International Association of Navigation Congresses, Permanent Environmental Committee Working Group PEC5, responsible for development of international guidelines for confined (diked) dredged material disposal.

Current. Chairman of EPA Contaminated Aquatic Sediments Remedial Guidance Workgroup, Subaqueous Capping Subgroup, responsible for development of implementing guidance for Superfund remedial project managers.

11. Professional Publications:

A. Refereed journal/textbook publications: 22
B. Proceedings of conferences and symposia:
(1) Refereed: 31
(2) Others: 32
C. All other professional publications:
(1) WES/ ERDC publications: 65
(2) Others: 25

Total publications: 175

A. Refereed publications in journals of professional societies, textbook chapters, etc:

Miller, J.L., Palermo, M.R., and Groff, T.W. 2001. "Hopper Overflow Characteristics for the Delaware River," Journal of Dredging Engineering, Western Dredging Association, Vol 3, No. 1, March 2001.

Olin-Estes, T.J. and Palermo, MR. 2001. "Recovery Of Dredged Material For Beneficial Use: The Future Role Of Physical Separation Processes," Journal of Hazardous Materials, 85 (2001) pp39-5, Elsevier.

Palermo, M.R. 2000. "Disposal and Placement of Dredged Material," In Herbich, J.B. (editor). *Handbook of Coastal Engineering*. McGraw Hill. New York, N.Y. ISBN 0-07-134402-0.

Palermo, M.R. 2000. "Subaqueous Capping of Contaminated Sediment," In Herbich, J.B. (editor). *Handbook of Coastal Engineering*. McGraw Hill. New York, N.Y. ISBN 0-07-134402-0.

Palermo, M.R. 1998. "Design Considerations for *In-Situ* Capping of Contaminated Sediments," Water Science and Technology, Vol. 37, No. 6-7, pp. 315-321.

Ling, H.I., Leshchinsky, D., Gilbert, P.A., and Palermo, M.R. 1996. "In-Situ Capping of Contaminated Submarine Sediments: Geotechnical Considerations," Proceedings of the Second International Congress of Environmental Geotechnics, IS-Osaka '96, Osaka, Japan, published in Environmental Geotechnics, edited by Masashi Kamon, A.A. , 1996, Balkem, Rotterdam, The Netherlands, pp 575-580.

Palermo, M.R. and Clausner, J.N. 1996. "Concepts for Sediment Remediation on the Palos Verdes Shelf, California," Remediation- The Journal of Environmental Cleanup Costs, Technologies, and Techniques, Vol. 6, No. 4, Autumn 1996, John Wiley and Sons, Inc.

Palermo, M.R. and Miller, J.A. 1995. "Strategies for Management of Contaminated Sediments," in Dredging, Remediation, and Containment of Contaminated Sediments", edited by Demars, K.R., Richardson, G.N., Yong, R.N. and Chaney, R.C., American Society of Testing and Materials (ASTM) Special Technical Publication 1293, ASTM, Philadelphia, PA.

Palermo, M.R. 1994. "Technical Framework for Environmental Evaluation of Dredged Material Management Alternatives," World Dredging and Marine Construction, January 1994.

Palermo, M.R., Engler, R.M. and Francingues, N.R. 1993. "The U.S. Army Corps of Engineers Perspective on Environmental Dredging," Buffalo Environmental Law Journal, Vol. 1, Fall 1993, No. 2., Buffalo, N.Y.

Thackston, E.L. and Palermo, M.R. 1992. "Predicting Effluent PCB's from Superfund Site Dredged Material," Journal of Environmental Engineering, American Society of Civil Engineers, Vol. 118, No. 5, September/October, 1992.

Palermo, M.R. 1992. "Long Term Storage Capacity of Confined Disposal Facilities," Chapter 8, Handbook of Dredging Engineering, McGraw Hill.

Palermo, M.R. and Hayes, D.F. 1992. "Environmental Effects of Dredging," Vol. 3, Chapter 15 of Handbook of Coastal and Ocean Engineering, Gulf Publishing Company, Houston, Texas.

Palermo, M.R. 1992. "Dredged Material Disposal," Vol. 3, Chapter 6 of Handbook of Coastal and Ocean Engineering, Gulf Publishing Company, Houston, Texas.

Engler, R.M., Francingues, N.R., and Palermo, M.R. 1991. "Managing Contaminated Sediments: Corps of Engineers Posturing to Meet the Challenge," World Dredging and Marine Construction, August 1991.

Palermo, M.R. 1991. "Equipment Choices for Dredging Contaminated Sediments," Remediation - The Journal of Environmental Cleanup Costs, Technologies, and Techniques, Executive Enterprises Co. Inc., New York, NY, Autumn 1991.

Palermo, M.R. 1989. "Corps of Engineers Manual Series on Dredging and Dredged Material Disposal," World Dredging and Marine Construction, July/August 1989.

Palermo, M.R. and Thackston, E.L. 1988. "Verification of Predictions of Dredged Material Effluent Quality," Journal of Environmental Engineering, American Society of Civil Engineers, Vol 114, No. 6, December 1988.

Palermo, M.R. and Thackston, E.L. 1988. "Test for Dredged Material Effluent Quality," Journal of Environmental Engineering, American Society of Civil Engineers, Vol 114, No. 6, December 1988.

Palermo, M.R. and Thackston, E.L. 1988. "Flocculent Settling Above the Zone Settling Interface," Journal of Environmental Engineering, American Society of Civil Engineers, Vol 114, No. 4, August 1988.

Palermo, M.R. 1984. "Technique Developed for Prediction of Effluent Quality for Confined Disposal Areas," World Dredging and Marine Construction, May 1984.

Palermo, M. R., Montgomery, R. L., and Raymond, G. L. 1983. "Techniques for Reducing Contaminant Release During Dredging Operations," Proceedings, Integration of Ecological Aspects in Coastal Engineering Projects, Rotterdam, the Netherlands.

B. Publications in proceedings of professional conferences and/or symposia:

(1) Refereed conference/ proceedings papers:

Palermo, M.R. and J.R. Wilson. 2000. "Corps of Engineers Role In Contaminated Sediment Management And Remediation," Proceedings, American Bar Association, Section of Environment, Energy, and Resources, Panel on Contaminated Sediments: Science, Law, and Politics, 8th Section Fall Meeting, 22 September, 2000, New Orleans, Louisiana.

Palermo, M.R., Ebersole, B. and Peyman-Dove, L. 1998. “Siting of Island CDF and CAD Pit Options For The Port of New York/ New Jersey” , Proceedings, Fifteenth World Dredging Congress, Las Vegas, NV, June 28-July 2, 1998.

Thackson, E.L, and Palermo, M.R. 1998. “Improved Methods for Correlating Turbidity and Suspended Solids for Dredging and Disposal Monitoring” , Proceedings, Fifteenth World Dredging Congress, Las Vegas, NV, June 28-July 2, 1998.

Palermo, M.R. and Wilson, J. 1997. “Dredging State of the Practice: Corps of Engineers Perspective,” *Proceedings, Geologan 97, The First National Conference of the Geo-Institute, Logan, Utah, July 15-19, 1997*, American Society of Civil Engineers, New York, New York.

Risko, A.J., Randall, R.E., and Palermo, M.R. 1995. "Modeling Placement and Stability of Subaqueous Capped Contaminated Dredged Sediments within Santa Monica Bay, California," Proceedings of the 14th World Dredging Congress, World Organization of Dredging Associations, Amsterdam, The Netherlands, November 1995.

Landin, MC., Palermo, M.R., Patin, T.R., Clarke, D.G., and Davis, J.E. 1995. "Environmental Restoration and Habitat Development using Dredged Material in U.S. Waters," Proceedings of the 14th World Dredging Congress, World Organization of Dredging Associations, Amsterdam, The Netherlands, November 1995.

Palermo, M.R. and Vogt, C. 1995. "U.S. Guidelines for Environmental Evaluation of Dredged Material Disposal Alternatives," Proceedings of the 14th World Dredging Congress, World Organization of Dredging Associations, Amsterdam, The Netherlands, November 1995.

Loglgian, J.M., Dudek, E.A, and Palermo, M.R. 1994. "Design of Dredge Containment and Dewatering Facilities for Marathon Battery Superfund Project," Proceedings of Dredging 94, The Second International Conference and Exhibition on Dredging and Dredged Material Placement, American Society of Civil Engineers, Lake Buena Vista, FL.

Francingues, N.R. and Palermo, M.R. 1994. "Technical Guidelines for Dredged Material," Proceedings of Dredging 94, The Second International Conference and Exhibition on Dredging and Dredged Material Placement, American Society of Civil Engineers, Lake Buena Vista, FL.

Palermo, M.R., Fischenich, C.J., Dardeau, E.A., and Zappi, P. 1994. "Guidance for Wetland Restoration with Dredged Material," Proceedings of Dredging 94, The Second International Conference and Exhibition on Dredging and Dredged Material Placement, American Society of Civil Engineers, Lake Buena Vista, FL.

Palermo, M.R., 1994. "Placement Techniques for Capping Contaminated Sediments," Proceedings of Dredging 94, The Second International Conference and Exhibition on Dredging and Dredged Material Placement, American Society of Civil Engineers, Lake Buena Vista, FL.

Palermo, M.R., Engler, R.M. and Francingues, N.R. 1992. "Corps of Engineers Perspective on Environmental Dredging," Proceedings of International Symposium on Environmental Dredging, Buffalo, NY, 30 Sep-3 Oct 1992.

Hayes, D.L., and Palermo, M.R. Engineering Aspects of Wetland Design," 1992. Proceedings of the Water Resources Sessions at Water Forum 92, American Society of Civil Engineers, 2-6 August, 1992.

Palermo, M.R., Lee, C.R., and Francingues, N.R. 1989. "Management Strategies for Disposal of Contaminated Sediments," Contaminated Marine Sediments - Assessment and Remediation, Marine Board, National Research Council, National Academy Press, Washington, D.C.

Palermo, M.R. 1989. "Capping Contaminated Dredged Material in Deep Water," Proceedings of the Specialty Conference Ports 89, American Society of Civil Engineers, Boston MA.

Payonk, P.M. and Palermo, M.R. 1989. "Clamshell Dredging and Overflow Monitoring," Proceedings of the WODCON XII, Dredging: Technology, Environmental, Mining, World Dredging Congress, Orlando, FL., 2-5 May 1989.

Palermo, M.R. and Randall, R.E. 1989. "Practices and Problems Associated with Economic Loading and Overflow of Hoppers and Scows," Proceedings of the WODCON XII, Dredging: Technology, Environmental, Mining, World Dredging Congress, Orlando, FL., 2-5 May 1989.

Thackston, E.L. and Palermo, M.R. 1988. "A Procedure for Predicting Pollutant Concentrations in the Effluent from Confined Dredged Material Disposal Areas," Heavy Metals in the Hydrologic Cycle, Proceedings of the Conference on Chemicals (Heavy Metals) in the Environment, Lisbon Portugal.

Payonk, P.M., Palermo, M.R., and Teeter, Allen M. 1988. "Clamshell Dredging and Overflow Monitoring, Military Ocean Terminal, Sunny Point, N.C.," Proceedings of the Symposium on Coastal Water Resources, American Water Resources Association, Wilmington, NC, May 22-25, 1988.

Malek, J. and Palermo, M.R. "Application of a Management Strategy for Dredging and Disposal of Contaminated Sediments to Proposed U.S. Navy Homeport Project at East Waterway," Proceedings of Coastal Zone 87, Fifth Symposium on Coastal and Ocean Management, Seattle, WA., May 26-29, 1987.

Palermo, M.R., Francingues, N.R., Lee, C.R., and Peddicord, R.K. 1986. "Evaluation of Dredged Material Disposal Alternatives: Test Protocols and Contaminant Control Measures," Proceedings of the WODCON XI, World Dredging Congress, Brighton, UK.

Hummer, C.W., Greener, G.E., and Palermo, M.R. 1984. "The National Dredging Data Management System," Proceedings of the Specialty Conference Dredging 84, American Society of Civil Engineers, Clearwater, FL.

Thackston, E.L., Montgomery, R.L., and Palermo, M.R. 1984. "Settling of Dredged Material Slurries," Proceedings of the Specialty Conference Dredging 84, American Society of Civil Engineers, Clearwater, FL.

Francingues, N.R. and Palermo, M.R. 1984. "Management Strategy for the Disposal of Dredged Material," Proceedings of the Specialty Conference Dredging 84, American Society of Civil Engineers, Clearwater, FL.

Palermo, M. R. 1984. "Design of Confined Disposal Areas for Retention of Contaminants," Proceedings of the Specialty Conference Dredging 84, American Society of Civil Engineers, Clearwater, FL.

Palermo, M. R., Montgomery, R. L., and Raymond, G. L. 1983. "Techniques for Reducing Contaminant Release During Dredging Operations," Proceedings, Integration of Ecological Aspects in Coastal Engineering Projects, Rotterdam, the Netherlands.

Palermo, M. R. 1981 "A Management Plan for Craney Island Disposal Area," Proceedings of the Specialty Conference Water Forum 81, American Society of Civil Engineers, San Francisco, CA.

Patin, T. R., and Palermo, M. R. 1981. "Productive Uses of Dredged Material," Proceedings of the Specialty Conference Water Forum 81, American Society of Civil Engineers, San Francisco, CA.

Palermo, M. R. 1980. "Long Term Storage Capacity of Dredged Material Containment Areas," Proceedings of WODCON IX, World Dredging Congress, Vancouver, British Columbia, Canada.

Montgomery, R. L., and Palermo, M. R. 1976. "First Steps Toward Disposal Area Reuse," Proceedings of the Specialty Conference on Dredging and Its Environmental Effects, American Society of Civil Engineers, January 1976, Mobile, AL.

(2) Other conference/ proceedings papers:

Palermo, M.R., F. Schauffler, T. J. Fredette, J. Clausner, S. McDowell, and E. Nevarez. 2001. Palos Verdes Shelf Pilot Capping: Description and Rationale. Proceedings, 21st Annual Meeting of the Western Dredging Association (WEDA XXI) and 33rd Annual Texas A&M Dredging Seminar, Houston, TX.

Peddicord, R., J. Brannon, T. Bridges, J. Cura, R. Engler, C. Lee, M. Palermo, C. Price, R. Price, R. Schroeder, J. Simmers, H. Tatem, and J. Wilson. 2000. "Evaluation of Dredged Material Proposed for Placement in Upland Sites," Proceedings, Western Dredging Association 20th Technical Conference and 32nd Annual Texas A&M Dredging Seminar, June 25-28, 2000, Warwick, Rhode Island.

Palermo, M. and D. Averett. 2000. "Summary of Constructed CDF Containment Features for Contaminated Sediments," Proceedings, Western Dredging Association 20th Technical Conference and 32nd Annual Texas A&M Dredging Seminar, June 25-28, 2000, Warwick, Rhode Island.

Kennish R, Clarke SC, Land JM, Palermo MR, Tso SF (2000). Options for meeting Hong Kong's future contaminated marine sediment disposal needs. Proceedings of the ISWA International Symposium and Exhibition on Management in Asian Cities, Hong Kong, China, Volume 2 189-195.

Palermo, M. 1999. "Sizing Of Constructed Cad Pits For Lower New York Bay," Proceedings of the Western Dredging Association 19th Technical Conference and 31th Annual Texas A&M Dredging Seminar, May 16-20, Louisville, KY.

Palermo, M.R. 1998. "In-Situ Capping of Contaminated Sediment - Overview and Case Studies," Proceedings, National Conference on Management and Treatment of Contaminated Sediments, EPA/625/R-98-001, U. S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Palermo, M.R., Francingues, N.R. and Averett, D.E. 1998. "Environmental Dredging and Disposal - Overview and Case Studies," Proceedings, National Conference on Management and Treatment of Contaminated Sediments, EPA/625/R-98-001, U. S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Francingues, N.R., Palermo, M.R., Averett, D.E., and Engler, R.M. 1998. "Corps of Engineers Research Programs on Contaminated Sediments," Proceedings, National Conference on Management and Treatment of Contaminated Sediments, EPA/625/R-98-001, U. S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Palermo, M.R. 1997. "Contained Aquatic Disposal of Contaminated Sediments in Subaqueous Borrow Pits," Proceedings of the Western Dredging Association 18th Technical Conference and 30th Annual Texas A&M Dredging Seminar, June 29-July 2, 1997, Charleston, S.C.

Palermo, M.R. 1997. "Recent Case Studies on Subaqueous In-Situ Capping of Contaminated Sediment," Proceedings of the 18th U.S. Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, 5-7 November, 1997, Kobe, Japan.

Palermo, M.R. 1997. "Options for Remediation of DDT Contaminated Sediments on the Continental Shelf," Proceedings of the 18th U.S. Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, 5-7 November, 1997, Kobe, Japan.

Palermo, M.R. 1997. "Corps of Engineers Dredged Material and Contaminated Sediments Research," Proceedings of the 18th U.S. Japan Experts Meeting on Management of Bottom Sediments Containing Toxic Substances, 5-7 November, 1997, Kobe, Japan.

Palermo, M.R. 1996. “Design and Operation of Dredged Material Containment Islands,” Proceedings of the Western Dredging Association Sixteenth Technical Conference, June 11-14, 1996, New Orleans, LA.

Palermo, M.R. 1995. "Development of U.S. Army Corps of Engineers Guidance for Wetlands Engineering," in Technical Report WRP-RE-8, Proceedings of the National Wetlands Engineering Workshop, St. Louis Missouri, 3-5 August 1993, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Ling, H.I., Leshchinsky, D., Gilbert, P.A., and Palermo, M.R. 1995. "Geotechnical Considerations Related to In-Situ Capping of Contaminated Submarine Sediments," Proceedings of the Western Dredging Association Sixteenth Technical Conference, Twenty-Eighth Annual Texas A&M Dredging Seminar and University of Wisconsin Sea Grant Dredging Workshop , May 23-26, 1995, Minneapolis MN.,CDS Report No. 343, Center for Dredging Studies, Texas A&M University, College Station, TX.

Palermo, M.R. 1995. "Considerations for Disposal of Dredged Sediments in Solid Waste Landfills," Proceedings of the Western Dredging Association Sixteenth Technical Conference, Twenty-Eighth Annual Texas A&M Dredging Seminar and University of Wisconsin Sea Grant Dredging Workshop , May 23-26, 1995, Minneapolis MN.,CDS Report No. 343, Center for Dredging Studies, Texas A&M University, College Station, TX.

Palermo, M.R. 1994. "Options for Submerged Discharge of Dredged Material," Proceedings of the 25th Dredging Seminar and Western Dredging Association XIII Annual Meeting, May 18-20, 1994, San Diego, CA.

Palermo, M.R., 1994. "Environmental Framework for Dredged Material Management," Southern States Environmental Conference, Biloxi, MS.

Palermo, M.R. 1993. "Wetlands Engineering Design Procedures" Proceedings of the Society of Wetland Scientists Annual Meeting, New Orleans, LA.

Palermo, M.R., Mathis, D., Wilson, J., Southerland, B, Chase, T., and Cunniff, S. 1993. "Joint USACE/EPA Guidance Documents for Dredged Material," Proceedings of the Twenty-Sixth Annual Dredging Seminar and Western Dredging Association XIV Annual Meeting, May 25-28, 1993, Atlantic City, New Jersey.

Palermo, M.R. 1992. "An Update of Dredged Material Capping Experiences in the U.S.," Management of Bottom Sediments Containing Toxic Substances, Proceedings of the Fourteenth U.S./Japan Experts Meeting, Yokohama, Japan.

Palermo, M.R. 1992. "Design Procedure for Capping Contaminated Sediments," Proceedings of the Twenty-Fifth Annual Dredging Seminar and Western Dredging Association XIII Annual Meeting, May 26-29, 1992, Mobile AL, CDS Report No. 323, Center for Dredging Studies, Texas A&M University, College Station, TX.

Engler, R.M., Francingues, N.R., and Palermo, M.R. 1991. "Dredging as a Tool in Managing Contaminated Sediments: Capabilities, Authorities, and Responsibilities," Proceedings of the 24th Dredging Seminar and Western Dredging Association XII Annual Meeting, Texas A&M University, May, 1991, Las Vegas, NV.

Palermo, M.R. and Thackston, E.L. 1990. "Confined Disposal Area Effluent Quality for New Bedford Superfund Pilot Dredging," Coastal and Inland Water Quality, Seminar Proceedings No. 22, Committee on Water Quality, U.S. Army Corps of Engineers, Eighth Seminar, 6-7 February 1990.

Palermo, M.R., and Randall, R.E. 1988. "Hopper Loading and Overflow Characteristics for Saginaw River, Michigan," Proceedings of the 21st Dredging Seminar, Center for Dredging Studies, Texas A&M University, 20-21 October, 1988, Metarie, LA.

McLellan, T.N., Truitt, C.L, and Palermo, M.R. 1986. "Evaluation of the Matchbox Dredgehead and Submerged Diffuser," Proceedings the Nineteenth Dredging Seminar, Center for Dredging Studies, Texas A&M University, 15-17 October 1986, Baltimore, MD.

Palermo, M.R. 1984. "Prediction and Field Evaluation of the Water Quality of Effluent from Confined Disposal Areas," Proceedings of the US- Netherlands Meeting on Dredging and Related Technology, Charleston, SC.

Palermo, M. R. 1983. "Effluent Water Quality Studies, Craney Island Disposal Area, Norfolk, Virginia," Proceedings, Port Deepening and the Beneficial Use of Dredged Materials, Old Dominion University, Norfolk, VA.

Palermo, M. R. 1982. "Management of Large Confined Disposal Areas to Increase Storage Capacity," Proceedings of the First U.S./Dutch Memorandum of Understanding, U.S. Army Engineer Waterways Experiment Station, 10-14 September, 1984, New Orleans, LA.

Palermo, M. R. 1981. "Contaminants in Disposal Area Effluents - Problem Identification and Proposed Rationale," Proceedings of the 14th Dredging Seminar, Center for Dredging Studies, Texas A&M University, October 1982, New Orleans, LA.

Palermo, M. R. 1980. "New Developments in Disposal Area Design," Proceedings of the Seminar Dredging Technology in the 80's, Old Dominion University, Norfolk, Va.

Palermo, M. R., and Montgomery, R. L. 1976. "A New Concept in Dredged Material Disposal," Proceedings of the Eighth Dredging Seminar, Center for Dredging Studies, Texas A&M University, December 1976, College Station, TX.

C. All other professional publications:

(1) Waterways Experiment Station (WES) and Engineer Research and Development Center (ERDC) publications:

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