

UNITED STATES OF AMERICA
BEFORE THE
DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Millennium Pipeline Company, L.P.,)
)
 Appellant,)
)
 v.)
)
 State of New York, Department of State,)
)
 Respondent.)

AFFIDAVIT OF
SUSAN G. METZGER

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

SUSAN METZGER, being duly sworn, deposes and says as follows:

1 I am a Senior Scientist at Lawler, Matusky & Skelly Engineers, LLP (“LMS”). In that position, I provide in-house technical consultation on large-scale environmental projects, special studies, and research and development programs. I have also served as principal in charge and project manager on projects related to dredging and habitat restoration, including in the Hudson River. I have been employed with LMS for approximately 26 years. During that time, I also held the position of Project Manager of the Environmental Sciences Group. In that position, my responsibilities included, among other things; (1) coordinating and supervising activities of a staff of environmental scientists and engineers as principal of the firm and manager of LMS’s Environmental Sciences Group; (2) managing studies and preparing environmental analyses; (3) preparing comprehensive assessments of biological and water quality impacts associated with various activities, such as dredging, consumptive and nonconsumptive water withdrawal, discharges of permitted effluents containing conventional

and priority pollutants, and habitat disruption associated with construction of sewage treatment plants, power plant siting, and residential developments; and (4) developing procedures and programs to mitigate the loss of fish and pelagic organisms, benthic habitats, and both freshwater and saltwater wetlands. I also have extensive experience in New York Harbor fisheries, benthic, sediment, and water quality studies. The New York Harbor studies under my direction have included dredging and disposal permits; waterfront development; impact assessment under (NEPA), (SEQRA), (CEQRA), and Coastal Zone Management (CZM) regulations; benthic collection and identification; and impact assessments evaluating effects of shading, dredging, and pier and piling construction. A true copy of my resume is annexed hereto and incorporated herewith as Exhibit "A."

2. I make this Affidavit in response to many of the assertions set forth in the Reply Brief submitted by the New York State Department of State ("NYSDOS") in connection with this appeal. More specifically, I make this Affidavit to explain the nature of the services rendered by LMS for the Millennium Project (1) in preparing the Coastal Zone Consistency Determination documentation and (2) specifically in evaluating the Project's potential impacts on Haverstraw Bay, and the Jane E. Lyle Arboretum (the "Arboretum") (including its wetlands). The scope of our services and conclusions that we have reached (together with the supporting rationale) are summarized below. This Affidavit supplements our Coastal Zone Consistency Determination reports dated January 2001, March 2001, and July 2001, which were submitted by Millennium to the NYSDOS.

3. Particularly pertinent here is LMS's extensive collective experience in dealing with Hudson River issues, including dredging projects. Indeed, it is my understanding that Millennium retained LMS specifically because of its expertise concerning dredging, its long

history of experience with environmental issues affecting the Hudson River, and the substantial data collection and studies in which LMS has engaged respecting the Hudson.

4. More specifically respecting LMS's intimate familiarity with Hudson River issues, a major part of LMS's efforts over a span of more than 30 years has focused on projects involving the Hudson. LMS has been engaged in a variety of assignments for over 70 different clients in industry and government at a cost of more than \$100 million. LMS has produced over 300 reports and documents on the Hudson River estuary and its surroundings. These studies and our interdisciplinary approach have given LMS a thorough ecosystem-level understanding of the Hudson River. Additionally, LMS has reviewed virtually all the studies available from other investigations. These studies provide a wealth of information that can be used to characterize the biota and water/sediment quality in many areas and to provide a baseline for assessing changes that may be induced by a variety of actions.

5. Significantly, LMS has developed a Hudson River data bank that includes hundreds of reports and publications on the estuary, as well as a computerized data bank indexed with key topics such as water quality, aquatic habitat utilization, population dynamics of key species, and hydrodynamics and sedimentation patterns. The data bank was developed from data sets collected by LMS, supplemented by other investigators' data. Studies have included:

- Extensive environmental studies and analysis in connection with siting, impact assessment, preliminary design, and permitting waterfront projects, including shoreline developments, power plants, highways, etc.;
- Long-term sampling and analysis of fish populations in the Hudson River and documentation of life history characteristics of key species;

- Modeling of water quality parameters and assimilation capacity in the Hudson River and other portions of the Hudson River estuary;
- Analysis and modeling of water quality parameters, especially those of concern to aquatic life well-being and analyses of long-term trends in environmental and water quality parameters such as temperature, freshwater flow, dissolved oxygen (“DO”), salinity, and others;
- Stock-recruitment analyses based on commercial catch statistics and other indices of stock abundance to estimate compensatory reserve of fish populations in the Hudson River;
- Water supply studies directed at new source requirements, infrastructure rehabilitation, and conservation;
- Estimation of the economic value of the mid-Atlantic striped bass sport fishery;
- Analysis of the influence of environmental variables such as temperature and freshwater flow on growth and abundance of fish species in the Hudson River;
- Mathematical modeling studies of the impact of power plants on fish populations in the Hudson River; and
- Analysis of long-term trends in abundance indices of Hudson River fish populations to detect power plant impacts.

6. I emphasize LMS’s extensive experience dealing with dredging and other Hudson River issues in light of the significance of Haverstraw Bay in the NYSDOS’s consistency objection. With all due respect to the NYSDOS’s concerns, its conclusions and objection

regarding alleged ecosystem-wide effects on Haverstraw Bay are not scientifically sound and are not supported by the extensive database on Hudson River aquatic resources or the analyses conducted specifically for the Millennium Project.

7. The purpose of this Affidavit is to (1) provide necessary context by briefly recounting the basic parameters and objective of the Haverstraw Bay crossing (including the measures to which Millennium has committed to minimize adverse effects) and (2) set forth, yet again, the scientific foundation for LMS's conclusion that there will be no permanent adverse effects to the functioning of the Haverstraw Bay ecosystem. To accomplish the latter, I will address the specific contentions of the NYSDOS and our points of disagreement.

8. This Affidavit will also address wetlands and other environmental issues respecting the Arboretum.

9. In preparing this Affidavit, I have consulted with other experts at LMS in the area of fisheries (Mr. Ronald Alevras); wetlands biology/ecology (Stephen Seymour), and dredging engineering (Mr. Peter McGroddy). The resumes of these experts are attached hereto and incorporated herewith, respectively, as Exhibits "B", "C", and "D."

HAVERSTRAW BAY

Background

10. At the outset, it is necessary to describe briefly the construction methodology (including dredging, lay barge placement of pipe, and redeposition of river bottom sediments) that is proposed for the Hudson River crossing at Haverstraw Bay, as well as the restoration measures that Millennium will perform after installation of the pipeline.

The construction technique is innovative in that it retains the sediments excavated to create a trench in scows rather than side-casting the material on the river bottom as is commonly done for long water crossings. This reduces the footprint of the impact area by half

because it avoids the placement of dredged material on the river bottom adjacent to the trench and the subsequent excavation of this material to backfill the trench. The NYSDOS fails to recognize this innovation or its relationship to the magnitude of impact.

12. By retaining the sediments in scows, the construction technique reduces the turbidity and loss of sediment from the work area because the sediment is not rehandled in the water as it would be if it were side-cast. By minimizing the loss of sediments, more of the original material is returned to the excavated footprint. The lay-barge technique to place the pipe permits the installation work to be completed while involving only 1300 feet at any given time. This means that the majority of the river width is unaffected and migratory fish are provided a very large area for unobstructed movements throughout the construction period of 2 1/2 months.

13. The sediments returned to the excavated trench will require time to settle and compact, thus, initially, the bottom of the footprint would have an irregular surface (+/-1 ft). Over time, the effects of tidal flow and wind-generated wave action will smooth the surface and new sediment would be added from the load carried by the river. Because the trench is surrounded by a vast area of bottom substrate containing typical local invertebrates, the backfilled area will be rapidly recolonized. Former and existing dredging operations (channel maintenance) in Haverstraw Bay have shown this rapid recovery following dredging.

14. In this context, the flaws in the NYSDOS's analysis and conclusions are described below. First, I have presented what I believe to be material flaws in the NYSDOS's overall approach. Second, I have addressed the NYSDOS's specific allegations of permanent, significant adverse effects on the Haverstraw Bay ecosystem. The state's contentions are unsupported by the science.

General Flaws In The NYSDOS's Analysis

15. The most serious, pervasive flaw in the NYSDOS's "impact assessment" is its failure to support its claims of impact at various levels with any technical analyses. For example, the NYSDOS provides no technical support in the way of new data, new analyses of existing data, alternative interpretations of Millennium's analyses, or reliance upon ecological principles. Likewise, the NYSDOS does not identify any physical processes or biological mechanisms to support its claims of permanent impacts to physical habitat, multiyear adverse effects on fish populations or mechanisms by which pipeline effects could be extended to North Atlantic fisheries. The NYSDOS also makes no attempt to refute Millennium's position (i.e., that pipeline installation and operation will result in only temporary, spatially-limited effects) with technical arguments which address the detailed biological and ecological rationale presented by Millennium.

16. In addition, despite the NYSDOS's use of statements made by Federal resource agencies, which imply significant impacts, the NYSDOS fails to acknowledge the findings of these agencies in NOAA's Biological Opinion (Patricia Kurkel, September 14, 2001) regarding the endangered shortnose sturgeon and the evaluation of the Essential Fish Habitat (EFH) Assessments prepared by the Federal Energy Regulatory Commission ("FERC") (January 2001 and July 2002). The resource agencies did not find substantial adverse impacts to these important resources in either assessment. The species addressed in these assessments would, of course, be exposed to the same project induced disturbances that all aquatic life in the near vicinity of the pipeline installation would experience. The lack of substantial impact on these species is indicative of a small, temporary impact on habitat and aquatic life throughout the ecosystem of the Hudson River. The conclusion of no substantial adverse impact by the FERC in its assessment of endangered species and EFH is based on the same data and information that lead

to Millennium's and our conclusions in the CZM determination. The NYSDOS makes no attempt to explain the inconsistency of the agencies in these findings and the opposite conclusions presented in the agency letters, which they quote;, nor do they justify their use of the agencies' contradictory positions.

17. The NYSDOS does not identify any physical processes that would permanently alter habitat; nor do they identify biological mechanisms by which short-term disturbances and a temporary loss of benthos could be extended to multi-year effects on fish populations or an adverse impact on North Atlantic fisheries. Simply declaring that such impacts could occur does not make them a reality or even reasonably probable particularly when the resource agencies have required third party monitors throughout to construct process to assure that impacts do not occur. The basis for such claims must be grounded in a showing of how physical processes and biological mechanisms are irretrievably altered and then demonstrating how such changes would result in impacts on distant resources. This type of analysis is notably absent from the NYSDOS's submission. A wealth of information exists on physical processes and fish population dynamics for the Hudson River, but none of this has been used by the NYSDOS to support their claims.

18. In fact, the forces that control physical processes in the Hudson River, such as tidal flow, freshwater discharge, and weather, will act on the disturbances created during installation of the pipeline to return the disturbed area to its existing value as aquatic habitat. The habitat of Haverstraw Bay, which combines estuarine hydrodynamics and extensive shallows to create high biological productivity, is characterized by relatively high turbidity caused by strong winds and water flow disturbing the sediments over vast areas of the Bay.

Millennium's action represents a minor, localized disturbance, which will have no impact on the forces which control these physical processes of the Bay.

In preparing the CZM Determination, LMS addressed point by point the elements identified in the list of potential impairments to significant habitats associated with the pipeline in Haverstraw Bay.

With each element of physical process or biological activity addressed by LMS, there was a discussion of the potential interaction of pipeline construction on the process or activity and an evaluation of how the construction disturbance would influence the spatial and temporal aspects of the process or activity. While the NYSDOS has relied upon the regulations associated with the Significant Coastal Habitats to deny the action, it makes no attempt to relate the elements of its impairment test to the proposed action. Most importantly it makes no attempt to refute the point-by-point evaluation of the impairment test made by Millennium in its CZM Determination.

21. The declaration of concern for environmental impacts in letters by agency administrators is no substitute for a comprehensive assessment of the specific impairments set forth in the regulations. It is notable that the various statements made by agency administrators were not supported by a detailed assessment of the specific impairments of which the NYSDOS claims are the criteria for assessing impact. In fact, where the agencies take a technically based position (endangered species and EFH), they concur with Millennium on the significance of impact.

22. The presentation for CZM Policy 7 (page 27 of the March 2001 document) follows the elements listed in the impairment test. LMS discussed how the physical habitat would be disturbed by dredging, including the physical removal of material, the areas and

volumes involved, modeling analyses of turbidity plume distributions and how the habitat would recover, supported by studies of estuarine benthic invertebrates and fish, individual species, and the ecosystem. LMS also addressed functional activity, such as feeding, migration ,and movements; reproduction; and species interactions. The CZM assessment included endangered species and LMS provided site-specific data to THE FERC for the EFH Assessment.

The Construction Technique

23. The major innovative elements of the construction technique are discussed in paragraph 11 above. The dredging work will employ a closed bucket dredge, which is commonly used and frequently approved equipment for reducing sediment loss and turbidity during dredging. Closed bucket dredging was approved by several federal agencies as well as the NYSDOS and New York State Department of Environmental Conservation (NYSDEC) for the U.S. Gypsum access channel in Haverstraw Bay, located only a short distance from the Millennium pipeline crossing. This channel begins where the proposed Millennium route crosses the Federal navigation channel and roughly parallels the pipeline route. The permit review process for U.S. Gypsum dredging involved Federal resource agencies and the NYSDOS. The closed bucket equipment was included as a best management technique to minimize turbidity and sediment loss.

24. In addition to the use of a closed bucket dredge, dredging impacts will be minimized through the use of a seasonal window (September 1 to November 15) selected by State and Federal resource agencies, no barge overflow, a restriction on backfilling of the trench to low slack tide only, and a rigorous monitoring program, which provides NYSDEC with daily turnaround of turbidity data from field sampling.

25. In its Reply Brief, the NYSDOS cites a study (Nightingale and Simenstad 2001) which suggests a closed bucket dredge may increase the turbidity plume near the bottom in

comparison with an open bucket dredge. In the citation it provides, the study is authors indicate a need for further analyses to assess the trade-offs involved in using a tightly sealed bucket. The authors recognize that the distribution of a turbidity plume vertically and horizontally in the water column can be influenced by many factors. In their executive summary the authors state:

“The site-specific selection of dredging equipment and methods, and operational procedures, can mitigate some of the negative direct effects of dredging. For example: use of a closed or sealed bucket clamshell dredge can be used to minimize the effects of increased turbidity and contain contaminated materials.”
(Executive Summary, page 4).

26. The NYSDOS’ position neglects to acknowledge that the State had an opportunity to select the dredge bucket to be used for this project. In fact, the NYSDEC chose a closed bucket and made it a requirement of the Section 401 Water Quality Certification, as it has done for many other projects in this region. In addition, I personally attended several meetings with the NYSDOS concerning the Millennium Project. Never once did anyone from the NYSDOS object to the use of the closed bucket. In fact, they commented favorably on Millennium’s proposal to use a closed bucket for this project. As such, I am at a loss as to why they have raised this issue now.

27. A very small length of the Millennium route (185 ft) would involve blasting to remove rock, which occurs beneath the existing bottom sediments. The NYSDOS implies that the rock to be blasted is exposed on the river bottom, which would prevent a recovery of the original habitat after the rock is removed. In fact, the rock lies under a layer of fine-grained sediments similar to those throughout Haverstraw Bay. Because the river bottom surface in the area of the proposed blasting is fine-grained sediment, this material will be removed by dredging and stored in a scow. After any required blasting is completed and the pipeline is placed in the trench, the blasted rock will be back-filled to the original rock elevation, and then the sediment

would be back-filled to the original sediment elevation (+/-1 ft). This sequence of blasting activity will return the river bottom to its original bedrock and sediment, type and the area will be repopulated with the same type of organisms that used the area prior to pipeline installation. Thus, there would be no permanent change in substrate type and no expected change in the organisms that would resettle in the area.

28. Underwater blasting can be controlled and its potential impact minimized in a variety of ways. The supplemental CZM evaluation for blasting identified these techniques, which are all proven techniques in use at many blasting sites. The use of millisecond delays on charges, stemming of boreholes, and an air bubble curtain all serve to control and dissipate the energy of a blast, which reduces the area of impact to a very small zone around the blasting site. Hydroacoustic fish monitoring prior to blasting will detect the presence of significant numbers of fish and provide for an adjustment in the timing of the blast to periods when fish density is very low. Clearly, the NMFS concurs that mitigative measures will acceptably limit impacts in the event blasting is required, given that its Revised Opinion merely recommends employing particular mitigation measures and, otherwise, reaffirms the “no jeopardy” conclusion in its initial Biological Opinion.

29. Finally in respect to its generalized assertions, the NYSDOS appears confused in its discussion of functional versus designated habitat. The relationship of functional habitat to designated habitat is important to an understanding of the magnitude of impact. The NYSDOS’s description of the designated habitat in Haverstraw Bay does not say that it is the only habitat of its type, nor does it say that its value is greater than other Hudson River habitats. In fact, the designated habitat in Croton Bay, which was included in Millennium’s functional habitat area, is

characterized by the NYSDOS as having similar values as those of Haverstraw providing a “productive nursery, foraging and resting area for anadromous and resident fish species.”

30. The question of the distribution of habitats in the area encompassed by Millennium’s functional habitat was addressed directly in a study by Buckley (1979), which he found that the habitat that provides the shallow, highly productive zone of the lower Hudson River extends from Piermont Marsh to Stony Point.

31. The NYSDOS uses a designation of significant habitat complexes by the U.S. Fish and Wildlife Service (USFWS) to show that the habitat in Haverstraw Bay is significant, and it quotes the relevant discussion, which includes Haverstraw Bay (See NYSDOS Reply Brief at p. 16). In that quote, USFWS describes the entire reach from Piermont Marsh to Stony Point as having similar habitat value and makes no distinction among any of the sub-areas of this reach. This is precisely the area used by Millennium in defining its functional habitat.

32. Rather than obfuscating the overall impact as claimed by the NYSDOS, Millennium’s use of a functional habitat clarifies the spatial habitat relationships of the pipeline installation. The functional habitat analysis in the CZM is consistent with recognized estuarine values in an area with similar physical structure and water quality conditions. It should be noted that the actual habitat used by many important species, such as striped bass, blue crab, and EFH-designated species, extends well beyond the functional habitat defined by Millennium.

33. Further, regardless of which comparison is made, the foot print of the dredged area is 0.2% of designated significant habitat in Haverstraw Bay and 0.08% of the contiguous functional habitat in Haverstraw Bay, Croton Bay and Tappan Zee. The area temporarily impacted by the dredge footprint and re-suspended solids (that may be increased by up to 35 mg/l over ambient) is also small; 0.4% of functional habitat and 1.2 % of designated habitat.

The NYSDOS' Specific Allegations Impact

34. The NYSDOS' specific assertions regarding impacts to Haverstraw Bay are set forth on pages 69-91 of its Reply Brief. The NYSDOS raises issues respecting (1) the pipeline footprint, alleging "habitat fragmentation;" (2) long-term physical effects; (3) long-term biological effects; (4) irreparable ecosystem-wide effects from blasting; and (5) cumulative adverse effects to Haverstraw Bay. The NYSDOS thus concludes that construction and operation of the pipeline will destroy or significantly impair the functioning of the Haverstraw Bay ecosystem. As set forth below, the State's allegations of significant impact are unsupported, and its conclusion respecting significant harm is inaccurate.

35. In attacking Millennium's use of footprint size, the NYSDOS is both misguided and inconsistent. The spatial relationship of the pipeline footprint to the overall habitat is a fundamental component of the assessment because it establishes, in quantitative terms, the size of the area over which direct impacts will occur and provides a basis for evaluating the magnitude of impact. Organisms distribute themselves in space (the habitat) according to their life history needs and the productivity of the habitat. Because spatial distribution is a basic feature of animal populations, it is appropriate to attempt to relate the impact area to a definable area of habitat. In this case, the NYSDOS defined the area in its formal designation, and throughout its briefs it frequently refers to one of the most important features of the habitat-its size. The NYSDOS attempts to characterize the size of the pipeline footprint in terms of football fields (incorrectly calculating the acreage of a football field I might add). The NYSDOS clearly recognizes the relevance of spatial relationships but refuses to use the obvious and scientifically relevant comparison, which is to the habitat area they designated.

36. Also incorrect is the NYSDOS's "habitat fragmentation" theory. The NYSDOS characterizes the pipeline installation as an impact that would fragment Haverstraw Bay into two

halves, which in some way would result in a major loss in productivity and habitat value. In making this characterization, it references landscape (terrestrial) ecology and inappropriately attempts to apply the concepts of terrestrial ecology (e.g., “patchiness” and “edge effects”). As with all of its positions, the NYSDOS provides no technical support for the transfer of a terrestrial habitat concept to an aquatic environment, nor does it show how the pipeline footprint would represent a change in habitat that would influence habitat selection by aquatic life.

37. In terrestrial habitats, fragmentation occurs because some organisms do not readily cross a break in habitat or cannot use a preferred habitat type that is close to the edge where the preferred habitat abuts a different kind of habitat. An important aspect of habitat fragmentation is its effects on the movements of various types of organism groups, some of which cannot readily move across barriers, such as major highways separating forest habitats. The footprint will return to its existing bathymetry and will be recolonized by organisms similar to those living in the sediments today. There will be no structure blocking the river flow, tides or movement of pelagic organisms in the vast water column above the bay bottom that which would negate the application of fragmentation to Haverstraw Bay. Migratory fish pass through the full length of the Hudson Estuary millions during both upstream and downstream migrations. During these migrations, they pass through large areas of modified physical habitat, particularly deep navigation channels, which generally are in the middle of the channel. These widespread trenches in the Hudson Estuary are obviously not a barrier to fish movements. Many common species in the Hudson freely use the channels as habitat, and there is no evidence that the channels prevent fish from moving from one side of the river to the other. The navigation channel in Haverstraw Bay predates the designation of the Bay as significant habitat, but now the

channel is recognized as wintering habitat for a number of species, an important component of the habitat.

The NYSDOS misrepresents the dredging process by stating that up to 2600 ft of trench length would be active at any given time. From this misinterpretation, it is obvious that the NYSDOS does not understand the construction plan. There is no plan to operate multiple dredges, and the backfilling will be restricted to the placement window of 1 hour on either side of low stack tide as defined in the Section 401 Water Quality Certificate (WQC).

The NYSDOS cites a study that shows a turbidity plume from bucket dredging extending beyond the plume limits defined in the WQC for the Millennium Project. It fails to recognize that turbidity plume distributors are very site specific, neither does it reference the review of Millennium's plume modeling conducted by the U.S. Army Corps of Engineers (USACE), which shows the plume will be confined within specified limits and represents a conservative assessment of plume distribution. The NYSDOS's use of inflated values for the construction activity area and turbidity plume are an obvious, but incorrect, attempt to overstate the instantaneous effects of the pipeline installation the NYSDOS questions the science underlying the position that Haverstraw Bay possesses high productivity but low diversity and is relatively uniform spatially, leading to a conclusion that the impact of the Millennium Project would be ecologically insignificant.

40. The NYSDOS questions the science underlying the position that Haverstraw Bay possesses high productivity but low diversity and is relatively uniform spatially leading to a conclusion that the impact of the Millennium Project would be ecologically insignificant. The NYSDOS is particularly troubled by the phrase "high productivity, low diversity, spatially uniform" and question this characterization given the current scientific understanding of the Bay.

The high productivity and low diversity are characterizations found in its own descriptions of significant habitats in the tidal portion of the Hudson River (Hudson River Significant Tidal Habitats: A guide to the functions, values, and protection of the River's Natural Resources," prepared by New York State Department of State, Division of Coastal Resources and Waterfront Revitalization and the Nature Conservancy, March 1990). The characterization of a spatially uniform habitat stems from the acknowledged broad expanse of shallow habitat in Haverstraw Bay. Our personal experience, over decades of work in this area, has confirmed the uniformity of the habitat in Haverstraw Bay. In fact, in response to a request of the NYSDOS for this project, we conducted a diver survey of the proposed pipeline route, which further confirmed the uniformity of the habitat.

41. Because the habitat has low diversity, there is a large amount of habitat similar to the area that will be temporarily disturbed by pipeline installation. This means the pipeline installation disturbs a very small area of a very large area with similar biological resources. This small area impact, in combination with the rapid recovery of the habitat following pipeline installation, leads to the conclusion of no significant ecosystem impacts.

42. The support claimed by the NYSDOS from Federal resource agencies is addressed in paragraph 13 above. The letters quoted by the NYSDOS do not represent their agencies' official positions. The agency positions regarding the most important fish resources are contained in the findings the agencies submitted to the FERC regarding endangered species and EFH as part of the official Federal review process.

43. With regard to scars left on the bottom of the Hudson from other pipeline crossings, the NYSDOS cites a study that shows these scars. The NYSDOS fails to compare the method of installation of this pipeline to the techniques proposed by Millennium and fails to

acknowledge how differing techniques strongly influence the recovery of bottom habitat. The upriver pipeline crossing was installed with additional rock ballast layered over the pipeline. This rock ballast was detected in the river bottom surveys. Millennium will jacket the pipeline in concrete and bury the pipeline at a sufficient depth so that no additional ballast is needed on the substrate surface. This obvious difference in construction techniques leads to the NYSDOS's inappropriate comparison of the two pipelines. Millennium also has agreed to bury the pipeline with additional cover, in particular in the navigation channel, in order to prevent damage from anchor drag. Thus, rock ballast or concrete mats over the pipeline are not necessary for mechanical protection. The existing soft sediments can be replaced.

44. In pages 78-82 of its Reply Brief, the NYSDOS asserts that significant, long-term biological effects will result and states that Millennium's claim of short-term spatially limited impact "could not be further from the truth."

45. Based on the numerous studies, ample data, and a rigorously designed construction technique Millennium's conclusions that impacts will be localized, short-term and of no ecological/ecosystemwide import are firmly supported.

46. The NYSDOS's claim of multi-year impacts on fish populations fail to identify which species would suffer multi-year effects, nor do they identify the biological mechanisms that would be altered leading to these effects. The pipeline installation would occur over a discrete 2.5-month period, selected to minimize impacts on important fish populations. There will be no direct mortality to fish, thus no change in the numbers of fish in their respective populations. The habitat on which the Hudson River fish community depends for support will recover following pipeline installation; thus there will be no progressive decline in habitat value and no decline from year to year in population numbers.

47. The NYSDOS quotes the National Oceanic and Atmospheric Administration (NOAA) (page 79, Reply Brief) to support its position of longterm impacts on marine fish populations. While the quotation implies that impacts would occur to endangered and EFH species, the official position of NOAA, as presented in its official response to the FERC did not challenge FERC's position that there "...would be no substantial adverse impact (individual or cumulative)" to these species. (FERC, 200, Essential Fish Habitat Assessment: Millennium Pipeline, FERC, 2001) The NYSDOS's attempt to extend the pipeline impact to North Atlantic fisheries is without technical foundation.

48. The NYSDOS recognizes the fidelity striped bass have for their natal waters, but then claims that because Chesapeake Bay stocks of striped bass are in decline, the spawning and recruitment of striped bass in the Delaware and Hudson Rivers is supporting the Atlantic coastal populations. The Hudson River cannot replace the loss of production from the Chesapeake at whatever level it is occurring because the available habitat in the Hudson cannot increase to produce more striped bass. In addition, the Hudson stock of striped bass does not migrate beyond its fixed range; thus it cannot provide fish for the Chesapeake population because striped bass do not migrate over that portion of the Atlantic coast.

49. The NYSDOS presents DNA-based analyses of striped bass occurring at the eastern end of Long Island, which shows the Hudson River as the source of most of the fish. This analysis does not indicate that striped bass dominate the Atlantic coastal population because striped bass migrate over hundred of miles, and individual river populations migrate at different times. A coast-wide sampling would be needed for such an analysis.

50. Juvenile striped bass do not occur "almost exclusively" in Haverstraw Bay as stated by the NYSDOS. Striped bass use a vast area of the Hudson Estuary and New York

Harbor. Millennium used a functional habitat area to reflect this broad distribution. The NYSDOS provided no support from the extensive database on Hudson River striped bass to support its claim that juvenile striped bass are confined to Haverstraw Bay. It does however, identify Esopus Estuary, North and South Tivoli Bays, Esopus Meadows, and the Flats as spawning and nursery grounds for striped bass (“Hudson River Significant Tidal Habitats: A guide to the functions, values, and protection of the River’s Natural Resources,” prepared by New York State Department of State, Division of Coastal Resources and Waterfront Revitalization and the Nature Conservancy, March 1990).

51. In pages 82-85 of the NYSDOS’s Reply Brief, the State claims that the limited blasting that may be necessary for 185 ft along the shoreline will be ecologically significant in that it will (1) directly remove critical near shore habitat; and (2) permanently fracture underlying bedrock. The NYSDOS claims a host of long-term impacts from blasting which are all founded on the misunderstanding of the blasting process. As stated in paragraph 15 above, the rock to be potentially blasted is beneath the sediments at the bottom of the river. After blasting is completed, the blasted rock will be covered by the original sediment in the backfill process, which will allow natural river processes to work the substrate back to its original contours. The NYSDOS’s claims of permanent alterations affecting water velocity, flow patterns, stability of sediments, mobility of contaminants, and changes in benthic habitat value are unsupported by any proof of how these processes would be changed. The construction methods proposed for the pipeline are designed to return the river’s bottom contours as close as possible to its present condition (+/- 1 ft); thus existing processes will also be similar to post construction processes.

52. The NYSDOS has had the Millennium Pipeline Project under review for several years, but to date has provided no substantive analyses of the impacts based on the wealth of detailed information available on the natural resources of the Hudson River. It has rejected Millennium's assessment, but has never shown how the rationale supporting Millennium's position is flawed. It has not provided alternative analyses; rather it has relied on statements from Federal resource agencies which are also not founded on any original analyses and are, in fact, contradictory with the technical assessments the agencies submitted as part of the Federal review process.

53. The Millennium pipeline crossing will be buried deep in the sediments of Haverstraw Bay, with no structure extending above the bottom. The original sediments excavated from the trench will be backfilled to the original contour (+/-1 ft) so that natural river processes will re-establish the substrate in equilibrium with the surrounding undisturbed areas. This will provide habitat for reinvasion by benthic invertebrates and subsequent use of this space and as food resources by fish. This recovery of habitat will occur over a period of months to one year. Because the habitat has the potential to recover quickly from the installation work, the impacts of the pipeline on Haverstraw Bay will be limited to a temporary disturbance of benthic habitat and no long-term impairment of Haverstraw Bay or the aquatic life using the Bay.

THE ARBORETUM

54. Millennium's most recent plan for pipeline installation (which it filed with the FERC and other agencies long ago) where it crosses the wetland and stream associated with wetland, WO8CT within the Arboretum has moved the pipeline to an area which will not require the removal of large, mature trees at the edge of the Arboretum forest. The pipeline will be placed outside of the mature forest and the adjacent work area will be narrowed as necessary near the closest large trees to avoid disturbance to the root systems to the extent possible. In

addition, heavy equipment will be kept off of the tree foot systems. Retaining these large trees will ensure that their influence on the interior habitat of the Arboretum through shading will not be altered by pipeline installation. Once again it is obvious that the NYSDOS did not consider all the information provided by Millennium before making its assessment of impacts.

55. Millennium has also prepared detailed plans for crossing each of the perennial and intermittent streams near the Arboretum. These plans include completing the crossings “in the dry” (separately transporting any water flow across the construction work area via pumps or culverts) and restoring the original stream contour. Special right-of-way maintenance plans will restrict mowing in these areas, allowing a large portion of the right-of-way to return to a natural state. Therefore, there will not be any hydrological changes in the Arboretum’s wetland as a result of pipeline construction or operation.

CONCLUSION

56. The Millennium pipeline at the Hudson River Crossing was designed to avoid long-term impacts. The pipeline will be buried deep under the river and existing sediments will be replaced on top of the buried pipeline. The river bottom will be returned as closely as possible to the existing bathymetry (+/- 1 ft) initially, followed by recontouring through natural processes to re-establish a substrate equal in value to the original substrate in the area. There will be no depression or structure left in the river to impede fish passage or water flow and no change in habitat type. In the event that blasting is necessary, it would occur over a 185 foot segment of the crossing, at the east shoreline will employ a bubble curtain that will contain blasting effects to the immediate vicinity of the trench. Construction will take place in a 2.5 month period and no maintenance dredging will be required, thus eliminating multi-year impacts.

57. The construction techniques for the installation of the Millennium Pipeline at the Hudson River Crossing were designed to avoid and minimize short-term impacts to the

maximum extent possible. Only 1300 feet in length will be disturbed at any given time, leaving ample room for fish and invertebrates to move around and through the pipeline footprint.

Sediments for refilling the trench will be deposited in scows while awaiting use as cover, not side-cast on the adjacent substrate. An environmental bucket will be used to excavate sediments and cover sediments will be deposited only one hour before and one hour after slack tide, when the currents are slowest and sediments are less likely to be carried outside the trench.

Millennium has provided to USACE models of the cover sediment discharge using site conditions for currents and sediment particle size which show a restricted sedimentation plume; these were reviewed and accepted.

58. State and Federal agencies have taken steps to insure that the construction impacts will be minimized and that minimization techniques will be implemented. The State WQC stipulates the use of an environmental bucket, and further requires that a monitoring program be conducted during construction. A third party inspector will report directly to the NYSDEC. NOAA's Biological Opinion requires that the NMFS trained observers be present on the dredge and backfill barge for the duration of the project (September 1 to November 15)," (Patricia Kurkel, September 14, 2001, page 19). Further, to ensure that the impact associated with resuspension of sediments during backfilling is minimized, the NMFS's Biological Opinion also requires that bottom weighted silt curtains "run surface to bottom around the area being backfilled."

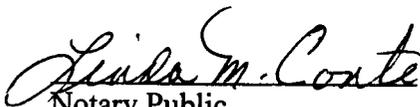
59. The NYSDOS's characterization of the project does not consider the project's technology and controls. It predicts long term, multi-year impacts from a construction project that will be completed in 21/2 months and, unlike many previous pipeline crossings and channel constructions, leave the river bottom in substantially the same condition as it is today. Further, it

mistakenly presents Haverstraw Bay as more important than other portions of the Hudson River's significant habitats to the North Atlantic stock of striped bass. The NYSDOS does not, however, provide analyses that evaluate the potential for impact to aquatic resources from the project and its construction techniques as it has been proposed by Millennium and accepted by NOAA's Biological Opinion and the NYSDEC's Water Quality Certification.

Dated: April 18, 2003


SUSAN G. METZGER, PhD

Sworn to before me this
18th day of April, 2003


Notary Public
80766

LINDA M. CONTE
Notary Public, State of New York
No. 01CO6074281
Qualified in Rockland County
Commission Expires May 13, 2006

METZGER, SUSAN G.

EDUCATION

Ph.D., Zoology
State University of New York at Albany, 1978

M.S., Public Administration
New York University, 1989

A.B., Biology
Hood College, 1966

EXPERIENCE

Lawler, Matusky & Skelly Engineers LLP **1987-Present**
Pearl River, New York

Scientist **2002**
Dr. Metzger provides in-house technical consultation on large-scale environmental projects, special studies, and research and development programs. She serves as principle in charge and project manager on projects related to dredging and habitat restoration. She is preparing a feasibility evaluation and draft environmental impact statement for restoration of natural aquatic habitats in the Hudson Raritan estuary. This study includes conceptual design of 12 priority sites representing diverse contiguous habitats. This project, conducted for the US Corps of Engineers, is being performed by ERC a joint venture of LMS and URS Group. Dr. Metzger also manages the consultant team.

Principal **1993-2002**

Manager, Environmental Sciences Group
Dr. Metzger coordinated and supervised activities of a staff of environmental scientists and engineers as principle and manager of LMS' Environmental Sciences Group. She managed studies and prepared analyses that were included in many environmental impact statements (EISs) developed under the National Environmental Policy Act (NEPA), the New York State Environmental Quality Review Act (SEQRA), and the City Environmental Quality Act (CEQRA).

Dr. Metzger's work included comprehensive assessments of biological and water quality impacts associated with various activities, such as dredging, consumptive and nonconsumptive water withdrawal, discharges of permitted effluents containing conventional and priority pollutants, and habitat infringement associated with construction of sewage treatment plants, power plant siting, and residential developments. Most of the programs involved extensive field sampling and laboratory analyses, often using a variety of collection gear to ensure assessment of multiple species and age classes. Dr. Metzger and her staff have developed procedures designed to mitigate the loss of fish and pelagic organisms, benthic habitats, and both freshwater and saltwater wetlands. These techniques include developing hatchery programs, alternative benthic habitats, construction of new salt marshes, and upgrading freshwater wetlands by providing superior habitat for native wildlife.

Dr. Metzger has prepared risk assessments considering the fate and transport of heavy metals and other potential toxicants from sediments and surface waters. She coauthored a report to the U.S. Army Corps of Engineers (USACE) on the efficacy of using sediment capping as a mitigation technique to isolate and control organic contaminants at the experimental Mud Dump Site pile in the New York Bight.

Dr. Metzger has extensive experience in New York Harbor fisheries, benthic, sediment, and water quality studies. As director of the Environmental Sciences Group, she coordinates duties and report and permit application activities of LMS scientists, engineers, and biologists. New York Harbor studies under her direction include dredging and disposal permits; waterfront development; impact assessment under NEPA, SEQR, CEQR, and Coastal Zone Management (CZM) compliance; bioassay, bioaccumulation studies, and benthic collection and identification; and impact assessment due to shading, dredging, and pier and piling construction.

New York Harbor-specific studies include the Port Authority of New York/New Jersey (PANY/NJ) fisheries and water quality studies at the World Trade Center; impact assessment of the Staten Island Bridges Program; the Westway Highway Project for the New York State Department of Transportation (NYSDOT); the Halleck Street and Oak Point Floating Prison Barge Project (East River, New York) for the New York City Department of Correction (NYCDOC); the Arcorps Waterfront Project (Jersey City, New Jersey); barge mooring/dredging studies at Pier 35, Manhattan, New York, for the New York City Department of Sanitation (NYCDOS) and harbor deepening studies for the USACE. These studies involved all aspects (existing conditions, potential impacts, mitigation technologies) of water quality, sediment, dredging, fisheries, and benthos studies specific to New York Harbor.

Environmental Impact Assessment

- Project manager for the assessment (under NEPA, SEQR and CEQA) of impacts associated with deepening New York Harbor to 52 ft and other navigation improvements. The EIS included evaluations for Essential Fish Habitat, threatened and endangered species, hydrodynamics, water quality, coastal erosion, navigation safety, and 404(b)1 evaluations. A comprehensive mitigation plan encompassing diverse shallow water and wetland habitats was developed to address impacts associated with different deepening scenarios. This study conducted for the US Army Corps of Engineers was performed by a joint venture of LMS and Moffat & Nichol, Engineers. Dr. Metzger also managed the joint venture team and its subconsultants.
- Coordinated the preparation of an EIS (SEQRA) on the impacts of Hudson River power plants on biota, fisheries, and wetlands, including participation of representatives from seven consulting firms and four utilities. LMS served as lead in developing this document to support State Pollutant Discharge Elimination System (SPDES) permit renewal for four power plants. A variety of impact evaluations was included in this multifaceted document.
- Project manager for the environmental assessment of a subaqueous confined disposal facility in Newark Bay. The project involves removing contaminated sediments from a pit 70 ft deep, constructing a secure disposal facility, and depositing Category III contaminated dredged material. The environmental assessment includes ecological and human health risk assessments associated with the proposed action.
- Project manager and technical director for the assessment of environmental impacts (NEPA/CEQRA) associated with the proposed Staten Island Bridges Program (a new span crossing the Arthur Kill between Staten Island, New York, and Elizabeth, New Jersey). Specific studies include sediment and benthic organism collection and analyses, fisheries, permitting, disposal analyses (sediment quality, availability of upland disposal sites, State Pollutant Discharge Elimination System [NPDES] permits, dewatering/stabilization time frames), and extensive wetlands and wildlife studies, including functional analysis, delineation, and conceptual design of replacement wetlands.
- Manager of all aspects of an EIS prepared under New York State SEQRA evaluating construction of a major marina community along the Hudson River (Anchorage on the Hudson), including evaluation of dredging alternatives, marina design, nutrient and wastewater loading from point and non-point sources, and impacts on biota.
- Project manager of a comprehensive biological evaluation of 600 square miles in the New York Bight designed to assess the potential for offshore siting of power plants; included fish, plankton, water quality, and benthos.
- Ecologist and technical spokesperson for the environmental impact assessment (SEQRA) and public participation program conducted for a comprehensive 18,000-acre development, with the New York State Department of Environmental Conservation (NYSDEC) Region 3 as lead agency.

- Principal-in-charge for the New York District USACE term contract for biological and cultural resource assignments including dredging and restoration feasibility studies and environmental impact studies.

Dredging Studies

- Impact evaluation of dredging dioxin-contaminated sediments using total suspended solids (TSS) and turbidity monitoring during a dredging and dewatering study of Howland Hook Marine Terminal for PANY/NJ and USACE.

Study for NYCDOS to provide solutions to dredge and dispose of sediments at marine terminals. As ocean disposal of dredged sediment from New York Harbor is not currently feasible, alternative and treatment disposal methods were evaluated.

Baseline ecological survey of the aquatic resources of Newark Bay in support of an impact evaluation of confined aquatic disposal pits. Analysis includes identifying species of aquatic organisms and waterfowl and their estimated densities.

Risk Assessment

- Project manager for ecological assessment and environmental risk studies for the Brookhaven National Laboratory (U.S. Department of Energy) on Long Island, New York.

Project manager for environmental studies (under subcontract to NYCDEP) at the Pennsylvania and Fountain Avenue landfill sites in Brooklyn, New York. The landfill studies include sediment collection and interpretation of analyses results; water, fisheries, and wildlife studies; wetland investigation; and contributions to the remedial investigation/feasibility studies (RI/FS) for the capping and closure of both landfill.

- Chemical risk assessment of the Upper Illinois Waterway. Evaluation of contaminant and temperature data from a 20-mile segment of waterways in Chicago to identify chemical contaminants and describe potential synergistic effects on biota.

Electric Generating Stations

- Multitrophic-level field studies, data evaluation, and exhibit preparation for relicensing 11 hydroelectric plants owned by Consumers Power Company on the Manistee, Muskegon, and AuSable rivers in Michigan, including evaluation of mitigation methods for fish passage and entrainment, bank erosion and sediment transport studies, nutrient loading, dissolved oxygen/biochemical oxygen demand (DO/BOD) relationships, and temperature increases. Fish entrainment was monitored hydroacoustically and with netting. Turbine mortality was measured through controlled tests in which selected species and sizes of fish were released into the turbine and collected in the tailrace with a draft tube net equipped with a live box. Results of the field studies were summarized in technical reports and incorporated into the Exhibit E's.

- Project manager for a one-year study of fish impingement and larval entrainment at H.A. Wagner Power Plant (Baltimore Gas & Electric Company (BG&E) to assess potential impact on the Patapsco River ecological system. In addition to these studies, a series of three thermal surveys were conducted to define the extent and nature of the thermal plume produced by this plant. These studies were performed in order for BG&E to meet State of Maryland water pollution control requirements.
- Project manager for one-year abundance monitoring of impingement and entrainment at Consolidated Edison Company of New York, Inc.'s, in-city generating stations (Arthur Kill, Ravenswood, and Astoria). This included fish and blue crab impingement sampling at dual-flow and conventional traveling screens, as well as fish egg and larval entrainment monitoring by multidepth pump samples. Special studies included screenwash efficiency testing, debris characterization, and screen-specific impingement rates. Impingement samples were analyzed for species, size class, and individual length measurements. Entrainment samples were analyzed for species and life stage. Water quality measurements, including temperature, DO, salinity, conductivity, and pH, were made at the intake and discharge of each plant. Reports were generated that included detailed descriptions of plant intakes and site descriptions, materials and methods, impingement and entrainment rates corrected for screenwash efficiency, water quality data, debris characterization, and seasonal and diel differences in impingement and entrainment rates.
- Project scientist for studies conducted at the J.A. FitzPatrick Plant, Lake Ontario, New York (New York Power Authority). The distribution and abundance of various trophic-level groups (phytoplankton, zooplankton, benthos, ichthyoplankton, and fish) in the near- and farfield vicinity of the James A. FitzPatrick Nuclear Power Station were examined to determine whether plant operation was affecting the environment. In addition, in-plant entrainment and impingement studies, coupled with standing stock estimates (where available), were used to quantify cropping rates. A lakewide analysis of impingement losses was also conducted. Overall cropping rates were found to be low and supported the results of the lake study, which generally indicated no observable effect of plant operation on the local biology.
- Project manager for a field investigation conducted at Albany Steam Station (Niagara Mohawk Power Corporation). Prepared a report on the effect of the plant on Hudson River temperature and ecology, which included a 316(a) and (b) demonstration. Follow-up studies conducted to assess impingement trends included observations of fish survival from the screenwash discharge.
- Project scientist for a three-year study of the distribution, abundance, and behavior of Great Lakes fish in the thermal plumes of the Pickering, Nanticoke, and Lennox Station power plants owned by Ontario Hydro on the north shore of Lake Ontario. The study included hydroacoustic assessment of fish populations, sonic tracking of smallmouth bass, laboratory incubation of fish eggs, mark-recapture experiments, and literature evaluation.
- Hudson River-Long Water quality survey to define ambient metal concentrations and relate existing baseline levels to present and proposed water quality standards and criteria for Empire State Electric Energy Research Corporation.

- Statistical design of biological field collections to evaluate impacts of Hudson River power plants, including program and gear design.

Special Studies (Marine Borers, Threatened and Endangered Species, and Species of Concern)

- Principal-in-charge of a term contract with the New York State Department of Transportation (NYSDOT) to identify, evaluate, and protect threatened and endangered species at risk of impact associated with NYSDOT projects.
- Contract manager for the rehabilitation of three marine transfer facilities owned and operated by the NYC department of Sanitation. These wood docking structures had been damaged by marine borers, *Limnoria* and *Teredo*.
- Developed procedures designed to mitigate the loss of both freshwater and saltwater wetlands. Techniques included construction of new salt marshes and upgrading freshwater wetlands by providing superior habitat for native wildlife.

Ecosystems

1983-1987

Warwick, New York

Owner

Ecosystems specialized in aquatic ecology and environmental issues. Services included assessment of impacts and risks associated with toxic effluents and wastes, evaluation of toxic exposures and effects, data evaluation, literature review, and interpretive reports. Special services included independent quality assurance reviews and inspections for field, laboratory, and data evaluation programs. Ecosystems also provided technical support in legal proceedings and permitting processes involving environmental issues.

Lawler, Matusky & Skelly Engineers

1973-1983

Pearl River, New York

Manager, Environmental Group

1978-1982

Technical, supervisory, and financial responsibility for all activities of both the Measurements and the Assessments divisions. Tasks included preparation of proposals and grant applications, development and execution of field and laboratory surveys, impact assessment, report preparation, data analysis, and serving as expert witness. Studies included oceanographic assessment of impacts associated with power plant siting in the New York Bight, evaluation of ambient metals concentrations in New York State waters, and impacts associated with power plant siting operation.

Director, Environmental Measurements and Laboratory Division

1974-1978

Technical, supervisory, and financial responsibility for field surveys and sample analyses, water quality testing, and pilot plant process testing at laboratories located throughout the U.S., including New York, Michigan, South Carolina, Florida, and California. Directed the initial funding and setting up of three of these laboratories.

Lawler, Matusky & Skelly Engineers LLP

Assistant Laboratory Director 1973-1974
Responsible for technical review and coordination of laboratory projects.

Project Manager 1973-1983
Directed specific projects for clients, including Grumman Ecosystems Corporation, Empire State Electric Energy Research Corporation, and New York State Energy Research & Development Authority.

University of Maryland 1971-1973
Natural Resources Institute

Biologist
Analysis of data to evaluate environmental impact. Design of surveys and data analysis techniques. Field collection and laboratory analysis of samples.

State University of New York at Albany 1968-1970
Albany, New York

Teaching Assistant
General biology, invertebrate zoology, histology, and histological technique.

Albany Medical College 1967-1968
Albany, New York

Biochemistry Technician

PRESENTATIONS and PUBLICATIONS

Innovative approaches to dredged material management in New York Harbor. 2002. Presented at the Sixth Marine and Estuarine Shallow Water Science and Management Conference, March 18-20, 2002-Atlantic City, NJ. (with K.A. Abood).

Solving problems in dredged material management in New York Harbor. 2002. Presented at the Sixth Marine and Estuarine Shallow Water Science and Management Conference, March 18-20, 2002-Atlantic City, NJ. (with K.A. Abood).

New York/New Jersey Harbor Navigation Project: *An Overview*. Presented at ASCE Ports '01 Conference, April 29-May 2, 2001. Norfolk, VA. *Published* in Ports'01 American Society of Civil Engineers, Proceedings of the Conference (with T.Shea, T. Hodson, P. Blum, E. Brickman, S. Weinberg, J.R. Headland, and T. MacAllen).

New York/New Jersey Harbor Navigation Project: *Navigation Plan Formulation Aspects*. Presented at ASCE Ports '01 Conference, April 29-May 2, 2001. Norfolk, VA. *Published* in Ports'01 American Society of Civil Engineers, Proceedings of the Conference (with J. Headland, T. Shea, T. Hodson, P. Blum, T.s MacAllen, Patricia McNeal, D. Miller, and J. Diamantides).

New York/New Jersey Harbor Navigation Project: *Environmental Aspects*. Presented at ASCE Ports '01 Conference, April 29-May 2, 2001. Norfolk, VA. *Published* in Ports'01 American Society of Civil Engineers, Proceedings of the Conference (with J. Matousek, Teresa Nelson, Nancy Wolfe, Patricia McNeal, Roselle Henn and Jenine Gallo).

Green Ports: Aquatic Impact avoidance, minimization and mitigation for port developments. Presented at ASCE Ports '01 Conference, April 29-May 2, 2001. Norfolk, VA. *Published* in Ports'01 American Society of Civil Engineers, Proceedings of the Conference (with K.A. Abood).

Mitigation planning for unvegetated littoral habitat. Presented at Fifth Marine and Estuarine Shallow Water Science and Management Conference, March 12-16, 2000, Atlantic City, NJ (with S.M. Seymour).

Utilization of biological data to assess use of NY harbor habitats. Presented at Fifth Marine and Estuarine Shallow Water Science and Management Conference, March 12-16, 2000, Atlantic City, NJ (with K.A. Abood and J.A. Matousek).

Blending science & engineering to design aquatic impact avoidance, minimization, and mitigation sites, Fifth Marine and Estuarine Shallow Water Science and Management Conference, March 12-16, 2000, Atlantic City, New Jersey (with K.A. Abood).

A functional assessment method for littoral zone wetlands in an urbanized ecosystem. Presented at 3rd Annual Wetlands Regulatory Workshop, November 2, 2000, Atlantic City, NJ. (with S.M. Seymour, Nancy B. Wolfe, and Jennine Gallo).

Cooling water systems face compliance eddies. *Published* in *Electric Light and Power* May 1999. (with T.L. Englert, J. Matousek and G. Piehler).

Minimizing dredged material disposal via sediment management in New York Harbor. Presented at the Third Annual Marine & Estuarine Shallow Water Conference (AERS/ERF), December 1-5, 1996, Atlantic City, NJ. *Published* in *Estuaries* 22, (3B): 763-769, 1999 (with K.A. Abood and D. Distant).

Making Projects Happen: How to Manage Contaminated Sediments Via A Subaqueous Containment Facility as Typified by the Newark Bay Confined Disposal Facility (NBCDF). Presented at the WEFTEC '98, 71st Annual Water Environment Federation Conference and Exposition, October 3-7, 1998, Orlando, Florida (with K.A. Abood, J.A. Matousek, E. Knoesel and M. Helman).

A Case Study Illustrating the Role of Environmental Remediation in Contaminated Sediment Management in NY/NJ Harbor. Presented at the 15th World Dredging Congress, June 28-July 2, 1998, Las Vegas, NE (with K.A. Abood, P. Dunlap, and W. Gay).

Beneficial Reuses of Contaminated Dredged Material in New York Harbor. Presented (poster) at National Symposium on Contaminated Sediments, May 27-29, 1998, Washington, D.C. (with K.A. Abood, P. Dunlap, and W. Gay).

Minimizing Dredging Impacts in New York Harbor. Presented at Fourth Annual Marine & Estuarine Shallow Water Conference, March 15-19, 1998, Atlantic City, New Jersey (with K.A. Abood, M. Masters, M. Miao, S. Zahn).

New York Harbor Dredging Perspective. Presented (poster) at the Fourth Annual Marine & Estuarine Shallow Water Conference, March 15-19, 1998, Atlantic City, New Jersey (with K.A. Abood).

The Limnoria Has Landed! Presented at Ports '98, March 8-11, 1998, Long Beach, CA. Sponsored by American Society of Civil Engineers. Published in ASCE, Ports '98, Vol. 1, p. 672-681, March, 1998 (with K.A. Abood).

Management of Dredging and Disposal of Contaminated Sediment in New York/New Jersey Harbor: A Framework for Contaminated Sediment Management. Proc. Hazwaste World Superfund XVIII Conference, pp. 219-226, December 2-4, 1997, Washington, D.C. (with K.A. Abood).

Management of Contaminated Estuarine Sediments in NY Harbor. Presented at the Estuarine Research Federation's 14th International Conference, Providence, R.I., October 12-16, 1997 (with K. A. Abood).

Comparing impacts to shallow water habitats through time and space. Presented at the Marine and Estuarine Shallow Water Science and Management in the Mid-Atlantic Region (AERS/ERF), March 8-11, 1994, Atlantic City, NJ. *Published in Estuaries 19(2A):220-228, 1996* (with K.A. Abood).

Marine Borer Control: Prepenetration Strategies and Postpenetration Options. Presented at the Second Annual Marine Shallow Water Science and Management Conference, April 3-7, 1995, Atlantic City, New Jersey (with K.A. Abood).

Feasibility of restoring tidal influence to the Middle Section of Manitou Marsh, Presented at the 16th Annual Meeting, Society of Wetland Scientists, May 28 - June 2, 1995, Boston, MA. p 47. (with C.V. Beckers and C. Keene).

Relative cost and precision of hydroacoustic and net sampling at hydroelectric facilities. *Published in Waterpower '95, 25-28 July 1995: Proceedings of the International Conference on Hydropower* (J.J. Cassidy, ed). Pp. 2167-2176 American Society of Civil Engineers. (with J.A. Matousek, A.W. Wells, D.S. Battige, and R.W. Williams).

Turbine entrainment at six hydroelectric projects located on the AuSable River, Michigan. *Published in Waterpower '95, 25-28 July 1995: Proceedings of the International Conference on Hydropower* (J.J. Cassidy, ed). Pp. 2167-2176 American Society of Civil Engineers (with J.A. Matousek, A.W. Wells, D.S. Battige, and R.W. Williams).

Ecological risk assessment and the endangered species act. *Published in Proceedings of the Superfund XV Conference and Exhibition. Pp. 452-1456 November 31 - December 4, 1994, Washington, D.C.* (with K.A. Abood).

Reporting survival results of fish passing through low-head turbines. *Published in Hydro Review* May 1994. (with J.A. Matousek, A.W. Wells, and J.H. Hecht).

A chemical risk screening of the Upper Illinois Waterway. Presented at 15th Annual Meeting Society of Environmental Toxicology and Chemistry, Ecological Risk: Science, Policy, Law, and Perception, 30 October-3 November 1994, Denver, CO. P. 204 (with Christine Barker and Donna Randall).

Biological context and consequences of the Great Lakes Initiative. *Published in Clearwaters* pp. 21-25. 1993. (with B.L. Lippincott and R.A. Alevras).

Determining the number of transects in IFIM studies. *Published in Waterpower '93: Proceedings of the International Conference on Hydropower* (W.D. Hall, ed.) pp. 2089-2094 American Society of Civil Engineers. (with M.E. Conners, J. Homa, Jr., and A.W. Wells).

Turbine passage survival at low-head hydro projects. pp. 159-168, *In Waterpower '93: Proceedings of the International Conference on Hydropower* (W.D. Hall, ed.), American Society of Civil Engineers. (with J.A. Matousek, K.G. Whalen, J.H. Hecht, A.W. Wells).

Turbine entrainment survival of nonanadromous resident fish species at four small hydroelectric projects in Michigan. Presented at 48th Northeast Fish and Wildlife Conference, Norfolk, VA, 3-6 May 1992. (with J.H. Hecht, C. Thieling, A.W. Wells, and K.G. Whalen).

Abundance of selected Hudson River fish species in previously unsampled strata. *Published in Estuarine Research in the 1980's: the Seventh Symposium on Hudson River Ecology*, 1992 (C. Lavett Smith, ed.) pp 348-375. (with R. Keppel, P. Geoghegan, A.W. Wells).

Evaluation of the 1980 capping operations at the experimental mud dump site, New York Bight apex. U.S. Army Corps of Engineers Dredging Operations Technical Support Program Report D-83-3. October 1983 (with J.M. O'Connor)*

Fisheries survey of the lower Hudson River in the vicinity of Manhattan, 1979-1980. Fifth Symposium on Hudson River Ecology. 1981. Hudson River Environmental Society, New Paltz. (with R.A. Alevras, C.B. Dew, and J.H. Hecht).*

The effects of power plants on productivity of the nekton. Presented at Second International Conference of the Estuarine Research Society, Myrtle Beach, SC. October 1973. *Published in Estuarine Research*, Vol. I. Chemistry, Biology, and the Estuarine System. (L.E. Cronin, ed.) pp. 494-517. Academic Press, NY 1975. (with A.J. McErlean).*

Stability and species diversity of fish populations. *Published in Estuarine and Coastal Marine Science* 1:19-36. 1973. (with A.J. McErlean and J.A. Mihursky).*

*Published as Susan G. O'Connor

ALEVRAS, RONALD A.

EDUCATION

M.S., Fishery Science
Oregon State University, 1970

B.A., Science Education (Biology)
Montclair State College, New Jersey, 1965

EXPERIENCE

Lawler, Matusky & Skelly Engineers LLP
Pearl River, New York

1975-Present

Senior Project Manager
Environmental Science and Modeling Group

Project Manager

Preparation of environmental impact statements for waterfront development projects in New York Harbor. These projects include waterfront parks, ferry terminals, platform structures for residential and commercial developments, and dredging and filling associated with navigation projects. These studies included field sampling to document physical, chemical, and biological conditions at the project sites. Evaluation of project impacts included the development of mitigation to minimize effects or enhance aquatic habitat conditions. Coordination with architects and engineers on the project design to minimize aquatic impacts was a major element in these studies. The design considerations related to aquatic life included the effects of structures on water flow, depth, and sedimentation; the use of structure for habitat by fish and invertebrates and the protection of the structures from marine borers.

Project Manager

Project manager for a project proposed by the Port Authority of New York and New Jersey (PANY/NJ) involving subchannel placement cells in Newark Bay for the disposal of contaminated dredged material. LMS was a third-party contractor working for the U.S. Army Corps of Engineers, under contract to PANY/NJ. LMS prepared the Draft Environmental Impact Statement (DEIS) following scoping sessions with the public and resource agencies. The EIS focused on impacts on aquatic resources during construction of the cells and the discharge of dredged material into the cells. The EIS evaluated dredged material disposal alternatives, the need for capping the cells, and an implementation and monitoring plan. LMS drafted the 404(b)1 guidelines evaluation.

Project Manager

Project manager for a U.S. Army Corps of Engineers (USACE) project in the New York/New Jersey Harbor. USACE, in cooperation with state and local interests, has been developing a Dredged Material Management Plan (DMMP) for the New York/New Jersey Harbor. The planning function requires a Programmatic Environmental Impact Statement (PEIS). LMS was retained to assist USACE in refining and updating the PEIS following initial comments from the DMMP work group. The thrust of the EIS is to present the disposal options and alternatives

(options grouped into a course of action) and then evaluate impacts so that the options and alternatives could be compared. The PEIS is a complex presentation of numerous options and alternatives encompassing a broad potential implementation area and covering all major resource categories. The PEIS summarizes large databases on aquatic resources, modeling studies, a risk assessment, and other elements.

Project Manager

LMS prepared the aquatic analysis portion of the River Walk environmental impact statement (EIS) under the City of New York Environmental Quality Review Act (CEQRA). River Walk was a proposed residential-commercial development on a 16-acre, pile-supported platform, to be built between Manhattan's 17th and 24th streets on the lower East River. The aquatic studies evaluated the project effects on currents, sedimentation, water quality, and aquatic ecology of the East River. LMS conducted sampling for fish and invertebrates in the project area and at nearby reference stations. LMS also conducted bathymetric and tidal current studies in the project area to support a modeling effort to predict future sedimentation with different project configurations. LMS reviewed historical information on dredging and changes to the area as the former shipping facilities were abandoned over time. LMS worked with project architects to develop a design that controlled currents, sedimentation, and water depth to maximize habitat for striped bass and other fish.

Project Manager

Mr. Alevras has been the project manager for a number of efforts involving ferry terminal development. For the South Ferry Terminal, Mr. Alevras managed a field sampling program for aquatic resources in the vicinity of the existing ferry terminal to establish a baseline for the assessment of a new terminal. The proposed design was used as a basis for the assessment, which was incorporated into a draft EIS for the project. The assessment included an evaluation of the effects of marine borers on the existing and new in-water structures. Mr. Alevras also evaluated the effects of new, temporary ferry facilities on the East River on aquatic resources.

Project Manager

Project manager for a effort in which SK Services developed a land remediation project utilizing processed dredged material to cap a former industrial site in the Hackensack Meadowlands. The project involved state and Federal permitting for in-water construction and fill placement in wetlands. The wetlands were delineated and a functional analysis was performed. On- and off-site mitigation alternatives were evaluated and negotiated with resource agencies. The project also included monitoring dredging operations and evaluating temporal restrictions on dredging to protect nesting herons. Dredged material was collected for chemical analysis and leachate testing at a contracted laboratory.

Project Biologist

Preparation and review of reports, and presentation of expert testimony on Westway Project studies relating to water quality and aquatic resource. These studies and the impact assessments involved the effects of a 200+ acre landfill on the aquatic resources of New York Harbor, with emphasis on striped bass. The project included the development of habitat enhancement measures to mitigate for losses of habitat due to the landfill.

Project Manager

Project manager for the environmental assessment for downstream fish passage at Northeast Utilities Service Co. (NUSCO) Northfield Mountain Pumped Storage facility. Mr. Alevras was responsible for the supervision of project execution from the initial intensive field effort through report supervision. Mr. Alevras provided technical input and worked with NUSCO in developing presentation strategies. Major studies at the site included entrainment estimates, population impacts assessments and the testing of a barrier net to reduce entrainment of Atlantic salmon smolts.

Project Manager

Project Manager for field studies and the preparation of environmental reports (Exhibit E's) for the licensing of hydroelectric projects. The Exhibit E work incorporated the results of various studies by LMS, the project sponsor, and other consultants. The impact assessments have included redevelopment at existing dams, new developments and relicensing of existing sites with various capacity additions and operational changes. The hydro assignments have included participation with the project sponsor in the development of mitigation, protection and enhancement measures for various natural resource categories. A major aspect of this work included participation in negotiations on client's behalf with state and Federal regulators on the scope of studies and mitigation/enhancement measures.

Project Manager

Analysis of the effects of impingement and entrainment mortality at Consumers Power's J.R. Whiting Plant on the populations of four species of fish in the Western Basin of Lake Erie. Similar responsibility for impingement studies at D.E. Karn and J.C. Weadock Plants at the mouth of the Saginaw River on Lake Huron. This assignment included testimony before the Michigan Water Resources Commission with regard to effects of the J.R. Whiting Plant on the fishery resources of Lake Erie and the need for mitigation to reduce intake effects.

Project Manager

Development of a manual with methodology for assessing ecosystem effects related to intake of cooling waters for the Electric Power Research Institute. This project included a review of cooling system effects on lower trophic levels and techniques for quantitative assessment of entrainment and impingement effects on fish populations and aquatic communities.

Project Manager

Preparation of 316(a) demonstration for the thermal discharge from the Eden Mill of Whippany Paper Board Company.

Project Biologist

Analysis of fishery data for a resources inventory study of the lakes and streams of southern Nassau County, New York.

Project Biologist

Analysis of fishery sampling data from Lake Ontario and impingement sampling at the Oswego Steam Station for Niagara Mohawk Power Corporation; and preparation of an annual report to the client.

Project Biologist

Preparation of sections for 316 demonstration which analyzed impingement for the Bowline Point and Roseton Power plants on the Hudson River.

Consolidated Edison Company of New York, Inc.

New York, New York

Fisheries Biologist

Involved in an investigation of methods of protecting fish at a the intake of the Indian Point Nuclear Power Plant on the Hudson River. Directed a field crew of six technicians who monitored the withdrawal of fishes. Conducted tests of the effect of plant operating procedures on the impingement fate. Prepared modified plant operating procedures which have helped reduce fish impingement.

Prepared scope of work for a \$500,000 experimental flume study of fish protection systems. Presented written and oral testimony before the Nuclear Regulatory Commission Safety and Licensing Board and reviewed testimony presented by other parties. Assisted company lawyers in cross examination of expert witnesses, and on the biological and technical aspects of two damage suits involving impingement of fishes.

Member of the Edison Electric Institute's Subcommittee on Intake Structures which reviewed Federal EPA's Development Document of "Proposed Best Technology for Minimizing Adverse Impact of Cooling Water Intake Structures" for the utility industry.

Con Edison's representative on two inter-utility committees which sponsored studies on Long Island Sound.

Prepared sections of environmental reports on the impact of power plant operations on the aquatic environment and reviewed environmental impact statements (EIS) prepared by the Nuclear Regulatory Commission.

Reviewed reports of intensive and wide ranging studies of the impact of plant operations on an estuarine ecosystem. Evaluated the technical aspects of these studies and advised the Company on the need of modifications or additions to the study program.

Project biologist for the preparation of 316(a) demonstrations for three fossil fired plants in the Con Edison system.

Oregon State University

Teacher

Fish culture and limnology laboratory instruction.

Oregon State Game Commission

Scientific and Technical Trainee

Creel censuring of fishermen; inventory of lakes and streams by gill netting, trap netting, and electrofishing; surveys of mountain trout lakes; and benthic sampling of lakes for aquatic invertebrates.

PUBLICATIONS AND TESTIMONY

The estimation of fish impingement at Indian Point Units 1 and 2. Before the U.S. Atomic Energy Commission, Docket No. 50-247, 1973.

Occurrence of a lockdown in the Hudson River. *New York Fish and Game Journal*, Vol. 20, No. 1, 1973.

Status of air bubbler fish protection at Indian Point Station on the Hudson River. In: *Proceedings of the Second Entrainment and Intake Screening Workshop*. Electric Power Research Institute, Publication No. 74-049-00-5, 1974.

Possibilities for assessment of the effects of power plant operation at the ecosystem level. *Proc., 4th National Workshop on Entrainment and Impingement*, Chicago, Ill., 1978. (with E.K. Pikitch, J.M. Hillegas, Jr., and D.T. Logan)

Fisheries survey of the lower Hudson River in the vicinity of Manhattan 1979-1980. *Proceedings of the Hudson River Environmental Society Meeting*, September 1-2, 1981, Norrie Point, New York. (with C.B. Dew, J.H. Hecht, and S.G. O'Connor)

Fishery mitigation in an estuarine environment. *The Fourth Symposium on Coastal and Ocean Management*, Omni International Hotel, Baltimore, Maryland, July 30-August 2, 1985. (with D.M. Bell, S.H. Arnold, K.A. Abood, and G.R. McVoy)

Analysis of habitat characteristics and fisheries abundance characteristics in habitat-loss mitigation planning. *Estuaries: The Second Water Quality and Wetland Management Conference*, sponsored by the Louisiana Environmental Professionals Association, New Orleans, La., October 24-25, 1985. (with D.M. Bell, K.A. Abood and G.R. McVoy)

Biological Context and Consequences of the Great Lakes Initiative. *Clearwaters* pp. 21-25. 1993. (with B.L. Lippincott and S.G. Metzger)

SEYMOUR, STEPHEN M.

EDUCATION

M.S., Public Administration
Marist College, Poughkeepsie, New York, 1996

B.S., Fishery Biology
Colorado State University, Fort Collins, Colorado, 1988

A.A.S., Fisheries and Wildlife Technology
S.U.N.Y., Cobleskill, New York, 1978

CERTIFICATIONS

Certified Professional Wetland Scientist (Society of Wetland Scientists, 1999); Supervisor of Health and Safety Operations at Hazardous Materials Sites 29CFR1910.120 (E)(3) and (4) as defined by OSHA and mandated by SARA; American Red Cross Standard First Aid and Adult CPR

MEMBERSHIPS

Society of Wetlands Scientists
New York State Wetlands Forum
Hudson River Environmental Society

EXPERIENCE

Lawler, Matusky & Skelly Engineers LLP **1982-Present**
Pearl River, New York

Project Scientist **1990-Present**
Environmental Scientist 1987-1990
Field/Laboratory Scientist 1983-1987
Senior Field/Laboratory Technician 1982-1983

At LMS, Mr. Seymour is responsible for wetland and waterfront permitting and environmental review in southern New York, New York Harbor, and northern New Jersey. He has been involved in New York/New Jersey Harbor environmental studies and permitting for the past 20 years.

Wetland Training Courses

Has at:

- Id.
W

Lawler, Matusky & Skelly Engineers LLP



- Understanding Soil Conditions of Wetlands
- Freshwater Wetlands Transition Area Regulations

Permit Application Preparation Experience

Responsible for Nationwide and Individual Permit, Coastal Zone Management, Letter of Interpretation, Protection of Waters, Tidal and Freshwater Wetlands, and 401 Water Quality Certification permitting for state and Federal agencies. Has prepared impact and mitigation reports associated with dredging and waterfront construction in the lower Hudson River and has negotiated dredging techniques, time frames, and sedimentation control technologies with U.S. Army Corps of Engineers (USACE) New York and New England Districts and the New York State Department of State (NYS DOS). Has prepared and overseen upland disposal techniques (stabilization and dewatering) and has prepared cost and alternatives analyses for different dredging and disposal technologies. Has studied current velocities and sediment transport/deposition rates for several projects in the Hudson River and Long Island Sound.

Specific projects include:

- Preparing and obtaining USACE and NYSDEC waterfront permits for Metro-North Commuter Railroad's proposed reactivation of the Highbridge Yard in the Bronx, NY. He has obtained NYSDOS Coastal Zone Management concurrence (Coordinated with the NYC Dept. of City Planning's Local Waterfront Revitalization Program). Negotiated a phased approach to permitting to conform to the design-build nature of the project and negotiated the use of three nationwide permits (3, 7, and 13) with USACE Eastern Permits.
- Recently prepared and obtained USACE and NYSDEC dredging permits and NYSDOS Coastal Zone Consistency concurrence for the maintenance dredging of Consolidated Edison's West 59th Street Generating Station in Manhattan. Prepared plans for and oversaw the sediment sampling and analytical program and negotiated placement (beneficial re-use) of the dredged material at an out-of-state facility.
- Has prepared dredge permit analysis and a dock repair/rehabilitation permitting strategy for the New York City Department of Sanitation (NYC DOS). Prepared applications for and obtained state, Federal, and local permits over the past five years for the maintenance dredging of marine transfer stations and retrofitting the stations to prevent infestation by marine borers.
- Prepared state and Federal Coastal Zone Management (CZM) assessments for waterfront projects using NYSDOS criteria and, where applicable, the criteria in Local Waterfront Revitalization Plans (LWRP). Specific CZM projects include Metro-North Railroad, Bronx, NY; Piermont Landing, Piermont, NY; Anchorage on the Hudson, Newburgh, NY; Lone Star Industries in Poughkeepsie and Newburgh, NY; and six NYC DOS MTS facilities in Manhattan, Brooklyn, Queens, and on Staten Island.

- Has prepared SPDES stormwater notification for sites in Orangetown, Newburgh, and Piermont, and the Bronx, NY. He has also prepared Part 502 (Floodplain Management Criteria for state projects) concurrence for Metro-North, Bronx, NY.

Waterfront permit (NYSDEC and USACE) application research, preparation and submittal for Tilcon quarries in Stony Point and Haverstraw, NY; Chelsea Piers Management in Manhattan; Central Hudson Gas & Electric Corporation in Newburgh, NY; and for Lone Star Industries in Newburgh and Poughkeepsie, NY.

USACE Nationwide Permits for the NYCDOS Marine Borer Remediation program, New York, NY; Piermont Pier Development, Piermont, NY; Metro-North Railroad, Bronxville, NY; St. Thomas Aquinas College, Sparkill, NY; Orange and Rockland Utilities, Inc., Haverstraw, NY; NYCDOS, New York, NY; and Reynolds Metals Development Corporation, West Nyack, NY.

Wetlands Experience

Designed wetland mitigation programs for tidally influenced (Northport, Long Island, NY; Seaboard site, Hackensack, NJ; and Queens West Development, East River, NY) and nontidal (Interchange Commerce Center, Woodbury, NY, and Hudson River Psychiatric Center, Poughkeepsie, NY) wetlands.

Prepared wetland functional assessments for the Goethals Bridge vicinity (Highway Methodology), Brookhaven National Laboratory (NYSDEC criteria), and the Seaboard site (Indicator Value Assessment Method) and Jones Sanitation site (Hyde Park, N.Y.). Prepared the wetlands ecology sections of a NEPA EIS for the proposed deepening of navigation channels in New York Harbor. Developed a wetland assessment method to quantify the functions and values of littoral zone wetlands potentially affected by the proposed channel deepening in New York /New Jersey Harbor.

Conducted site surveys in New York and New Jersey to verify the location and types of tidally influenced wetlands near the proposed second span for the Goethals Bridge and prepared a conceptual mitigation program for the project. Conducted site surveys in Sterling Forest, Orange County, NY, to locate and verify NYSDEC- and USACE-mapped wetlands.

Conducted site surveys in Brooklyn, NY, to describe and verify the boundaries of tidally influenced wetlands near Jamaica Bay as part of landfill capping/closure plans. Also verified boundaries of NYSDEC- and USACE-mapped wetlands on and adjacent to the Utica Landfill, Oneida County, NY.

Responsible for compliance monitoring during construction at the Northport Marina, Northport, Long Island, NY, and implementation of a wetland protection and mitigation program and compliance monitoring for wetland creation/enhancement at the Palisades Mall, West Nyack, NY.

Responsible for wetland delineation in accordance with the field methodologies set forth in the 1987 USACE manual, the 1995 NYSDEC manual, and the NJDEP (1989 interagency) delineation

methodology. He is also responsible for wetland delineation in conformance with municipal wetland ordinances in Orange and Westchester counties, NY.

Specific delineation projects include:

New York - Sterling Forest Corporation, Tuxedo; Brookhaven National Laboratory, Upton; proposed Ambrey Reservoir in Stony Point; Ramapo Land Company holdings in Sloatsburg; St. Thomas Aquinas College in Sparkill; Ciba-Geigy properties in Suffern; General Bearing properties in Nyack; Reynolds Metals properties in West Nyack; Jones Sanitation site in Hyde Park; Consolidated Edison in Somers and on Staten Island; New Square properties in Spring Valley; Kerri Court properties in Pearl River; IBM properties in Yorktown Heights and Poughkeepsie; and Interchange Commerce Center properties in Woodbury.

New Jersey - Seaboard Site in Kearny; Ramapo Land Company holdings in Ringwood; Constantine property in Mahwah; proposed Smoke Ridge development in Vernon; and Brookhill Estates in Ramsey.

Delaware - Tybouts Corner Landfill property and Chicago Bridge and Iron Works property in New Castle and the ICI Americas property in Delaware City. All three sites also required OSHA hazardous waste site training and adherence to site-specific health and safety plans.

Wildlife Experience

Endangered/threatened species habitat mapping and site investigation, vector analysis, breeding bird identification, amphibian breeding surveys, small mammal trapping, and general wildlife surveys for draft environmental impact statement (DEIS), waterfront and wetland permitting, and remedial investigation/feasibility study (RI/FS) preparation.

Specific projects include:

Biological assessment of peregrine falcons at the Seaboard site, Kearny, NJ.

Columbia and Ulster counties landfill vector analysis and wildlife inventory.

- Wildlife habitat analysis (Blanding's and bog turtles); Stringham properties, East Fishkill, NY.
- Wildlife inventory and habitat analysis for Ciba-Geigy properties, Suffern; Utica Landfill, Utica; Jones Landfill, Hyde Park; and Dzus Fastener site, Islip, NY.
- Wildlife surveys for DEIS preparation at Northport Marina, Northport, NY; Pierson Lakes Estates, Sloatsburg, NY; Sterling Forest, Tuxedo, NY; Brookhaven Industrial Park, Upton, NY; Piermont Landing, Piermont, NY; Centennial Hills, Warwick, NY; St. Thomas Aquinas College, Sparkill, NY; and Anchorage-on-the-Hudson, Newburgh, NY.

Fisheries Experience

Work plan design and evaluation of fish populations for the Brookhaven National Laboratory property in Upton, NY; the Spring Valley Water Company, Sloatsburg, NY; the Dzus Fastener site in Islip, NY; Mountain Creek land holdings in Vernon, NJ, and the Sterling Forest Corporation, Tuxedo, NY. Responsible for fish collection (by trawl, trap net, gill net, electrofishing, and beach seines), fish analysis (scales, otolith), and quality control.

Specific projects include:

Westway, Hunters Point, Arcorps, and River Walk waterfront environmental impact studies in New York Harbor.

EBASCO Cable Crossing Study, Long Island, NY.

Fall shoals/beach seine surveys for Consolidated Edison in the Hudson River.

- Pennsylvania and Fountain Avenue Landfills, Jamaica Bay, NY.
- Impingement studies at Orange and Rockland Utilities, Inc., Bowline Point and Lovett power plants, and Central Hudson's Roseton and Danskammer Point power plants on the Hudson River.

White perch survey for Orange and Rockland Utilities, Inc., on the Hudson River.

- Electric Power Research Institute (EPRI) fish diversion study and Empire State Electric Energy Research Corporation (ESEERCO) fish collection, Newburgh, New York.

Atlantic tomcod survey for Consolidated Edison, Hudson River.

Hydropower Experience

Field survey of walleye spawning in the bypassed reach and tailrace of the Franklin Falls Project on the Saranac River, New York; fish and invertebrate surveys of selected impoundments in the Beaver River Hydro Project; bank erosion and sedimentation study to evaluate the effects of peaking operations of selected hydro projects on the Manistee, Muskegon, and AuSable Rivers in Michigan. Conducted electrofishing and water quality studies on the Mongaup River associated with peaking operations (Orange and Rockland Utilities, Inc.).

Hazardous Waste Experience

Trained in hazardous materials site evaluation sampling procedures and health and safety; participated in manager's course for Hazmat sites, also trained in use of self-contained breathing apparatus (SCBA).

Specific projects/hazardous sites include:

- Combe Fill South Landfill
- Witco Corporation site
- Onyx Corporation site
- Lyncott Landfill
- Heleva Landfill

Prepared Phase II (NYSDEC) reports for the following sites:

Hi-Tor Industrial Park, Haverstraw, NY
Beacon Landfill, Beacon, NY

DEIS/Report Preparation Experience

Responsible for project management of the proposed New York City Department of Correction (NYCDOC) prison barge project in Oak Point, Bronx, NY; fisheries data collection and literature review for Atlantic Basin site in Brooklyn, NY; and an aquatic ecology report for the Croton Point Landfill closure in Westchester County, NY.

Responsible for data collection, interpretation, report writing, and preparation of environmental impact statements. Also attends scoping sessions, public hearings, and agency meetings associated with the State Environmental Quality Review (SEQR) process.

Specific projects include:

- Inrawest (Mountain Creek), Vernon, NJ
- Sterling Forest LLC, Tuxedo, NY
- East River CSO Facility Plan, Bronx, NY
- Flushing Bay and Alley Creek CSO Facility Plans, Queens, NY
- Northport Marina in Northport, Long Island, NY
- Pierson Lakes Estates in Sloatsburg, NY
- Piermont Landing, Piermont, NY
- Centennial Hills, Warwick, NY
- St. Thomas Aquinas College, Sparkill, NY
- Spring Valley Water Company, Sloatsburg, NY
- Proposed industrial park, Brookhaven, NY
- Anchorage-on-the-Hudson, Newburgh, NY

PAPERS AND PRESENTATIONS

"A Functional Assessment Method for Littoral Zone Wetlands in an Urbanized Ecosystem." Seymour, S.M., N.B. Wolfe, S.G. Metzger, and J. Gallo. 2000. Presented at the EPA Shallow Water Conference, October 2000, and the 3rd Annual Wetlands Regulatory Workshop, November 2, 2000, Atlantic City, NJ.

"The Role of the Compliance Monitor in Wetland Mitigation" Presented at the First EPA Regulatory Conference, November 1998, Atlantic City, NJ.

"The Eastern Brook Trout: Surviving in Suburbia." Poster presentation at the Wild Trout VI Conference, August 1997, Bozeman, MT.

Biology of the redbfin pickerel. Submitted to *the Conservationist*.

McGRODDY, PETER M.

EDUCATION

M.S., Environmental Engineering, 1975
B.S., Civil Engineering, 1971

REGISTRATIONS

Professional Engineer in the States of New York, New Jersey, Pennsylvania, and California

EXPERIENCE

Lawler, Matusky & Skelly Engineers LLP 1972-Present
Pearl River, New York

As Chief Operating Officer (COO), Mr. McGroddy, oversees LMS' technical operations groups, which provide engineering design, hazardous waste, environmental studies, and regulatory compliance services to industry and government. He is in charge of the technical and administrative activities in the firm's offices in New York, Pennsylvania, and Illinois. Prior to serving as COO, he served as partner-in-charge of LMS' Environmental Measurements Group (EMG) and Mid-Hudson Valley Office. Mr. McGroddy has directed numerous complex environmental permitting projects for industrial facilities. He has over 20 years of demonstrated management capability and experience in environmental analyses. Mr. McGroddy is also well known as a professional in environmental compliance management and training.

As partner-in-charge of EMG, Mr. McGroddy oversaw the operation of the analytical chemistry and biological laboratories, warehouse and field service facilities, and several project-specific on-site laboratories. Services include water quality surveys, industrial and hazardous waste site audits, groundwater studies, pilot and prototype treatment evaluations, biological surveys, bioassay and toxicity studies, and hydrographic surveys. Mr. McGroddy developed and implemented the company Health and Safety Program.

As partner-in-charge of the Mid-Hudson Valley Office, Mr. McGroddy was responsible for the management and administration of industrial facility projects and the direction of project managers and project engineers, as well as the execution of engineering studies and the preparation and interpretation of reports and conceptual designs. Services include assistance in regulatory interpretation, permit acquisition and modification (RCRA, SPDES, TSCA, air, wetlands), reporting requirements (SARA, RCRA, SPDES, TSCA), facilities design and upgrade, and compliance auditing. Recent projects for manufacturing sites have included preparing NYS Title V Air Permits, NYS Part 373 permit applications for TSDf; implementing RCRA compliance monitoring programs at three sites, which resulted in no citations for noncompliance items during state inspections; conducting comprehensive multimedia audits of chemical and electronic production facilities; preparing SPDES permit renewal and major modification applications; and

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preparing and updating SPCC plans, audits of buildings for wastestream identification, and bulk chemical containment and distribution facilities design.

Key assignments have included:

- Conducted major training program for over 2500 Consolidated Edison personnel on environmental procedures; including a program on specific corporate environmental instructions for facility operating personnel.
- Multimedia audits of large production facilities and corrective recommendations in preparation for regulatory agency audits.

Management of air emissions inventory and compliance permitting including engineering certificate of permit applications.

- RCRA operations and permit reviews for the purpose of developing self-audit programs to assure regulatory compliance at TSDF sites.

Negotiation of multimedia permits for large manufacturing facilities.

- Development of Best Management Practices for permit compliance.

Investigation of solvent-contaminated groundwater and potential remedial measures for a Fortune 500 company facility.

- Development of corrective action plan for RCRA-regulated facilities, including design and selection of alternative corrective measures.
- Sampling for determination of radon in residences.

Air permit maintenance for several manufacturing facilities with our 100 emission sources.

PAPERS AND PRESENTATIONS

Pollution Prevention: Old Concepts and New Perspectives. New York-New Jersey Environmental Expo, October 9, 1991.

Environmental Regulatory Review. Rockland County Leadership Council.

Fouling and clogging evaluation of fine-mesh screens for offshore intakes in the marine environment. In P.B. Dorn and J.T. Johnson (eds.), Advanced intake technology for power plant cooling water systems. Proc., Workshop of Advanced Technology, San Diego, CA. 1981 (with S. Petrich and L.E. Larson)

Division of marine fish larvae with angled louvers and fine-mesh screens. In P.B. Dorn and J.T. Johnson (eds.), Advanced intake technology for power plant cooling water systems, pp. 237-246.



Proc., Workshop of Advanced Technology, San Diego, CA. 1981 (with S.J. Edwards, D.R. Lispi, and P.B. Dorn)

Effects of five steam electric generating stations on aquatic biota of the southern shore of Lake Ontario. Proc., 21st Conference on Great Lakes Research, Windsor, Ont., 1978. (with R.L. Wyman, J.A. Matousek, and T.E. Pease)

Apparatus and method for sampling water for fish larvae and other trophic levels. U.S. Patent #4117726, October 3, 1978.

Efficiency of nets and a new device for sampling living fish larvae. J. Fish. Res. B. Can., 34(4):571-574, 1976. (with R.L. Wyman)

Effects of power plants on physical and chemical water quality parameters with specific attention to temperature, dissolved oxygen, and chlorine distribution. Proc., 3rd Hudson River Environmental Symposium. 1974. (with K.A. Abood, K.A. Konrad, and J. Shirk)



COMPANY OVERVIEW



Lawler, Matusky & Skelly Engineers LLP (LMS)

is an environmental engineering and science firm with a reputation for providing comprehensive and responsive consulting services to our clients. The firm, based in Pearl River, New York, has almost four decades of experience in the assessment of natural and man-altered aspects of the environment and the design of procedures and systems for its protection and enhancement.



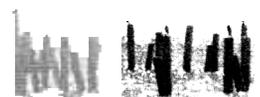
LMS combines a diverse group of specialists in Engineering, Environmental Science & Measurements, Environmental Modeling & Analysis, Environmental Assessment & Management, and Regulatory Analysis/Environmental Compliance & Permitting. Our staff's knowledge, insight and experience allow LMS to successfully complete projects of all sizes, while building and maintaining long-term relationships with our clients.



LMS has successfully completed over 5000 projects for more than 1000 private and public sector clients over the last 38 years. These projects have included environmental impact analyses, remedial investigations and design of remedial systems, assessment reports, design of water and wastewater treatment facilities, site engineering, regulatory compliance and permit application assistance, infrastructure assessment and design, resident engineering, expert testimony, field collection, laboratory analysis, and data interpretation.



LMS' home office is located 20 minutes north of New York City, in Pearl River, NY. In addition, we operate out of six other offices, located in Nyack, New York; Wappingers Falls, New York; Goshen, New York; Allentown, Pennsylvania; Smyrna, Delaware; and Woodstock, Illinois.



Lawler, Matusky & Skelly Engineers LLP

ENVIRONMENTAL SCIENCE & MEASUREMENTS



LMS' Ecology and Biology specialists apply life and physical sciences to the analyses of environmental and engineering problems. LMS has completed thousands of projects dealing with specialized environmental science and engineering services in the following areas:

- **Field and Laboratory Studies**

- Baseline surveys (flora and fauna, endangered species)
- Wetland mapping
- Wildlife and plant surveys
- Water quality sampling
- Hydrographic, bathymetric, and sediment (coring) surveys
- Sediment composition and chemistry
- Habitat evaluation
- Gear fabrication and evaluation
- Groundwater surveys
- Air quality sampling



- **Data Analysis and Interpretation**

- Database system development and management
- Population and community analyses
- Fish population dynamics
- Biostatistical interpretation

- **Environmental Evaluation Services**

- Environmental impact assessment
- Ecological site characterization
- Toxicity assessment
- Mitigation analysis, planning, and design
- Regulatory compliance evaluation
- Permitting/licensing assistance and interpretation
- EIS preparation/evaluation
- Workshops/handbook preparation/training sessions



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ENVIRONMENTAL SCIENCE (continued)



Habitat and Species Specific Assessments

- Wetland delineation
- Permitting
- Functional assessment and mitigation planning
- HEP, IFIM, WET
- Threatened and endangered species
- Forest fragmentation
- Wildlife populations and management
- ROW management programs



In the course of these efforts, LMS has prepared numerous environmental reports and testimony in support of permit applications before local, state, and Federal regulatory agencies, often representing clients at hearings and negotiating sessions. As a result, we are familiar with both Federal and regional regulatory compliance and permitting and have prepared comprehensive environmental impact statements in accordance with federal, state and local requirements.

We have been retained by industry and utility clients to prepare comments on Federal and state water quality criteria and regulations. These comments incorporated extensive statistical and ecological assessment of the toxicity data being used by the U.S. Environmental Protection Agency (EPA) and individual states to develop water quality standards and assess surface water impacts. We have also conducted numerous research projects in aquatic ecology, toxicology, and chemistry that, in many cases, resulted in development of specialized equipment and procedures.

LMS' Environmental Measurement capabilities include both data collection facilities and analytical and experimental laboratories. The laboratories are capable of conducting intensive biological and physical/chemical investigations of fresh, estuarine, and marine water bodies, as well as investigations of terrestrial and atmospheric environments.



LMS maintains fully staffed and equipped analytical chemistry and biological laboratories in Nyack, New York. Field sampling activities, analytical services, bioassays, treatability studies, other special laboratory and field services, and quality assurance functions are directed from this facility. Satellite laboratories designed and staffed to meet project needs are established where necessary.

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ENVIRONMENTAL SCIENCE (continued)



Field services (described below) are conducted in a range of environments and under a variety of health and safety requirements dictated by site conditions. Quality assurance and quality control (QA/QC) procedures are strictly adhered to during all phases of sample collection/transport and data reduction, so as to assure valid data and complete documentation.

Field Services

- Hazardous waste site surveys and sampling
- Groundwater sampling and monitoring
- Industrial/municipal wastewater, effluent, and sludge sampling
- Biological surveys of aquatic and terrestrial ecosystems
- Hydrographic, bathymetric, and coring surveys
- Stream gaging and current measurements
- Water quality and sediment surveys



Analytical Services

- Wet chemistry analyses
- Gas chromatography
- Aquatic organism taxonomy
- Grain-size analysis

- **Treatability Studies**

- Bench-scale testing
- Pilot plant evaluation
- Biological, physical, and chemical wastewater treatment systems



Special Services

- Hydroacoustics
- Triaxial temperature surveys
- Data Acquisition System
- Dye studies
- Equipment development and evaluation

MATHEMATICAL MODELING & ANALYSIS

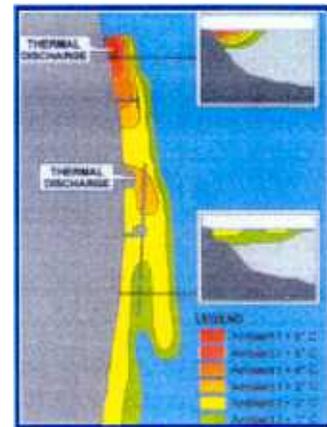
LMS

LMS' specialists in mathematical modeling, environmental engineering, statistics, and computer science have extensive experience performing analyses of complex environmental problems using mathematical models, as well as analytical techniques.

LMS has a demonstrated ability to develop, calibrate, and apply mathematical models, starting with either the basic equations of fluid transport, chemistry, thermodynamics, etc., or with an existing computer model that is applicable to the water body under study. LMS has earned a reputation for its extensive work in modeling physical, biological, and chemical parameters. We have performed hundreds of modeling projects involving specialized knowledge in the following areas:



- Water Quality
- TMDL (Total Maximum Daily Load)
- Hydrodynamics
- Water Supply and Reservoir Management
- Thermal Plume Modeling
- Pollutant Fate and Transport
- Watershed Analysis and Management
- Fish Life History/Population Dynamics
- Sediment Transport
- Groundwater Modeling
- Combined Sewer Overflow
- Environmental Statistics and Database Development



LMS has applied models to a diversity of waterways as part of various regulatory programs, including the setting of discharge permit limits (wasteload allocations), watershed planning and management, combined sewer overflow (CSO) projects, toxic contaminant studies, 316(a) and (b) demonstration studies, power plant (e.g., nuclear, fossil, hydroelectric) licensing applications, Article X, and dredge and fill permitting.

In addition, LMS develops and maintains databases of environmental information. Our professional staff has extensive experience in the application of a wide variety of commercially available database management systems, as well as the development of customized systems.

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REGULATORY ANALYSIS/ ENVIRONMENTAL COMPLIANCE & PERMITTING



LMS' engineers, scientists, regulatory specialists, and information management specialists provide a full range of services for industrial/manufacturing and commercial facilities. Our primary focus is to provide state-of-the-art environmental management and operating support services to industrial/commercial facilities in the energy, chemical, electronic, pharmaceutical, and heavy and light



manufacturing industries, as well as government entities. Current clients include major energy providers, Fortune 500 industries, small industry, Federal and state agencies, and large and small municipalities located throughout the US.

Our specialists blend a variety of backgrounds, including consulting, industrial operations, and regulatory agencies. This enables LMS to provide each client with a project team of technical experts, who not only bring their past environmental problems into compliance, but help them stay in compliance, and let them know how changing regulations will affect their futures.

- **Compliance Services**
 - Facility audits and compliance assessments
 - Permitting: air, water, hazardous and solid waste management
 - Tank assessments
 - Management and staff training
 - Site assessments
 - Facility infrastructure evaluation and planning
 - Permit management
 - Environmental risk analysis
 - Waste Minimization Programs
- **Support Services**
 - Data management and reporting
 - Regulatory compliance training programs
 - Facility environmental management programs
 - Facility planning assistance
 - Regulatory reference research
 - Facility staffing and outsource services
- **Engineering Services**
 - Design and Construction Management
 - Water supply and waste treatment
 - Material handling facilities
 - Remediation systems
 - O&M support for operations



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ENVIRONMENTAL ASSESSMENT & MANAGEMENT

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LMS' Environmental Assessment & Management specialists include professional geologists, engineers, geochemists, and environmental scientists who focus on each client's concerns for contaminants in the environment. Our extensive project experience includes evaluation and modeling of groundwater contamination, remediation of



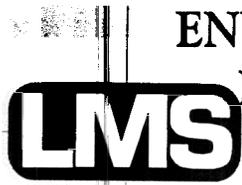
contaminated sites, redevelopment of brownfields sites, quantitative assessment of the transport and environmental fate of contaminants (including their adsorption and volatilization), critical review of toxicity data, risk assessments, groundwater remediation, and water supply development.

We meet our clients' objectives in efficiently dealing with the full range of contaminants (petroleum hydrocarbons; heavy metals; polychlorinated biphenyls [PCBs]; industrial solvents; cyanides; pesticides; volatile organics; benzene, toluene, ethylbenzene, and xylene [BTEX]; polycyclic aromatic hydrocarbons [PAHs]; radioactive elements; and radon) in all environmental media (surface water, groundwater, soil, sediment, air, wastes). Our experience encompasses all aspects of contaminant waste studies, including:

- ***Brownfields redevelopment studies.*** LMS has been a pioneer in the area of brownfield redevelopment. We have assisted clients in defining regulatory needs and insurance coverage. We also conduct site investigation assessment and prepare redevelopment plans.
- ***Preliminary investigations and site surveys.*** We have performed dozens of site assessments, including many for real estate transfers (due diligence). Our services include lead-based paint assessment, as well as coordination of asbestos testing and remediation.
- ***Remedial investigations (RI).*** These investigations may include such activities as geophysical studies; drilling test borings and installing monitoring wells; collecting soil, groundwater, surface water, and air samples, and performing laboratory analyses; geophysical investigations and interpretation; interpretation of groundwater and contaminant plume movements; surveying; and public health and environmental risk assessment.



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ENVIRONMENTAL ASSESSMENT & MANAGEMENT (continued)

Feasibility studies (FS). These studies focus on resolving the contaminant concerns in a way that meets our clients objectives. In the process we develop and evaluate remedial action alternatives. Starting from a list of site-appropriate technologies and site-specific remedial objectives and criteria, a range of alternative actions (generally including no action) are developed and evaluated.



Remedial design (RD). Elements of remedial design for hazardous waste sites include conceptual or predesign studies, preliminary treatability studies, preliminary and final design documents (plans, specifications), and preparation of contract documents.

- **Construction management and resident engineering (CM/RE).** CM/RE services by our design group include the preparation of operation and maintenance (O&M) manuals, construction management and RE services, and preparation of as-built drawings. These services can also be extended to final closure certification and postclosure environmental monitoring.

Our services relating to contaminant issues frequently include negotiations with local, state, and Federal agencies to gain their approval of the planned remedial development plan.

We offer a full range of services to clients with regard to petroleum storage facilities, including Spill Prevention, Control, and Countermeasure (SPCC) plans; Discharge Prevention, Containment, and Countermeasure (DPCC) plans in New Jersey; permitting; tank testing (by subcontractor); design and supervision of tank pulls; and design of new aboveground and underground storage tank (AST/UST) installations. We have provided such services to a wide variety of clients.



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ENGINEERING

LMS

LMS' professional engineering staff provides a broad spectrum of services including managing municipal and industrial projects involving water supply, wastewater, and solid waste management; remedial design and resident engineering services; site engineering and CADD services. Our engineers, environmental scientists, and urban planners bring a wealth of knowledge, insight and experience into each project.



LMS' project experience includes conceptual design of water and wastewater treatment facilities, economic analysis of treatment options, supervision of laboratory- and pilot-scale process investigations, and engineering and economic assessment of remedial options for groundwater contamination and other hazardous waste problems. Work for industrial clients has also included representation before regulatory agencies to determine treatment requirements and discharge limitations developed in response to groundwater contamination, as well as remedial designs for groundwater and soil contamination projects.

LMS has designed and provided resident engineering on all types of water, wastewater, and waste management systems, including the following:

- Physical, chemical, and biological waste treatment facilities**
- Water treatment plants**
- Water distribution systems**
- Sanitary, storm, and combined sewers and stormwater retention basins**
- Pumping stations**
- Resource recovery systems**
- Circulating water systems, submerged outfalls, and diffuser systems**

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ENGINEERING (continued)

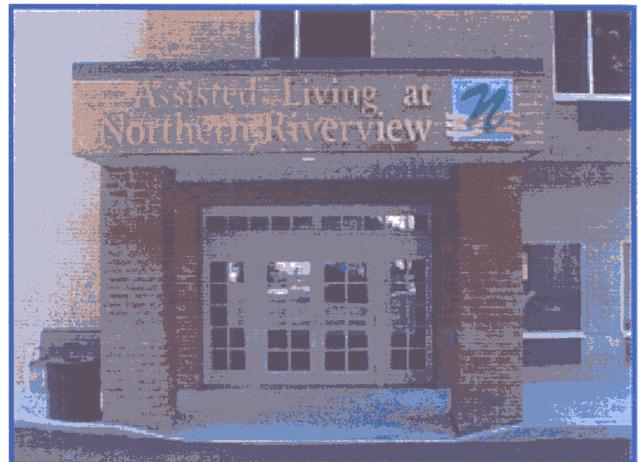


LMS' Civil Engineering & CADD Services section provides design and construction support to all market sectors, clients, and other divisions of the company. One of our primary areas of expertise is municipal services, both conventional civil engineering services (such as plan review and construction inspection) and specialty services, such as wetlands delineation and trenchless pipeline repair and replacement.



Some of our more recent projects include the Construction Monitoring for the Town of Clarkstown for the Palisades Center Mall; Sewage Treatment Plant and Collection System Upgrades for the Village of Goshen; Nyack Trunk Line repairs for the Town of Orangetown; Tank Pulls and an Athletic Field design for East Ramapo Central School District; Tank remediation, SEQRA Consulting and Permitting for Clarkstown Central School District; Garage Salt Storage, landfill repairs and detention basin upgrades for the Town of Clarkstown; Site plan, site improvements and wastewater treatment systems for Brewster Central School District, and a new middle school for Chappaqua Central School District.

Being municipal specialists, LMS also offers a wide range of services to residential and commercial Developers. We can take a site development project from the planning stage to sketch plan, handling environmental concerns, developing water supply and wastewater disposal options, providing engineering design, obtaining plot approval, and offering resident engineering and construction management services. We specialize in wetlands



delineation and permitting, and stormwater management and sedimentation and erosion control activities. Our experience in environmental impact analysis and regulatory procedures (such as the NY State Environmental Quality Review [SEQR]) and in the potential liabilities of recently purchased sites as formulated in Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), allows us to provide complete environmental assessments prior to site purchase. We provide subdivision services from 2 to 2,000 units, and site plan services from single homes to large shopping centers to golf courses.

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ENGINEERING (continued)

LMS

Some examples of these include site plans in Rockland County for active adult housing, independent living, assistive living, and advanced care facilities; design and engineering for a new Stop & Shop in Poughkeepsie, NY; and stormwater management and compliance for the Mansion Ridge Golf Course.

LMS has also been heavily involved in local and regional wastewater management and contaminant investigations, including the U.S. Army Corps of Engineers' (USACE) urban studies programs, industrial pretreatment studies, area wide liquid and solid waste management programs, and facilities planning under Section 201 of the Clean Water



Act (CWA). Broadly, these assignments involve stages of "needs" assessment, including formulation and evaluation of alternative management plans. Specifically, these projects include:

- Water resource evaluations**
- Treatment plant analysis and conceptual design**
- Site planning**
- Cost estimates**
- Landfill and hazardous waste site assessments**
- Stormwater runoff control**
- Combined sewer overflow assessment**
- Surface and groundwater modeling**
- Impact assessment**
- Planning projections**

LMS prides itself on being at the forefront of technology, both on the engineering side and the information technology side. Our CADD and other computer services are state-of-the-art, with such recent advances as AutoCAD 20002 with Land Development Desktop, Civil and Survey Packages, FTP, and Buzzsaw.com for fully integrated project execution.

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