FINAL DETERMINATION OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S ASSISTANT ADMINISTRATOR FOR WATER, CONCERNING WETLANDS OWNED BY THE RUSSO DEVELOPMENT CORPORATION IN CARLSTADT, NEW JERSEY PURSUANT TO SECTION 404(c) OF THE CLEAN WATER ACT

CONTENTS

I. INTRODUCTION

Section 404(c) of the Clean Water Act (CWA, U.S.C. 1251 et seq.), authorizes the Administrator of the Environmental Protection Agency (EPA) to prohibit or restrict the use of any defined area as a disposal or discharge site whenever he or she determines, after notice and opportunity for public hearing, that the discharge of dredged or fill material into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such a determination, the Administrator must consult with the Chief of the Army Corps of Engineers, the property owner(s), and the applicant(s) in cases where there has been application for a Section 404 permit.

EPA's regulations implementing Section 404(c), 40 CFR Part 231, establish procedures to be followed in exercising the Administrator's authority to prohibit or restrict the use of an area as a disposal site. The three major steps in the process are: 1) the Regional Administrator's proposed decision to prohibit or restrict the use of a site, 2) the Regional Administrator's recommendation to the Administrator to prohibit or restrict use of the site, and 3) the Administrator's final decision to affirm, modify, or rescind the regional recommendation. The Administrator has delegated the authority to make a final decision under Section 404(c) to the Assistant Administrator for Water who is EPA's national Section 404 program manager.

This Final Determination concerns a 57.5 acre wetland in Carlstadt, New Jersey where the Russo Development Corporation (Russo) proposes to maintain 52.5 acres of unauthorized fill (of which 44 acres have been built upon) and to fill an additional five acres of wetland to complete a warehouse complex.[1/] The wetland site is located in the Hackensack Meadowlands in Carlstadt at the Lots 59, 64.01 - 64.06 and 66.01/.02. In negotiations during the Corps' permit process, Russo proposed to enhance a nearby (although not delineated) wetland northeast of the project site and to secure the permanent preservation of 23 acres of wetland in Troy Meadows of the Passaic River basin (to the southwest of the Hackensack River basin) as mitigation.

This Final 404(c) Determination addresses unacceptable adverse effects to wildlife. The 404(c) regulations define unacceptable adverse effect as an impact on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies or significant loss or

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1/ As I discuss in Part III, A of this Final Determination, it is possible that portions of the areas delineated as old field on EPA's map of the Russo site in its pre-discharge condition may have contained uplands. Although this does not alter my final decision, it does call into question the precise acreage of wetlands which contain unauthorized fill. I will, therefore refer to an approximate acreage for the purposes of this document.

damage to fisheries, shellfishing, wildlife habitat or recreation areas. Under Section 231.2(e) of the 404(c) regulations, the evaluation of the the unacceptability of such impacts should consider the relevant portions of the Section 404(b)(1) Guidelines.

Those portions of the Guidelines relating to significant degradation of waters of the U.S. (40 CFR 230.10(c)), to minimizing adverse impacts to aquatic resources (40 CFR 230.10(d)), and to the determination of cumulative effects on the aquatic ecosystem (40 CFR 230.11(g)) are of importance to evaluating the unacceptability of environmental impacts in this case. Compliance with the Guidelines requires that no discharge of dredged or fill material shall be permitted if it causes or contributes to significant degradation of waters of the U.S. Effects contributing to significant degradation include but are not limited to the loss of wildlife habitat or the loss of a wetland's capacity to assimilate nutrients. Compliance with the Guidelines also requires that no discharge be permitted unless appropriate and practicable steps have been taken to minimize adverse impacts of the discharge on the aquatic ecosystem, including steps to mitigate the discharge. In addition, the Guidelines state that the permitting authority should consider information concerning cumulative impacts during the decision-making process. Thus, it is appropriate, within the context of my Final Determination, to take into account whether the project has resulted or will result in significant site specific and cumulative losses of wildlife habitat and whether the proposed mitigation is adequate.

I have carefully considered the record developed by EPA and the Corps of Engineers (Corps) in this case, including the public comments submitted in response to the notice announcing the proposed determination and at the public hearing, the comments of other federal and state agencies and the information received during EPA headquarters' consultation with Russo and the Corps. As described more fully below, I have determined that the Russo site was/is very valuable to wildlife from a site specific and cumulative standpoint and, therefore, that its values must be retained. This conclusion, combined with the fact that the proposed mitigation plan would not replace those wildlife values that have been and are anticipated to be lost, leads me to my determination that the unauthorized discharge of fill material and the proposed discharge of fill material into the Russo site has had and will continue to have an unacceptable adverse effect upon wildlife. Therefore, I am affirming the Regional Recommended Determination and exercising my authority to prohibit the designation of the subject wetlands as a discharge site. I explain the basis for my conclusions in the following sections.

As previously stated, unauthorized fill material is in place on site and EPA's 404(c) action therefore, addresses an after-the-fact permit application as well as a request for a permit to place additional fill material. EPA's 404(c) action, therefore, denies Russo legal authorization for approximately 52.5 acres of existing fill and prohibits the proposed deposition of fill material on the remaining 5 acres of wetlands.

II. PROJECT DESCRIPTION AND BACKGROUND

A. The Project

The project is located in approximately 57.5 acres of wetlands in Carlstadt in the Hackensack Meadowlands in Bergen County, New Jersey. Figure one identifies the project vicinity. The Russo Development Corporation (Russo) placed fill material in approximately 44 acres of wetlands without the benefit of a Corps of Engineers (Corps) Section 404 permit in 1980 and constructed six warehouses and began a seventh on the 44 acre fill. These six warehouses are currently tenanted. Russo subsequently filled approximately 8.5 additional acres of wetlands adjacent to the 44 acre fill in order to build additional warehouses. This was accomplished prior to the Corps' issuance of a cease and desist order addressing the company's activities. Russo also excavated two to three acres of an adjacent five acre wetland area to remove wetland soils and provide an opportunity to fill with suitable construction materials. The two to three acre area previously excavated subsequently ponded and developed into open water with aquatic and emergent vegetation.

In summary, the project currently at issue with respect to this 404(c) action involves approximately 44 acres of existing, unauthorized fill with warehouses, approximately 8.5 acres of existing, unauthorized fill with no structures, and five acres of wetlands containing a two to three acre pond. Russo has also proposed a mitigation plan for wetlands loss. The mitigation plan which was at issue at the end of the Corps' permit process includes enhancement of an unspecified acreage of wetlands located approximately 1.5 miles northeast of the project site within the Hackensack Meadowlands and the permanent preservation (via deed restriction) of 23 acres of offsite wetlands owned by Russo and located in Troy meadows, within the Passaic River basin, which is southwest of the Hackensack River basin.

B. Background

I have reviewed Region II's Recommended 404(c) Determination (RD) and the administrative record pertaining to this case and find that the Region II's Determination accurately reflects the background events to which it refers. I hereby adopt pages 3-6 of the RD. Below, I provide additional background information as well as a summary of EPA headquarters actions.

Additional Background Information

Mitigation is a method by which wetlands impacts associated with discharges of fill material, are avoided, reduced or compensated. While avoidance of impacts is the most preferred type of mitigation, mitigation measures commonly include minimization of impacts, wetland enhancement, wetland restoration, and wetland creation. Discussions on mitigation during the Corps' permit application process were concerned with replacing the functions and values of the wetlands at issue. Under a value-for-value approach both the Russo wetlands and the proposed mitigation wetlands are compared to a common standard to determine the mitigation sites' ability to effect replacement of lost wetland functions and values. Depending on the mitigation site, value-for-value mitigation could result in either less or more acreage being created or enhanced than that impacted on the Russo site.

LOCATION OF RUSSO TRACT

SOURCE: USGS WEEHAWKEN QUADRANGLE PHOTOREVISED 1981

SCALE: 1" = 2000'

FIGURE 1

Russo submitted per acre wetland values in February 1986 in conjunction with its mitigation proposal in Lyndhurst. Russo's contractors assigned the project site a pre-project (i.e., pre-fill) per acre value of 1.5 and the proposed preservation area within Troy Meadows a per acre value of 8.4 based upon best professional judgment (the per acre value assigned to the Lyndhurst wetlands is not repeated as the site has been withdrawn from consideration as a mitigation site). As the RD indicates, Region II considered the pre-project, per acre value of the Russo wetlands, as assigned by Russo's contractors, to be too low and requested technical data to support that value. Russo did not submit further documentation in this regard.

The administrative record indicates that the Corps assigned per acre values to the filled wetlands at the Russo site and the Troy Meadows wetlands proposed for preservation in July, 1986 (See Corps Memorandum For The Record dated July 11, 1986). In a meeting on July 11, 1986, personnel of the New York District Regulatory Branch assigned the Russo site a pre-project, per acre value of 2.3 based upon best professional judgment. In reaching this conclusion the Corps considered factors such as vegetative cover, hydrology, site history, juxtaposition to other wetlands, development and the Hackensack River and distribution of fill and refuse on the site. The Corps' conclusions also reflected their belief that the Russo site was dominated by common reed (Phragmites australis) and, therefore, that the habitat was not diversified. In the July 11, 1986 meeting the Corps assigned the wetlands in Troy Meadows a per acre value of 8.4 based upon best professional judgment. In arriving at this value, factors such as vegetative cover, juxtaposition to adjacent wetlands and development and a faunal survey which indicated that there is a wide range of wildlife diversity on site were considered. In a subsequent meeting also on July 11, the Corps concluded that only 15% of the Troy Meadows wetlands value would be accepted as mitigation. This value was also based upon best professional judgment and took into consideration that the site is not in the Hackensack River Basin, that it does not provide direct compensation since it is already wetlands and is protected from filling activities that do not meet the requirements of Section 404 of the CWA.

The administrative record also indicates that the Corps assigned a per acre value to the 5 unfilled acres on the Russo tract and pre and post enhancement per acre values to a "representative wetland enhancement site" within the Empire Tract (Russo had indicated that a wetland area within this tract may be used for enhancement purposes) (see Corps Memorandum for the Record dated January 28, 1987). Corps personnel inspected this area and then determined their relative values. A per acre value of 4.8 was assigned to the five unfilled acres of the Russo tract using the per acre value assigned to the filled wetlands in its pre-discharge state (2.3) as a reference point and considering certain factors which included a lack of habitat diversity due to the presumed, predominant common reed cover.

The memorandum indicates that a pre-enhancement per acre value of 2.3 was assigned to the "representative tract" based upon the dominant common reed cover which provides poor bird habitat and low biomass production. The memorandum also indicates that the Corps assigned a post enhancement value of 6.3 per acre based upon a plan that provides for the establishment of an intertidal wetland connected to the Hackensack River and vegetated with salt marsh cordgrass (Spartina alterniflora). Other factors considered in assigning this value were existing river pollution and proximity to industry (negative factors), estuarine community establishment, improvement in water quality and greater habitat diversity (positive factors). The memorandum indicates that the per acre values were used to calculate that 18.1 acres would be required to be enhanced to provide 50% of the value of the 57.5 acre site.

The record does not indicate that Region II, the National Marine Fisheries Service or the Fish and Wildlife Service contributed to or commented on the Corps assigned per acre values. The Corps did not assign per acre values to some of the wetlands at issue until January 1987 after Region II's Regional Administrator had met with the North Atlantic Division Engineer. The record indicates that discussions between the Corps and the resource agencies focused primarily on how much wetland value would be mitigated (replaced) as opposed to how the value would be determined. As the RD indicates, Region II objected to the Corps requiring mitigation for only 50% of the value of the Russo site.

EPA Headquarters Actions

After the close of the comment period, the Regional Administrator submitted the RD to me, as well as the administrative record compiled by the Region, to prohibit specification of the Russo site for the discharge of fill material. The Determination is based upon a finding that the existing unauthorized fill material discharged on approximately 52.5 acres of wetlands as well as the proposed discharge on 5 additional acres of wetlands has resulted and will result in unacceptable adverse effects to wildlife. The RD is dated January 19, 1988 and, along with the administrative record, was received at EPA Headquarters on January 22, 1988.

EPA subsequently notified the Russo Development Corporation and Mr. John Elmore, Chief, Operations and Readiness Division, Corps of Engineers by letter dated February 5, 1988 of their opportunity for consultation in compliance with the Section 404(c) regulations.

Mr. Lawrence Russo responded in a letter dated February 19, 1988 in which he requested a meeting and offered comments in rebuttal to the McGuire Report entitled "An Evaluation of Wetland Conditions on the Russo Tract Before and After Wetland Filling". The McGuire Report served as a basis for Region II's conclusions with respect to the current and pre-discharge wetland character of the Russo site and its current and previous wetland values.

The letter challenged the methodology and conclusions regarding onsite wildlife observations, the applicability of the Golet and Larsen method for evaluating wildlife values and the conclusions of the report with

respect to wildlife utilization of the remaining wetlands. Mr. Russo also stated that the report fails to observe that the wildlife values assigned to the remaining on site wetlands may be attributed to his excavaton of the two to three acre pond. Mr. Russo's letter stated that the aerial photographs used to map the site in its pre-discharge condition predate the construction of two roads (Commerce Boulevard and Central Boulevard) which served to separate approximately 44 acres of this site from adjacent wetland tracts and, therefore, that the vegetation map does not accurately represent the wetland's vegetative cover at the time of filing. He also contested the report's conclusions that the remaining wetlands trap waterbourne pollutants.

I met with Mr. Russo and his representatives on March 4, 1988. During our consultation meeting, Mr. Russo spoke at length concerning his frustration with the Section 404 permit process. He was particularly frustrated over negotiations with respect to mitigation. He stated that the Corps and EPA had not articulated what mitigation was specifically required and that the agencies did not understand or consider that factors such as property costs and land availability in the Meadowlands imposed constraints on Mr. Russo's capability to satisfy the agencies' mitigation concerns. He further stated that these constraints would probably have prevented him from complying with the Corps' intended permit conditions concerning mitigation. Mr. Russo declined to provide further written comments, stating his preference for a timely conclusion to EPA's Section 404(c) process based upon the record to date.

Dr. William Fehring of Greiner, Inc., a consultant for Russo discussed the technical aspects of the McGuire Report. He stated that wildlife utilization of the site in its pre-discharge state may have been restricted by the presence of the surrounding development. Second, he stated that the Russo site burned periodically providing an opportunity for vegetative succession to various degrees. He stated that because of this factor the vegetation map in the McGuire Report may not accurately represent a stable or continuous wetland character and may not accurately represent the wetland vegetation on the approximate 44 acre part of the site when Russo began the unauthorized work. He further stated his belief that common reed cover was increasing over the site from south to north. He also questioned the applicability of the Golet and Larsen methodology to predict the wildlife habitat value of the Russo site in its pre-discharge state.

The Corps responded to their invitation for consultation in a letter dated March 10, 1988 and provided comments regarding the technical aspects and interpretation of Guidelines compliance within the Region's RD. The Corps stated that they did not propose to take additional action to prevent unacceptable adverse impacts to wildlife because the additional procedural delays would be unfair to Russo and that the New York District's (NYD) decision was reasonable, based upon the information available at that time. They also stated that requesting NYD to reconsider its previous permit decision in light of new information on the site, did not guarantee that NYD's decision would be acceptable to EPA. Regarding the technical

adequacy of the RD, the Corps stated that EPA may have overestimated the amount of open water on the site in its pre-discharge condition which may have resulted in overestimating the value of the site for water-oriented species of wildlife. Regarding compliance with the Guidelines, the Corps supported NYD's decision to require one-half replacement of wetlands values in conjunction with its decision to authorize the Russo project. The Corps stated that NYD had worked with Russo to develop appropriate and practical mitigation, that this was in compliance with Part 230.10(d) of the Guidelines and consistent with previous Corps interpretations regarding mitigation and compliance with the Guidelines.2/ The Corps also stated their belief that the Guidelines do not preclude a net loss of wetlands or wetland values, only a significant loss.

2/ I believe that Part 230.10(c), as well as Part 230.10(d), of the Guidelines is also relevant in this case. I concur with the Regional Administrator that, in this case, significant adverse effects have resulted/will result even after implementation of the proposed/required mitigation. Therefore, the project with the proposed/required mitigation is not in compliance with Part 230.10(c) of the Guidelines.

III. DESCRIPTION OF THE SITE

I have reviewed the RD and the administrative record and conducted investigations as necessary and conclude that the RD provides an accurate description of the wetlands at issue and their values. I hereby adopt pages 7-15 of the RD as part of my Final Determination. Below, I summarize pertinent parts of the RD and provide additional discussion.

In addition, my discussion of Section 404 jurisdiction is essentially in two parts. First, I will briefly respond to Russo's claim that Section 404 jurisdiction is not applicable to the westernmost portion of the tract which is separated from the remainder of the tract by Commerce Boulevard and Central Boulevard. Second, I will clarify the applicability of Section 404 jurisdiction to the 52.5 acres of the site that have been filled in light of EPA's new information concerning vegetation on the Russo site in its pre-discharge state.

A. Section 404 CWA Jurisdiction

Russo has claimed, through letters from its legal representative and affidavits from consultants, that the westernmost 44 acres of the site that have already been filled and contain warehouses have historically been hydrologically altered by interruption of tidal flow and drainage activities, isolated from adjacent wetlands by road construction and adjacent development and disturbed by farming, as well as by the indiscriminate placement of fill material and refuse to the point of ultimately converting the area to uplands. In addition, Russo has claimed that if some portion of the 44 acres was wetlands, these wetlands are located above the point at which the flow of Monachie Creek is five cubic feet per second (which defines the headwaters within the Corps' permit regulations) and, therefore, that filling activities would be authorized pursuant to the nationwide permit at 33 CFR 330.5(a)(26).

The record indicates and EPA acknowledges that the subject site has undergone extensive changes within this century. To summarize, these changes include: installation of tide gates and earthen dikes in the mid-1920's which prevented tidal inundation of the area; excavation of a series of ditches in the mid-1930's for mosquito control purposes which serve to drain the site; construction of a sanitary sewer pipeline and, eventually, Central Boulevard along the same alignment, which divided 44 acres of the site from the easternmost 13.5 acres, and the construction of Commerce Boulevard along the site's southern edge which, in conjunction with development to the north, served to separate the area from adjacent wetland tracts; farming activities, especially in the western portion of the site; and miscellaneous filling activities to provide dirt paths across the site.

While these activities no doubt disturbed the site and cumulatively resulted in ecological succession of the site from intertidal estuarine wetlands to freshwater wetlands, the Corps has determined that they did not result in conversion to uplands.

The Corps investigated the jurisdictional issue and discussed the results in a Memorandum dated June 6, 1986. In conducting the investigation, the Corps relied on maps, reports, and data from the 1970's because of the extensive ecological changes to the site, to reach a conclusion that the entire Russo

site was wetlands subject to jurisdiction under Section 404 of the CWA and that fill deposited within the 44 acre portion of the site was not authorized by nationwide permit at 33 CFR 330.5(a)(26). I note that while Corps jurisdictional Memorandum dated June 6, 1986 was based upon their 1982 regulations, the Corps' 1977 regulations, which were in effect at the time the filling took place, and the Corps' 1986 regulations currently in effect do not deviate with respect to jurisdiction over the Russo site.

To fulfill EPA's obligations under 404(c) there is generally no need to revisit the Corps' jurisdictional determinations. However, because EPA obtained new information, not available to the Corps at the time it determined jurisdiction, it was necessary for me to consider the new information because I believe it raises questions with respect to Section 404 jurisdiction over the areas delineated as old field in Figure 3. Review of aerial photographs did not reveal a dominant species (or mixture of species) of vegetation on the old field areas as it did in other parts of the Russo site. In addition, the vegetation inferred to have existed in the old field areas includes predominantly facultative wetland species (species that are usually found in wetlands but are occasionally found in uplands) and facultative upland species (species that are usually found in uplands but are occasionally found in wetlands). It may be said that information on vegetation at this point is inconclusive and raises the possibility that portions of the old field areas may have been uplands.

Under EPA's wetland delineation methodology, further investigation of a site's soils and hydrology is required under these circumstances to ascertain the boundaries between wetlands and uplands. Unfortunately, these old field areas have already been filled and some of them are beneath existing warehouses and paved areas. Additional investigation of historical information on the old field portions of the Russo site will be necessary to determine the extent of wetland soils and hydrology.

I have not endeavored to completely resolve this matter within the context of EPA's 404(c) action. During consultation, Mr. Russo expressed his desire for a timely decision concerning EPA's 404(c) action. Complete resolution of this jurisdictional issue will take time and would require an extension to the 404(c) process if it were necessary to resolve it within the 404(c) process. *per se*. However, in this case we are dealing with an after-the-fact situation and the areas at issue are small in proportion to the entire Russo tract. Therefore, this situation does not cause me to reconsider my conclusions concerning the wildlife values that were and are provided by the Russo tract and the inadequacy of the proposed/required mitigation. While this issue may ultimately affect the precise amount of necessary mitigation, it does not affect my findings and conclusions with respect to consequences of the existing and proposed fill to wildlife.

B. New Information - Vegetation

As the RD indicates, Region II's investigations have revealed that, prior to filling, the Russo site supported other wetland communities in addition to common reed. Even though personnel of the Corps, EPA, FWS and NMFS had visited the 5 acre unfilled portion of the Russo tract and reviewed aerial photographs, the record indicates that assumptions with respect to the site's pre-discharge vegetative character were largely influenced

by the fact that common reed is the predominant vegetation in the Hackensack Meadowlands.

Region II's investigations in this regard employed a more detailed and sophisticated methodology. I will discuss the more substantive aspects of the methodology as they relate to the case at issue. The investigation was conducted by a botanist and a wildlife biologist who have education, training and professional experience in the interpretation of aerial photographs. The mapping of the Russo tract was prepared from stereo-paired aerial photographs taken in 1978. Mapping was facilitated by the examination of earlier photographs, the ground-truthing of current (1985) stereo-paired aerial photography, and verification from historical accounts.

Viewing stereo-paired aerial photographs involves viewing two aerial photographs at once (actually viewing the overlap of their respective coverages) through a lens stereoscope. This device provides a magnified, three dimensional image with enhancement of object height and texture. The vertical enhancement clearly shows the contrast between common reed, which is a tall plant, and much shorter vegetation found in, for example, a wet meadow. In addition texture may be defined as the pattern or signature which a wetland type exhibits in an aerial photograph. Viewing stereo-paired aerials enhances this feature, thus providing an additional component to facilitate differentiating between wetland types. "Ground-truthing" defines a process by which an on-site visit is performed to validate the accuracy of an aerial photograph with respect to current conditions. In this instance ground-truthing the 1985 aerial photographs of the 5 unfilled acre portion of the Russo tract validated their accuracy and provided a basis for identifying wetland vegetation in the 1978 aerials, thereby facilitating the mapping exercise. Interviews with persons familiar with the Russo tract prior to filling supported the vegetation map of the site. Most notably, an employee of the Hackensack Meadowlands Development Commission, whose expertise in the Meadowlands is well-recognized by the regulatory community, stated that the Russo tract more closely resembled the meadows around Losen Slote as opposed to the common reed areas of the Empire Tract (see McGuire Report).

In conclusion, I find that the mapping of the Russo site depicts an accurate account of the existing vegetation comprising the the five unfilled acres of wetlands and the wetland communities contained within the 57.5 acres of the site in its pre-discharge state.

To summarize, Figure 2 shows the 8 1/2 acre filled area and the current pattern of vegetation in the 5 unfilled acres of the Russo tract and Table 1 lists the plant species identified. A vegetation zone dominated by common reed occurs along the north, west and south edge of this portion of the site. Within this zone, common reed occurs in standing water in association with duck weed and on saturated soils with little or no surface ponding present. Between the common reed zone and the two to three acre pond is a zone of mixed emergent vegetation containing sedges, rushes, cattail, water smartweed, water plantain, saltmarsh fleabane, duckweed and common reed. The two to three acre pond contains a mix of emergent, floating-leaved and submergent vegetation. Broad-leaved cattail is the dominant emergent species with new growth in the northerly and westerly portions of the pond. Water purslane and several pondweeds (unidentified) occur in the shallower portions of the pond. A small area of wet meadow occurs along the eastern boundary

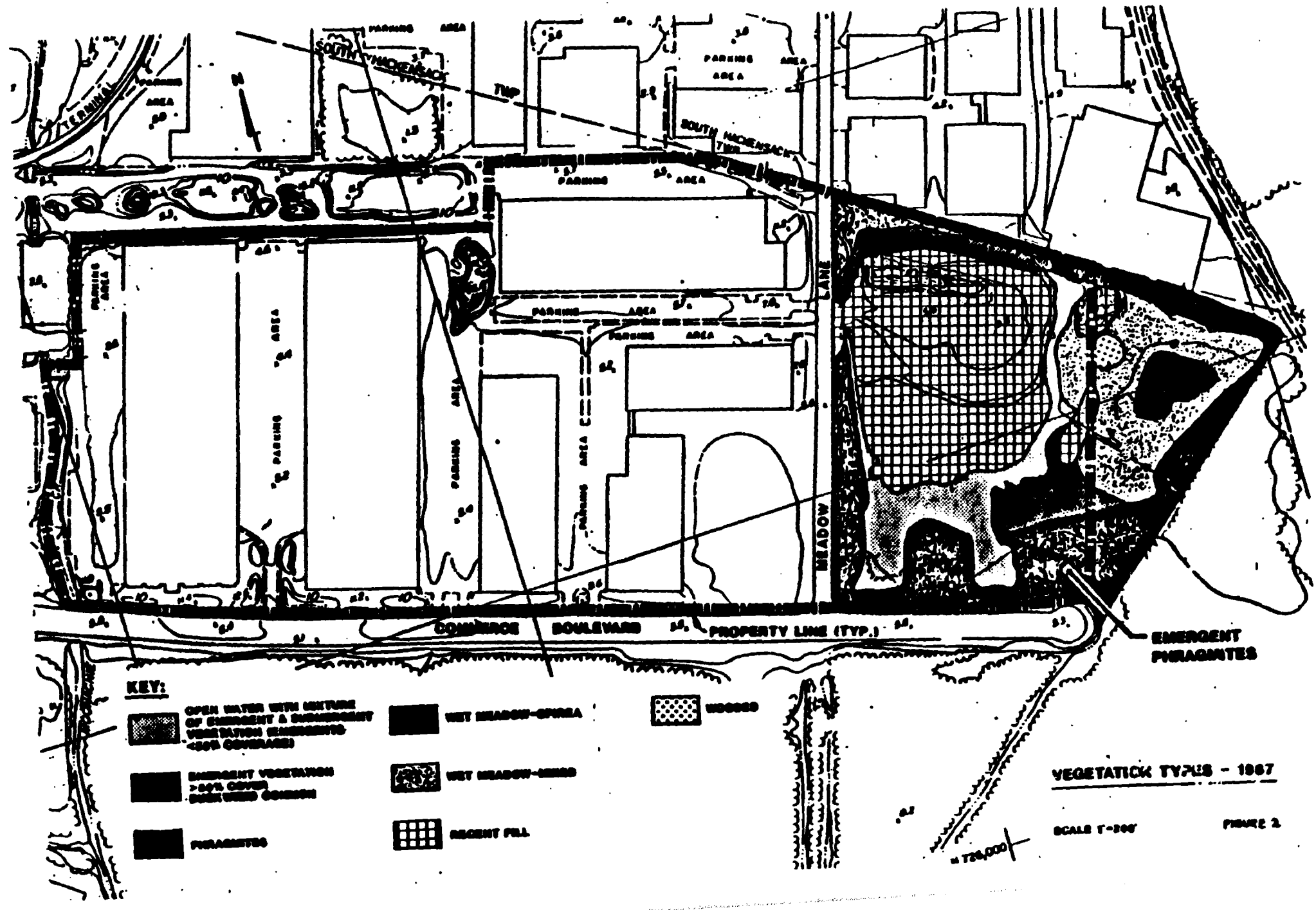

PARKING AREA
SOUTH HACKENSACK TRIB
TERMINAL
MEADOW LANE
COMMERCE BOULEVARD
PROPERTY LINE (TYP.)
EMERGENT PHRAGMITES
KEY:
OPEN WATER WITH MIXTURE OF EMERGENT & SUBMERGENT VEGETATION (EMERGENTS <50% COVERAGE)
EMERGENT VEGETATION >50% COVER DOMINATED COMMON
PHRAGMITES
WET MEADOW-GRASS
WET MEADOW-SEDGE
RECENT FILL
WOODED
VEGETATION TYPES - 1987
SCALE 1"=200'
FIGURE 2.

Table 1. Plant Species Identified on the Existing Wetland Site and Fill Area.

GENUS	SPECIES	TAXONOMY	COMMON NAME	STATUS	LOCATION
Sphagnum	sp.		sphagnum moss	obl	wwa
Osmunda	cinnamomea	L.	cinnamon fern	facw	wwa
Osmunda	regalis	L.	royal fern	obl	wwa
Onoclea	sensibilis	L.	sensitive fern	facw	wwa
Thelypteris	thelypteroides	(Michx.) J. Holub	marsh fern	facw	wwa
Typha	latifolia	L.	broad-leaved cattail	obl	owaes,ev
Typha	angustifolia	L.	narrow-leaved cattail	obl	owaes,ev
Alisma	subcordatum	Raf.	water plantain	obl	owaes,ev
Panicum	virgatum	L.	switchgrass	fac	wwa,was
Phragmites	australis	L.	common reed	facw	pnrag,wwa,was,ev,rt
Glyceria	melicaria	(Michx.) Hubbard	slender mannagrass	obl	wwa
Cyperus	flavescens	L.	yellow cyperus	obl	owaes,ev
Cyperus	strigosus	L.	umbrella sedge	facw	owaes,ev
Eleocharis	sp.		spike rush	obl	owaes,ev
Eleocharis	parvula	(R.&S.) Link.	dwarf clubrush	obl	owaes,ev
Scirpus	americanus	Pers.	three-square rush	obl	owaes,ev
Scirpus	cyperinus	L.	woolgrass	facw	owaes,ev
Lemna	sp.		duckweed	obl	ev,pnrag
Juncus	effusus	L.	soft rush	facw	owaes,ev
Juncus	canadensis	J. Gay.	Canada rush	obl	owaes,ev
Juncus	acuminatus	Michx.	sharp-fruited rush	obl	owaes,ev
Myrica	pensylvanica	Loisel.	bayberry	fac	wwa
Populus	tremuloides	Michx.	quaking aspen	facu	wood,rt,pnrag,wwa
Salix	babylonica	L.	weeping willow	facw	wwa,pnrag
Persicaria	mesochora	Greene	water smartweed	obl	owaes,ev,wwa
Phytolacca	americana	L.	pokeweed	facu	wwa,rt
Verbascum	Thapsus	L.	great mullein	upl	rt
Liquidambar	styraciflua	L.	sweet gum	fac	wwa
Spirea	tomentosa	L.	steeplebush	facw	wwa,was
Rubus	sp.		blackberry	*	wwa
Robinia	Pseudoacacia	L.	black locust	facu	rt
Impatiens	capensis	Meerb.	jewelweed, touch-me-not	facw	wwa
Rhus	Copallinum	L.	winged sumac	**	rt,wwa
Rhus	typhina	L.	staghorn sumac	upl	rt
Ilex	verticillata	(L.) Gray.	winterberry	facw	wwa
Acer	saccharinum	L.	silver maple	facw	wwa
Acer	rubrum	L.	red maple	fac	wwa
Hibiscus	moscheutus	L.	swamp rose-mallow	obl	wwa,pnrag
Triadenum	virginicum	(L.) Raf.	marsh St. John's-wort	obl	wwa
Lythrum	Salicaria	L.	purple loosestrife	facw	wwa,ev
Ludwigia	palustris	(L.) Ell.	marsh purslane	obl	owaes
Oenothera	biennis	L.	evening primrose	fac	rt,wwa
Daucus	Carota	L.	Queen Anne's lace	upl	rt
Fraxinus	pensylvanica	Marsh.	green ash	facw	wwa
Apocynum	sp.		dogbane	*	rt
Verbena	hastata	L.	blue vervain	facw	wwa
Eupatoradelphus	purpureum	L.(R.M.King & H.Rob)	Joe-Pye weed	fac	wwa
Solidago	sp.	L.	goldenrod	*	rt,wwa
Solidago	Elliottii	T.&G.	Elliott's goldenrod	obl	wwa
Solidago	tenuifolia	Pursh.	slender fragrant goldenrod	fac	wwa
Pluchea	camphorata	(L.) DC.	saltmarsh fleabane	facw	ev,owaes,wwa
Bidens	discoidea	(T.&G.) Britton	beggar-ticks	facw	wwa
Artemesia	sp.		mugwort	facu	rt

Key to Table 1

owmes = Open water with mixed emergents and submergents
ev = Emergent vegetation of greater than 50% cover
phrag = Phragmites
wms = Wet meadow - Spirea
wmm = Wet meadow mixed
rf = Recent fill
wood = Wooded

* = A status was unable to be assigned because the plant was not identified to the species level.

** = Status is unknown for this species.

obl = Obligate wetland species: Species that, under natural conditions, always occur in wetlands (i.e., greater that 99% of the time). The less that 1% is to allow for anomalous upland occurrences (i.e., occurrences that are the result of man-induced disturbances and transplants).

upl = Upland species: Species that, under natural conditions, always occur in uplands (i.e., greater than 99% of the time). The less than 1% is to allow for anomalous upland occurrences (i.e., occurrences that are the result of man-induced disturbances and transplants).

Facultative species

Species that can occur both in wetlands and uplands. There are three subcategories of facultative species (facultative wetland, straight facultative, and facultative upland).

fac = Facultative species: Species that have basically a similar likelihood (estimated probability of 34% - 66%) of occurring in both wetlands and uplands.

facw = Facultative wetland species: Species that are usually (estimated probability of 67% - 99%) found in wetlands, but are occasionally found in uplands.

facu = Facultative upland species: Species that are usually (estimated probability of 67% - 99%) found in uplands, but are occasionally found in wetlands.

Table 2. Species observed on the Russo owned wetlands.

Genus	Species	Common Name
Invertebrates		
Lymnaea	sp.	Water snail
Corixa	sp.	Water boatman
Enallagma	exsulans	Damselfly
Culex	pipiens	Mosquito
Libellula	sp.	Dragonfly
Bombus	feruidus	Bumblebee
Vespula	maculifrons	Yellow jacket
Schistocerca	alutacea	Bird grasshopper
Cicindela	sexguttata	Green tiger beetle +
Mantis	religiosa	Praying mantis +
Fish		
Fundulus	sp.	Killifish
Reptiles		
Malaclemys	terrapin	Diamondback terrapin
Chelydra	serpentina	Snapping turtle +
Amphibians		
Rana	utriculata	Leopard frog
Birds		
Anas	platyrynchos	Mallard (NSSE)
Anas	discolor	Blue winged teal
Anas	rubripes	Black duck (NSSE)
Anas	strepera	Gadwall
Phasianus	colchicus	Ring-necked pheasant
Ardea	herodias	Great blue heron (T)
Bubicos	iris	Cattle egret
Casmerodius	albus	Great egret
Charadrius	vociferus	Killdeer
Philohela	minor	American woodcock (NSSE)
Zenaidura	macroura	Mourning dove (NSSE)
Chaetura	pelagica	Chimney swift
Archilochus	colubris	Ruby-throated Hummingbird

KEY: (T) New Jersey State listed threatened species
NSSE U.S. Fish and Wildlife Service Species of Special Emphasis
\+ Additional species noted in Russo's records

Genus	Species	Common name
Mimus	polyglottos	Mockingbird
Melospiza	georgiana	Swamp sparrow
Melospiza	melodia	Song sparrow
Dolichonyx	oryzivorus	Bobolink (T) +
Agelaius	phoeniceus	Redwinged blackbird
Colinus	virginianus	Bobwhite quail

Mammals

Urocyon	cinereoargenteus	Gray fox
Microtus	pennsylvanicus	Meadow vole
Ondatra	zibethica	Muskrat
Rattus	norvegicus	Norway rat
Sylvilagus	floridanus	Cottontail rabbit
Marmota	monax	Woodchuck +

Genus	Species	Common Name
Troglodytes	troglodytes	Winter Wren
Cistothorus	platensis	Sedge Wren (E)
Cistothorus	palustris	Marsh Wren
Regulus	satrapa	Golden-crowned Kinglet
Regulus	calendula	Ruby-crowned Kinglet
Polioptila	caerulea	Blue-gray Gnatcatcher
Turdus	migratorius	American Robin
Dumetella	carolinensis	Gray Catbird
Mimus	polyglottus	Northern Mockingbird
Toxostoma	rufum	Brown Thrasher
Sturnus	vulgaris	European Starling
Vermivora	chyrsoptera	Golden-winged Warbler
Vermovora	celata	Orange-crowned Warbler
Vermivora	ruficapilla	Nashville Warbler
Dendroica	petechia	Yellow Warbler
Dendroica	coronata	Yellow-rumped Warbler
Dendroica	palmarum	Palm Warbler
Seiurus	noveboracenris	Northern Waterthrush
Geothylpis	trichas	Common Yellowthroat
Wilsonia	pusilla	Wilson's Warbler
Cardinalis	cardinalis	Cardinal
Passerina	cyanea	Indigo Bunting
Pipilo	erythrophthalmus	Rufous-sided Towhee
Spizella	arborea	American Tree Sparrow
Spizella	passerina	Chipping Sparrow
Spizella	pusilla	Field Sparrow
Pooecetes	gramineus	Vesper Sparrow (E)
Passerculus	sandwichensis	Savannah Sparrow (T)
Ammodramus	savannarum	Grasshopper Sparrow (T)
Ammospiza	caudacuta	Sharp-tailed Sparrow
Passerella	iliaca	Fox Sparrow
Melospiza	melodia	Song Sparrow
Melospiza	lincolnii	Lincoln's Sparrow
Melospiza	georgiana	Swamp Sparrow
Zonotrichia	albicollis	White-throated Sparrow
Zonotrichia	leucophrys	White-crowned Sparrow
Junco	hyemalis	Dark-eyed Junco
Calcarius	lapponicus	Lapland Longspur
Plectrophenax	nivalis	Snow Bunting
Dolichonyx	oryzivorus	Bobolink (T)
Aglelaius	phoenicius	Red-winged Blackbird
Sturnella	magna	Eastern Meadowlark
Quiscalus	quiscula	Common Grackle
Molothrus	ater	Brown-headed Cowbird
Carpodacus	mexicanus	House Finch
Carduelis	flammea	Common Redpoll
Carduelis	pinus	Pine Siskin
Carduelis	tristis	American Goldfinch

Genus	Species	Common Name
MAMMALS		
Didelphis	marsupialis	Opossum
Sorex	cinereus	Masked shrew
Cryptotis	parva	Least shrew
Blarina	brevicauda	Shorttail shrew
Condylura	cristata	Starnose mole
Scalopis	aquaticus	Eastern mole
Procyon	lotor	Raccoon
Mustela	frenata	Longtail weasel
Mustela	vison	Mink
Ondatra	zibethica	Muskrat
Mephitis	mephitis	Striped skunk
Vulpes	lulva	Red fox
Urocyon	cineresargenkus	Gray fox
Marmota	monax	Woodchuck
Peromyscus	leucopus	White-footed mouse
Clethrionomys	gopperi	Redback vole
Microtus	pennsylvanicus	Meadow vole
Zapus	hudsonius	Meadow jumping mouse
Sylvilagus	floridanus	Eastern cottontail rabbit

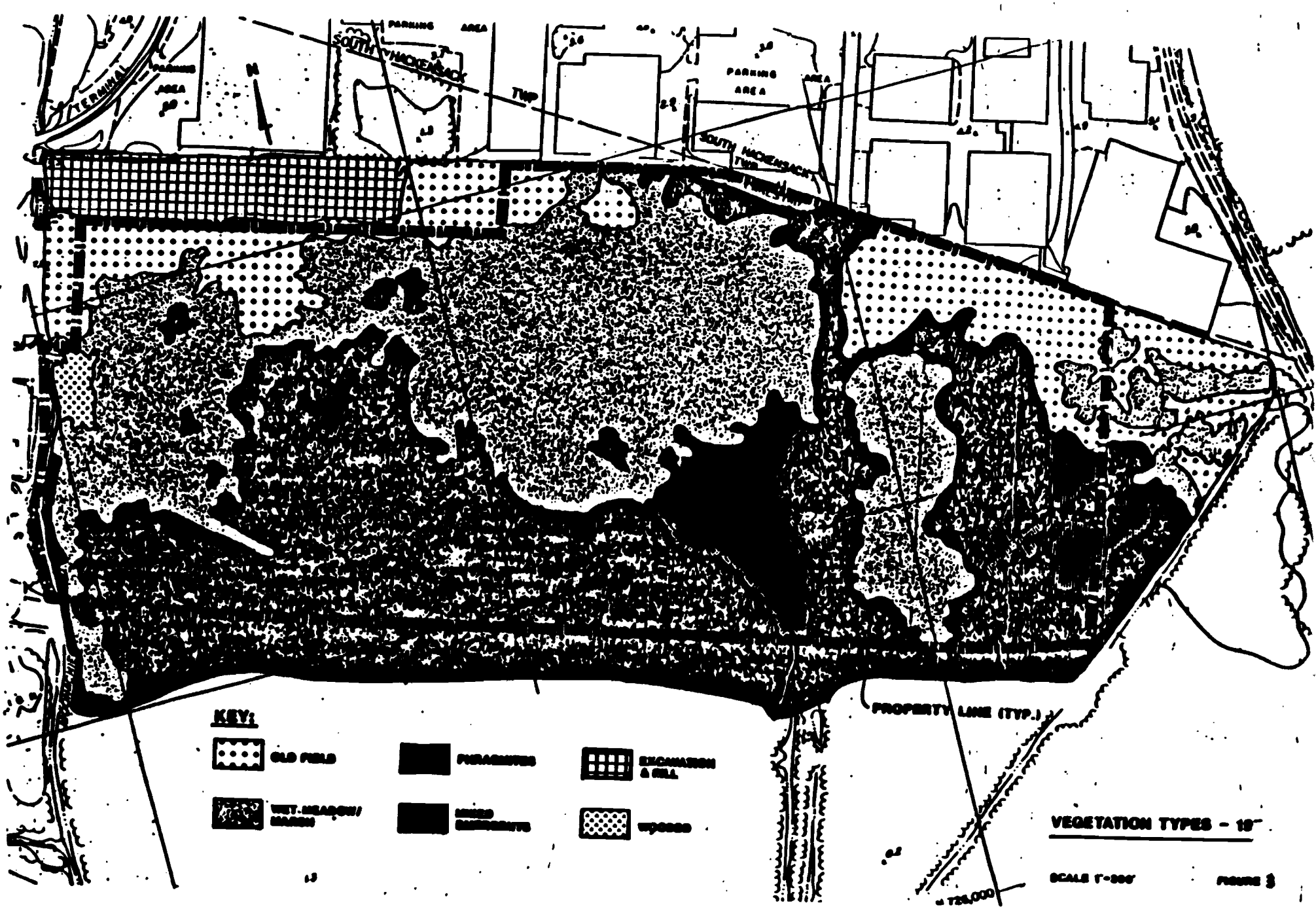
of the site which is part of a larger wet meadow extending beyond the Russo property line. Vegetation includes steeplebush, switchgrass, goldenrod, impatiens, Joe-Pye weed and common reed with no dominant species. Vegetation on the 8 1/2 acre fill area is dominated by aspen saplings and includes mugwort, goldenrod, grasses, mullein and dogbane. The 5 acre wetland area receives runoff from nearby paved areas, retains direct precipitation, and is situated over a shallow water table. In addition, the 5 acre wetland floods annually due to retarded drainage of storm flows.

Figure 3 shows the pattern of vegetation on the 57.5 acre site prior to the placement of fill. The area was/is a palustrine[3]/ wetland complex comprised of a complex of old field[4]/, wet meadow[5]/, fields of common reed, emergent marsh and small ponds. Table 1 lists the vegetation which has been determined to have existed on the 57.5 acre site via the previously discussed investigations conducted by Region II. Review of aerial photographs revealed that the old field communities appear disturbed and exhibit random tire tracks. These areas are vegetated primarily by grasses although a wetland community signature could not be confirmed. Vegetation comprising the old field community most likely included switchgrass, blue joint grass, stepplebush, mannagrass, beggar-ticks, blackberry, red and silver maple, Queen Anne's lace, goldenrod, sumac, mugwort, black locust and quaking aspen. Region II's investigation indicates that the site received runoff from adjacent areas and direct precipitation, was situated over a shallow water table and was subject to annual flooding due to retarded drainage of storm flows. This hydrology resulted in areas which had permanent ponded water, areas which were temporarily and seasonally flooded and areas which were only occasionally flooded in severe storms. The investigation revealed that the 57.5 acre site was comprised of different wetland types and hydroperiods, as opposed to being a monotypic stand of common reed.

3/ The definition of a Palustrine System is contained within the FWS publication, "Classification of Wetlands and Deepwater Habitats of the United States" which is the wetland classfication system used for the National Wetlands Inventory. The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.

4/ Old Field is a broad ecological term which generally includes sites that are undergoing revegetation (with grasses, shrubs or trees) after being disturbed (i.e., by agricultural practices) and then having been left fallow. The term does not differentiate between wetlands and uplands in this case. As stated in the RD, old field vegetation was present within the remaining 13.5 acre area but was too sparse and diffuse to merit individual mapping.

5/ Wet meadow is a broad ecological term. For the purposes of the mapping exercise, the definition of wet meadow contained within the Golet and Larsen "Wildlife Wetland Evaluation Model" was utilized to provide a more precise description of this wetland community. Wet meadows are wetlands dominated by meadow emergents, with up to 6 in. of surface water during the late fall, winter and early spring. During the growing season the soil is saturated and the surface exposed except in shallow depressions and drainage ditches.


PARKING AREA
SOUTH HACKENSACK TWP
PARKING AREA
SOUTH HACKENSACK TWP
TERMINAL
PROPERTY LINE (TYP.)
KEY:
OLD FIELD
EXCAVATION & FILL
WET MEADOW/ MARSH
WOODED
VEGETATION TYPES - 19
SCALE 1"=200'
FIGURE 3

The Corps questioned whether the amount of open water on site prior to the placement of fill had been overestimated. Open water is not shown on EPA's map of the Russo site. We acknowledge that the amount of open water on site fluctuated with seasonal changes in groundwater levels and precipitation. EPA has not quantified the amount of open water, rather we have depended upon the review of aerial photographs and interviews with people historically familiar with the site to verify whether or not open water was available.

Interviews with people historically familiar with the site revealed that there was muskrat trapping and duck hunting on the site. Aerial photographs revealed standing water and muskrat huts. The presence of muskrat on site suggests that surface water was available for extended periods. As the RD states, the areas of open water that existed onsite prior to filling were smaller and more dispersed as opposed to the two to three acre pond in the remaining five acres. Nonetheless, open water was available on site for use by water-oriented species.

As previously stated, the mapping of the Russo tract was prepared from 1978 aerial photographs. Russo did not begin unauthorized filling on the site until 1980. I would like to discuss the changes which the site experienced and respond to issues raised by Mr. Russo and his representatives during consultation.

The construction of Commerce Boulevard and Central Boulevard began after the date of the 1978 aerial photographs used to map the Russo site and was completed prior to unauthorized filling. The construction of these roads separated the westernmost 44 acres of the site from the easternmost 13.5 acres and, in conjunction with adjacent development to the north, separated 44 acres of the site from adjacent wetland tracts. The 1980 aerial photograph in the McGuire Report shows the base fills of the roads in place and a 1982 aerial photograph in the report shows completed roads with unauthorized work in progress. In addition, there was a fire on the Russo tract subsequent to the date of the 1978 mapping photographs and prior to Russo's activities (the aforementioned 1980 aerial exhibits dark areas on site which appear to have burned).

During consultation, Mr. Russo and his representatives opined that EPA's map of the site in its pre-discharge state did not accurately represent the vegetation on the 44 acre portion of the site immediately prior to filling. They offered the following in support of their position: 1) that road construction had a major impact on the site; 2) that the site burns periodically which provides an opportunity for vegetative succession; 3) that common reed is spreading over the site in a south to north direction.

Analysis of some of the aerial photographs which predate 1978 revealed dark areas which appear to have been burned and the McGuire Report states that fires reportedly occurred seasonally on the site. Yet analysis also revealed that the "signature" of the Russo site, as it appeared in the 1978 photographs, is also evident in older photographs. This means older aerial photographs show the same wetland communities. In addition, while review of photographs did reveal that common reed was

encroaching across the 44 acre part of the Russo site from a south to north direction, there is no evidence to suggest that this was occurring at a rate that would alter the balance of wetland communities in approximately two years. There is no evidence in the administrative record that suggests that the 44 acre parcel of the Russo site would have experienced significant changes in vegetation within approximately a two year period as a result of fires and common reed encroachment.

Wetland hydrology with the 44 acre part of the Russo tract was provided by runoff from adjacent areas, direct precipitation, a shallow water table and annual flooding due to retarded storm drainage. Construction of Commerce Boulevard and Central Boulevard would serve to retain water on the site. The Corps, in its June 6, 1986 jurisdictional memorandum, quotes a section of a report of boring results on Lot 59, which is located in the northeast corner of the 44 acre parcel, dated May 6, 1980 as follows: "water was on the surface in most of the site and in places was one to two feet deep. It is felt that the fill for Central Boulevard has cut off natural drainage." I do not believe that road construction would result in drier conditions on the 44 acre parcel. It may have, instead, increased the retention of water on the site resulting in more open water that may have remained on site for a longer time than prior to road construction.

C. Wildlife

The RD states that the Hackensack Meadowlands lie within the Atlantic flyway and lie within a Priority Habitat Range for waterfowl as indicated in the FWS's 1986 North American Waterfowl Management Plan (NAWMP). The Atlantic flyway is the easternmost of five flyways in North America which are utilized by migratory waterfowl. It provides resting, feeding, staging and breeding habitat for vast numbers of waterfowl that migrate annually. The NAWMP is an agreement between the United States and Canada which provides a broad framework for the conservation and management of populations of ducks, geese and swans that occur in North America. The Plan states that the loss and degradation of habitat is the major waterfowl management problem in North America and has delineated habitats of major importance because of these losses. The Plan further establishes two habitat areas of highest priority known as Priority Habitat Ranges because of habitat deterioration, and corresponding declines in species abundance. One of the Priority Habitat Ranges includes migration and wintering habitats for the black duck along the Atlantic Coast, which includes the Hackensack Meadowlands.

Table 2 lists the species observed in the remaining 5 acres of wetlands on the Russo site. The list includes a variety of waterfowl, wading birds, songbirds, game birds, mammals, rodents, reptiles and amphibians. The list includes black duck, mallard, woodcock, and mourning dove. FWS considers these four species to be of special concern in the northeast region and all but the mourning dove to be of special concern in New Jersey. These species are of special concern to FWS because they have experienced sharp declines in population which are due in whole or in part, to the loss or alteration of habitat. As previously mentioned, declines in the black duck population are attributed to habitat loss. Also observed was the great blue heron

and the bobolink which are listed among New Jersey's state threatened species. The New Jersey Office of Endangered and Nongame Species (NJOENS) considers a species threatened if it may become endangered within the state if conditions, which include habitat loss, begin to or continue to deteriorate. Declines in populations of the bobolink are attributed to loss of habitat. It should also be noted that the northern harrier (or marsh hawk), a New Jersey state endangered species, has been observed on adjacent wetland tracts by personnel of the FWS and the Hackensack Meadowlands Development Commission (HMDC), and FWS rates the remaining wetlands on the Russo site as highly suitable for this species. NJOENS considers a species endangered if prospects for the species' survival within the state are in immediate danger due to factors which include habitat loss. Observations also revealed evidence of the occurrence of raccoon, opossum, weasel, skunk, white-footed mice and deer mice.

Region II consulted with the New Jersey Audubon Society (NJAS) and FWS to compile a list of species believed to have used the vegetation types which occurred on the wetlands in their pre-discharge condition. The list of species which are associated with the habitat types depicted in Figure 3 and are known to have either been observed or are commonly known to migrate through or breed within the Hackensack Meadowlands. EPA Headquarters subsequently consulted with the NJAS and FWS and produced the species listed in Table 3. Table 3 includes 7 species of reptiles, 7 species of amphibians, 119 species of birds, including waterfowl, wading birds, song birds and raptors and 19 species of mammals. Table 3 includes 7 state endangered bird species and three state threatened species in addition to the two state threatened species listed in Table 2. Of the state endangered species, population of the pied-billed grebe, northern harrier, Cooper's hawk, short-eared owl, sedge wren and the vesper sparrow are in eminent danger due to habitat losses. The peregrine falcon, also a state endangered species, has also been projected to have occurred on the Russo site. Of the state threatened species, populations of the American bittern, savannah sparrow and the grasshopper sparrow may become endangered if habitat losses continue.

My review of the RD and the administrative record, including information from the NJAS and FWS leads me to conclude that the wetlands on the Russo site provided/provides very valuable wildlife habitat and that the habitat is rare within the context of the Hackensack Meadowlands. The site contained/contains open sheltered water, aquatic bed, emergent marsh, open meadow, shrub thickets and wooded fringes in close proximity to one another. These features, in conjunction with its juxtaposition to adjacent wetland tracts, contributed/ contributes to its attractiveness to wildlife. The site contained/contains plants with high wildlife food value including cattail, duckweed, smartweed, switchgrass, sedges, rushes and berry producing shrubs. Four species of special emphasis to FWS and a state threatened species, all of which are experiencing population declines due to loss and/or deterioration of habitat, have been observed onsite. The site is reported to have been utilized by a variety of wildlife which includes six state endangered species and three state threatened species which are experiencing population declines because of loss and/or deterioration of habitat.

During consultation, Mr. Russo's representative stated that wildlife utilization of the site in its pre-discharge condition may have been restricted by the surrounding development. I do not agree. The site is quite large and was adjacent to vast expanses of wetlands on its southern and eastern sides. While road construction created a physical separation of 44 acres of the site that probably impeded or prevented access into or egress from the site by some ground dwelling species, I do not believe that this significantly affected overall wildlife utilization of the site.

The wetland evaluation method described by Golet and Larsen (1976) was used to provide an evaluation of the values of the 57.5 acre tract (prior to fill) and the five acres of wetland remaining for wildlife. The method is one applied in the northeast; it is readily interpretable with the attribute of addressing important ecological factors, and it lends itself to application based on historical information. The Golet and Larsen method uses wetland classes, subclasses, size, type, habitat, cover, vegetative interspersion, juxtaposition and chemistry to assess the wildlife value of wetlands. The method and output is summarized in Appendix A. An evaluation of the wildlife values using this method rated both the existing five acres and the site in its pre-discharge state as having the potential to provide high value wildlife habitat.

During consultation, Mr. Russo and his contractor questioned EPA's use of the Golet and Larsen method but did not offer specific comments. As previously stated, the methodology lends itself to application based upon the level of information that EPA was able to develop on the Russo site in its pre-discharge condition. In addition, the method predicts the potential value of the site to wildlife in general based upon the theory that a more diverse habitat has the potential to satisfy more habitat requirements for a more diverse array of species. I believe this is a valid assumption with respect to evaluating wildlife habitat values. Also, the results obtained utilizing this method were not the sole determinant in my findings in this case. Rather, these results were evaluated in conjunction with the list of actual/probable species which utilize and which were reported to have have utilized the site to assess the values of the Russo site in its pre-discharge condition to wildlife.

As shown in Figure 4, palustrine wetlands comprise 19% (1,400 acres) of the 7,800 acres of wetlands and deep water habitats in the Hackensack Meadowlands. Of the 1,400 acres of palustrine wetlands, only 320 acres, (or 4% of the entire Meadowlands system) is non-common reed dominated. The Russo site was/is, therefore, a rare local habitat type. The association of such species as the bobolink, sedge wren, a variety of sparrows and short-eared owl (listed in Table 3) with this rare wet meadow habitat type contributed/contributes to the diversity of wildlife within the Meadowlands and its ability to support a number of state threatened and endangered species. The rodent population supported by wet meadow grasses provided/provides an excellent food base for the state endangered northern harrier. The unauthorized filling of approximately 52.5 acres destroyed about 8% of this rare local habitat type within the Meadowlands.

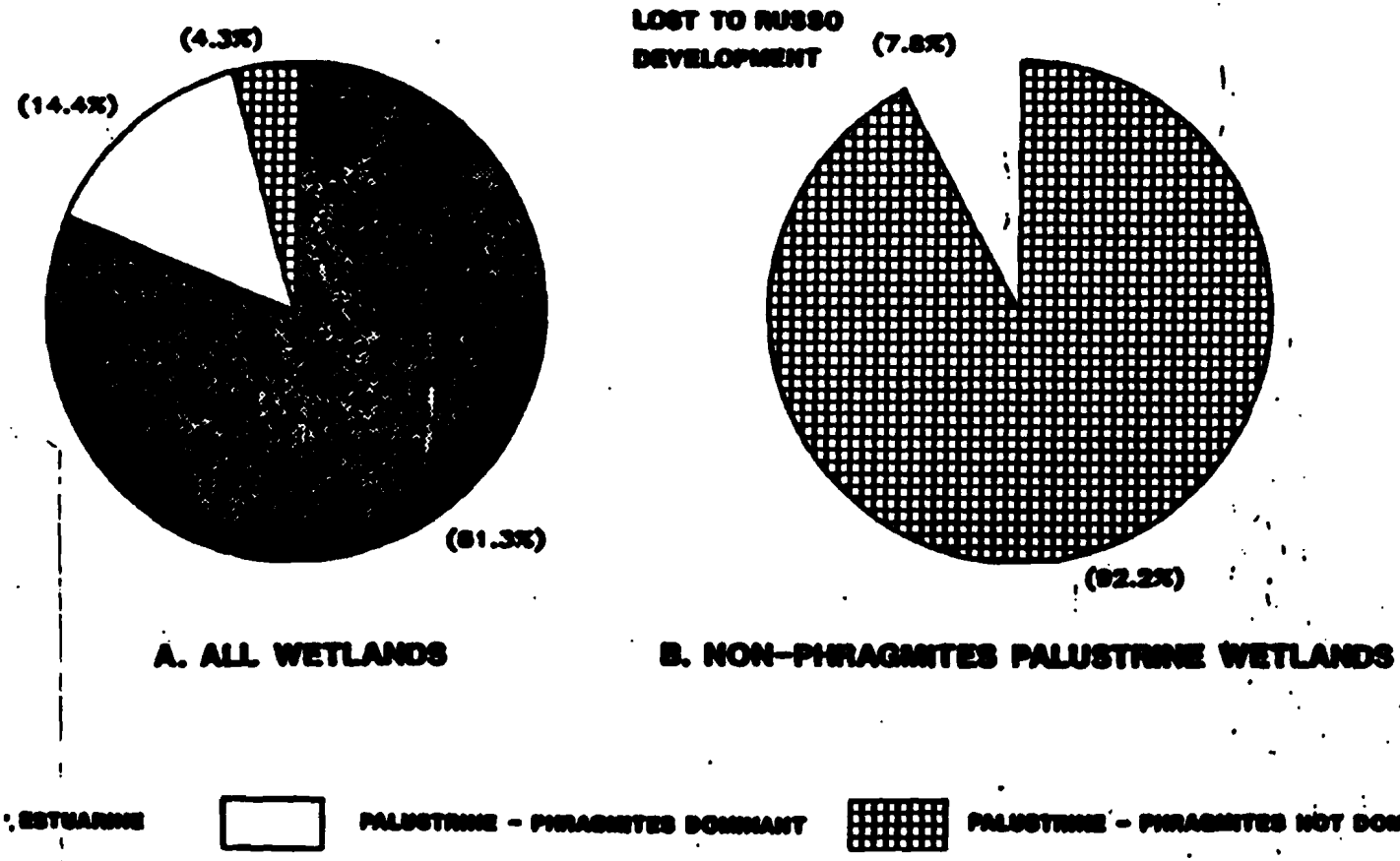
Table 3. Wildlife Species Projected to Have Occurred on the Russo Owned Wetlands Based on Species Habitat Associations and the Vegetation Types That Occurred on the Russo Owned Wetlands.

GENUS	Species	Common Name
REPTILES		
Clemmys	guttata	Spotted turtle
Malaclmys	terrapin	Diamondback terrapin
Chrysemys	picta	Eastern painted turtle
Terrapene	carolina	Box turtle
Natrix	sipedon	Northern watersnake
Thamnophis	sirtalis	Eastern garter snake
Thamnophis	sauritus	Eastern ribbon snake
AMPHIBIANS		
Notophthalmus	viridescens	Red-spotted newt
Desmognethus	fuscus	Northern dusky salamander
Pseudotriton	ruber	Northern red salamander
Bufo	americanus	American toad
Bufo	woodhousei	Fowlers toad
Rana	clamitans	Green frog
Rana	catesbeiana	Bull frog
BIRDS		
Podilymbus	podiceps	Pied-billed Grebe (E)
Bataurus	lentiginosus	American Bittern (T)
Ixobrychus	exilis	Least Bittern
Ardea	herodius	Great Blue Heron (T)
Casmerodius	albus	Great Egret
Butorides	striatus	Green-backed Heron
Nycticorax	nycticorax	Black-crowned Night-Heron
Branta	canadensis	Canada Goose
Aix	sponsa	Wood Duck
Anas	crecca	Green-winged Teal
Anas	rubripes	Black Duck
Anas	platyrhynchos	Mallard
Anas	acuta	Pintail
Anas	discors	Blue-winged Teal
Anas	clypeata	Shoveler
Anas	strepera	Gadwall
Lophodytes	cucullatus	Hooded Merganser
Cathartes	aura	Turkey Vulture
Circya	cyaneus	Northern Harrier (E)
Accipiter	striatus	Sharp-shinned Hawk
Accipiter	cooperii	Cooper's Hawk (E)
Butes	jamaicensis	Red-tailed Hawk
Butes	lagopus	Rough-legged Hawk

Key: (E) New Jersey state listed endangered species
(T) New Jersey state listed threatened species

Genus	Species	Common Name
Falco	sparverius	American Kestrel
Falco	columbarius	Merlin
Falco	peregrinus	Peregrine Falcon (E)
Colinus	virginianus	Bobwhite
Rallus	longirostris	Clapper Rail
Rallus	elegans	King Rail
Rallus	limicola	Virginia Rail
Porzana	carolina	Sora
Gallinula	chloropus	Common Moorhen
Fulica	americana	American Coot
Charadrius	vociferus	Killdeer
Tringa	melanoleuca	Greater Yellowlegs
Tringa	flaviceps	Lesser Yellowlegs
Tringa	solitaria	Solitary Sandpiper
Actitis	macularia	Spotted Sandpiper
Calidris	pusilla	Semipalmated Sandpiper
Calidris	minutilla	Least Sandpiper
Calidris	melanotos	Pectoral Sandpiper
Limnodromus	griseus	Short-billed Dowitcher
Limnodromus	scolopaceus	Long-billed Dowitcher
Capilla	gallinago	Common Snipe
Stelgidopteryx	ruficollis	Rough-Winged Swallow
Columba	livia	Rock Dove
Zenaida	macroura	Mourning Dove
Tyto	alba	Barn owl
Asio	otus	Long-eared owl
Asio	flammeus	Short-eared owl (E)
Chordeilis	minor	Common Nighthawk
Chaetura	pelagica	Chimney Swift
Archilochus	colubris	Ruby-throated Hummingbird
Megaceryle	alcyon	Belted kingfisher
Colaptes	auratus	Northern Flicker
Empidonax	alnorum	Alder Flycatcher
Empidonax	traillii	Willow Flycatcher
Empidonax	minimus	Least Flycatcher
Sayornis	phoebe	Eastern Phoebe
Tyrannus	tyrannus	Eastern Kingbird
Progne	subis	Purple Martin
Iridoprocne	bicolor	Tree Swallow
Riparia	riparia	Bank Swallow
Hirundo	rustica	Barn Swallow
Cyanocitta	cristata	Blue Jay
Corvus	brachyrhynchos	American Crow
Corvus	ossifragus	Fish Crow
Parus	atricapillus	Black-capped Chickadee
Sitta	canadensis	Red-breasted Nuthatch
Certhia	familiaris	Brown Creeper
Troglodytes	aedon	House Wren

FIGURE 4. WETLAND TYPES IN THE MEADOWLANDS



IV. ADVERSE EFFECTS OF THE PROPOSED PROJECT

I have reviewed the RD and the administrative record and find that the RD provides an accurate evaluation of the proposed mitigation plan as well as the site specific and cumulative impacts that have resulted/will result from the existing and proposed fill. I hereby adopt pages 16-20 of the RD. What follows is a summary discussion of the substantive points.

A. Impacts

The placement/proposed placement of approximately 57.5 acres of fill has resulted/will result in the conversion of wetlands to an industrial building complex with a higher site elevation, a complete change in substrate and hydrology and the loss of a diverse wetland complex and the replacement of same with impervious surfaces. This has resulted/will result in the loss of wildlife habitat values and sediment and pollutant retention capabilities.

Less mobile wildlife species perished/will perish as the site was/is prepared and subsequently filled. Mobile species migrated/will migrate to adjacent habitats. My review of the RD and the administrative record indicates that the Russo project has displaced/will displace a variety of wildlife of species. Displaced wildlife will perish or compete for adjacent habitats thus displacing resident wildlife. While it is probable that displacement does not equal mortality for all individuals, it is not safe to assume that all that are displaced will simply survive somewhere else. The degree of stress to any individual and cumulatively to the population of that species, depends upon what life needs the habitat is providing and, in particular, how prevalent available habitat is. This is particularly true with respect to the black duck, mallard and American woodcock, the wetland species observed on the Russo site that are of special emphasis to FWS, as well as the bobolink and, most likely, the northern harrier and the nine other state threatened or endangered species reported to have utilized the Russo site in its predischarge state. Since significant declines in the populations of these species have been attributed to loss and/or deterioration of habitat, further impacts on these species due to the existing and proposed fill are also likely to be significant.

In addition, the placement of 52.5 acres of fill has contributed to the loss of habitat diversity in the Hackensack Meadowlands by destroying approximately 8% of the remaining non-common reed palustrine vegetation, which accounts for only approximately 4% of the palustrine wetlands in the Meadowlands system. A diverse vegetative wetland has the potential to serve more habitat requirements for a greater number of species (as compared to a monotypic habitat) and, therefore, has the potential to support a more diverse wildlife population. The mix of five habitat types on site (old field, wet meadow, emergent, open water, wooded) is quite uncommon within the Meadowlands. This inherent and localized habitat diversity on site supported a diverse wildlife populati.- A loss of habitat diversity contributes to the loss of faunal diversity.

B. Cumulative Impacts

There have been significant wetlands losses within the Hackensack Meadowlands. The RD indicates that prior to enactment of the Clean Water Act, several of the Meadowlands' wetlands were favored areas for solid waste disposal

and many others were slated as acres to be "improved." Although the exact acreage of wetlands subject to solid waste landfill has not been determined, it is projected that the 1,516 acres of landfill in the Hackensack Meadowlands District were predominantly wetlands. In 1972, remaining wetlands comprised 8,624 acres of the Hackensack Meadowlands. In 1984 they comprised 7,800 acres - an additional loss of 824 acres. Under HMDC's existing zoning, another 3,345 acres of wetlands are planned for various development zones with open space requirements from 15 to 50%.

As discussed above, the FWS designated wetland areas in the eastern flyway, a category into which the Hackensack Meadowlands falls, as a Priority Habitat Range in their Waterfowl Management Plan (May 1986). The Service reports that the degradation of migratory and wintering habitat has contributed to long-term downward trends in populations of the black duck. Black ducks were seen on site prior to filling and were observed on the remaining five acres of wetlands. Therefore, loss of the Russo site wetlands has contributed to cumulative impacts to this species. Also, the population declines of species of special emphasis to FWS as well as threatened and endangered species are related to the loss of their habitats. The Russo site is known to support and projected to have supported three species of special emphasis to FWS (in addition to the black duck) and two state threatend species in New Jersey, and is highly suitable habitat for the state endangered northern harrier, seven additional state endangered bird species and three state threatened bird species. Eleven of these species are suffering population declines due to loss and/or deterioration of habitat. Loss of approximately 57.5 acres of wetland has contributed/will contribute to a cumulative adverse impact to those species.

C. Mitigation

The mitigation plan proposed by Russo and required by the Corps involves preservation of a 23 acre wetland area in an adjacent watershed and enhancement of an unspecified wetland area within 1.5 miles of the Russo site. The administrative record reveals that the enhancement area would be located within the Empire Tract, although still unspecified, and that the Corps would require enhancement of 18.1 acres as a condition of its permit (as per Corps' Memorandum for the Record dated January 28, 1987.)

The mitigation plan does not adequately address the site specific or cumulative impacts previously discussed. First, the information provided to date on the mitigation plan has not identified a particular wetland site for enhancement and is too limited to evaluate potential ecological gains or the probability of success. Second, wetland preservation (without enhancement or restoration) does not represent a gain of wildlife habitat values since the area is already wetlands and protected from filling activities that do not meet 404 requirements.

Third, the Corps based its assignment of per acre values on the assumption that 52.5 acres was a monotypic stand of common reed which provides relatively less wildlife habitat value than the mix of wetland complexes which I have determined to have comprised the site. Finally, the Corps would require

that mitigation only compensate on a 0.5:1 (mitigated/lost) value-for-value basis; this may or may not have been influenced by their belief that the area was predominantly common reed. In any event, the record now shows that the Russo site was very valuable to wildlife from a site specific and cumulative standpoint and 0.5:1 value-for-value mitigation would result in a net resource loss and is inadequate in this case.

V. CONCLUSION AND FINDINGS

My review of the RD and the administrative record leads me to conclude that the 5 remaining acres of wetlands and approximately 52.5 acres of wetlands in their pre-discharge state are/were comprised of a mix of wetland types and that the juxtaposition of these wetland types to each other as well as to adjacent wetlands provide/provided wildlife habitat that is rare and contributes/contributed to wildlife habitat diversity within the Hackensack Meadowlands. As Tables 2 and 3 indicate, the Russo tract provides/provided habitat for a large mix of species, many of which are currently experiencing population declines within New Jersey that is in whole or in part attributed to loss and/or deterioration of available habitat. In addition, the Russo tract is within the Priority Habitat Range for the black duck, which has experienced population declines on a national scale due to habitat loss and provides/provided habitat for four species of special concern to FWS because of population declines that have been attibuted to loss and/or deterioration of habitat in the northeast region as a whole and in New Jersey in particular. I conclude that the Russo site did/does provide important wildlife habitat from a site specific and cumulative standpoint and that the existing and proposed fill has and will seriously impact wildlife. I also conclude that these impacts are such that the diversity and habitat values that were/are provided by the Russo tract should be preserved, that is, there should be no net loss of these wildlife values as a result of the fill. I conclude that the fill caused/would cause unacceptable adverse impacts to wildlife values unless those values are maintained through mitigation.

Like the Regional Administrator, I find that the proposed mitigation plan is inadequate for that purpose. The Russo site, in its pre-discharge state, provides/provided a diversity of habitat within the context of the Meadowlands that attracts and is reported to have attracted a variety of wildlife species that included species that are habitat limited. These attributes are not adequately provided for in the proposed mitigation plan and the Corps requirement of 0.5:1 value-for-value mitigation is not adequate to offset the degree of impact. For the reasons previously discussed, I conclude that the proposed/required mitigation neither compensates for the loss of approximately 57.5 acres of valuable wildlife habitat nor constitutes appropriate and practicable mitigation.

I conclude that the offered/required mitigation would not offset the significant wildlife impacts identified in this decision document, and that, accordingly, the existing/proposed fill has resulted/will result in unacceptable adverse impacts to wildlife under Section 404(c) of the CWA.

VI. PROHIBITION ON USE OF THE RUSSO SITE FOR SPECIFICATION AS A DISPOSAL SITE

Section 404(c) authorizes EPA to impose different limitations on discharges through actions on disposal site specifications. Where the facts warrant I may recommend that any defined area be prohibited from specification as a disposal site pursuant to Sections 404(a) and (b). If I should determine that the discharge of certain materials will have significantly less damaging effects than others, or that limiting discharges by amount, method, and/or location will reduce the likelihood of unacceptable adverse effects, I may recommend that the use of a specified site merely be restricted in some manner or that the restriction or prohibition apply to only a portion of the area under consideration.

After considering the full record based upon my finding that the existing and proposed fill will result in unacceptable adverse effects on wildlife and under the authority delegated to me by the Administrator, I hereby prohibit the designation of the Russo site as a discharge site. I will reconsider this prohibition at the request of EPA's Regional Administrator in Region II upon a showing that the unacceptable adverse effects to wildlife have been addressed to his satisfaction.

In the present case, my finding of unacceptable adverse effects stems from current and anticipated losses of valuable wildlife habitat that has/will result from direct effects of discharges regulated under Section 404 of the CWA and within the Russo site. As previously stated, however, fill has already been placed on approximately 52.5 acres of wetlands and only 5 acres remain unfilled. Although I have concluded that the wildlife values previously and currently provided by the Russo tract are important enough to preserve, the fact remains that most of the site has been filled and its value to wildlife destroyed. Also, I am mindful that under these circumstances, final action by EPA pursuant to Section 404(c) of the CWA will not prevent the occurrence of most of the unacceptable adverse effect or accomplish reversal of such effects. Further actions will be necessary, either within the context of voluntary compliance by Russo or an enforcement action, to determine the extent of wetland value replacement and pursue compensatory action. The site has been damaged and, indeed, some or all of this damage may be irreversible. In addition, the presence of tenanted warehouses on the unauthorized fill raises other issues that run counter to restoration of the site. Mitigation has been a focal point of discussions with respect to this project during the Corps permit process as well as a contributing factor to my determination of unacceptable adverse effects. If the condition of the Russo tract precludes onsite restoration from a technical or practical standpoint, then EPA would expect to pursue replacement of lost wildlife values elsewhere. Mitigation of lost wildlife values will not be required for any portions of the previously discussed old field areas that are determined to have been uplands.

3/21/88
Date

Lawrence J. Jensen
Lawrence J. Jensen
Assistant Administrator for Water

APPENDIX A: From "An Evaluation of Wetland Conditions On the Russo Tract Before and After Wetland Filling". November 1987. Prepared by Maguire Group Inc., Providence, Rhode Island for EPA Region II.

SUMMARY OF WETLAND EVALUATION METHOD

(GOLET & LANEY 1976)

Table 2. Wildlife criteria, significance coefficients, specifications and ranks.

RANK	(3.0)	(2.5)	(2.0)	(1.5)	(1.0)
Criteria		**Specifications**			
Wetland Class Richness (5)[1]	5 or more classes	4 classes	3 classes	2 classes	1 class
Dominant Wetland Class (5)	SF, BM	SM	WS, SS	WW, BB	M
Size Category (5)	over 500 acres	101-500 acres	51-100 acres	10-50 acres	under 10 acres
Subclass Richness (4)	10 or more subclasses	6-9 subclasses	4-5 subclasses	2-3 subclasses	1 subclass
Site Type (4)	bottomland-lakeside bottomland-deltaic bottomland-streamside		bottomland-isolated upland-lakeside		upland-isolated

[1]Number in parentheses after each criterion is its significance coefficient.

Table 2 (continued)

RANK	(3.0)	(2.5)	(2.0)	(1.5)	(1.0)
Criteria			**Specifications**		
Surrounding Habitat Types (4)	2 or more of following constitute more than 90% of surrounding habitat: 1. forestland 2. agricultural or open land 3. salt marsh		1 or more of following constitute 50-90% of surrounding habitat: 1. forestland 2. agricultural or open land 3. salt marsh (or) 1 of preceding constitutes more than 90% of surrounding habitat.		1 or more of following constitute less than 50% of surrounding habitat: 1. forestland 2. agricultural or open land 3. salt marsh
Cover Type (3)	Type 5	Type 4	Type 3 Type 7	Type 1 Type 2 Type 6	Type 8
Vegetative Interspersion Type (3)	Type 3		Type 2		Type 1

Table 2 (continued)

RANK	(3.0)	(2.5)	(2.0)	(1.5)	(1.0)
Criteria			**Specifications**		
Wetland Juxtaposition (2)	Hydrologically connected to other wetlands (different dom. class) or open water bodies within 1 mile. (or) Hydrologically connected to other wetlands (same dom. class) within 1/4 mile. (or) Wetland greater than 500 acres, with three or more wetland classes (including BM or SM)		Hydrologically connected to other wetlands (different dom. class) or open water bodies from 1-3 miles away. (or) Hydrologically connected to other wetlands (same dom. class) from 1/4 - 1 mile away. (or) Within 1/2 mile of other wetlands (different dom. class) or open water bodies, but not hydrologically connected.		All other possibilities
Water Chemistry (1)	Total alkalinity greater than 69 ppm $CaCO_3$. pH greater than 7.5		Total alkalinity 23-69 ppm $CaCO_3$. pH 6.5-7.5		Total alkalinity less than 23 ppm $CaCO_3$. pH less than 6.5

Wetland scoring (Ranks are based on fictitious data).

	Criterion	Signif. Coeff.	Rank	Subscore
1.	Class Richness	5	2.0	10.0
2.	Dominant Class	5	3.0	15.0
3.	Size	5	2.5	12.5
4.	Subclass Richness	4	2.5	10.0
5.	Site Type	4	2.0	8.0
6.	Surrounding Habitat	4	3.0	12.0
7.	Cover Type	3	2.0	6.0
8.	Veg. Interspersion	3	1.0	3.0
9.	Juxtaposition	2	2.0	4.0
10.	Water Chemistry	1	3.0	3.0
			Total Wetland Score	83.5

The lowest possible total score is 36 and the highest is 108. A brief description of each of the criteria follows. For more details, see Golet (1972) or Golet and Larson (1974).

1. Wetland class richness. This criterion describes the number of wetland classes present in a wetland. An area must be at least 1 acre in size to be recognized as a separate class. As wetland class richness increases, so does the likelihood for greater wildlife species richness because each wetland class provides habitat for a different assemblage of species. However, the number of classes alone does not account for all of the species richness. Certain classes support a greater number of species than others, so that the kind and relative proportions of different wetland classes present are important as well. Wetland class richness is the broadest and most important of the criteria for evaluation.

2. Dominant wetland class. Some wetland classes support greater numbers and a greater diversity of wildlife than others, and certain classes provide the only suitable habitat for species such as waterfowl that are especially valued by man. Therefore, wetlands are rated according to the dominant class present. This is the one that clearly occupies the greatest area. If two or more classes are co-dominant, their ranks are averaged. Dominant life form of vegetation, water depth and permanence of surface water are the major characteristics considered in ranking classes (see Table 3).

3. Size categories. Wetlands are ranked from largest to smallest, according to the general principle that as size increases, so does wildlife value. Large wetlands serve as refuges for wildlife particularly sensitive to man's activities. With increasing size, disturbances on the periphery have less effect on wildlife in the interior. Large wetlands also tend to encompass a greater diversity of habitat types because of irregularities in topography and associated differences in water depth. Large wetlands are usually longer-lived than small ones because large size is generally correlated with a permanently high water table and an extensive watershed. In addition, wetlands larger than 100 acres are of great value to flocks of migrating waterfowl.

4. Subclass richness. This criterion goes one step further than wetland class richness in assessing habitat diversity. Just as particular life forms characterize classes, particular subforms characterize subclasses. A wetland's broad wildlife value increases as the number of subclasses increases. As noted above, a wetland segment must be at least 1 acre in size to be recognized as a separate subclass.

5. Site type. Bottomland wetlands are generally more valuable than upland wetlands because of greater soil fertility, more sustained surface water levels and greater life expectancy. Similarly, wetlands associated with open water bodies are usually more valuable than isolated ones. Using this rationale I grouped site types into three categories for evaluation (see Table 2).

6. Surrounding habitat types. Freshwater wetlands bordered by forest, agricultural or open land, or salt marsh are more valuable to wildlife than those adjacent to land more intensively developed by man. Furthermore, diversity in the surrounding habitat increases the possibility of wildlife diversity within the wetland. The percentage of the surrounding habitat occupied by the less intensively developed types and the number of these types present determine the rank given for this criterion.

7. Cover type. This criterion can be assessed in wetlands consisting of one or many wetland classes, although its value is most evident in evaluating deep and shallow marshes. Studies suggest that a cover-water ratio of approximately 50:50 is optimal for waterfowl and marsh birds in general (Weller and Spatcher 1965, McIlvray 1968). Highest ranks are thus given to wetlands with nearly equal proportions of cover and water. Areas with nearly total cover or total open water receive low ranks. In addition, cover interspersed with water is deemed more valuable than a band of cover surrounding open water.

8. Vegetative interspersion. A wetland receives a rank for this criterion according to which interspersion type (Fig. 5) it approximates. High ranks are associated with an abundance of edge between subform stands, small size of such stands and a large number of different kinds of edge.

9. Wetland juxtaposition. A wetland's wildlife value is generally higher if it is located near other wetlands, especially if the adjacent wetlands contain classes or subclasses different from those of the wetland being evaluated. Moreover, the value increases if the wetlands are connected by streams. In such cases, wildlife can move safely between wetlands to best satisfy their needs. This is especially advantageous for waterfowl.

Wetland juxtaposition is important because it provides habitat diversity. It is most important when the wetland of interest is small and contains few classes. In evaluation, a rank of 3.0 is automatically given to any wetland larger than 500 acres that also possesses three or more wetland classes, one of which is deep or shallow marsh. If the wetland does not meet these specifications, ranking proceeds according to the normal specifications given in Table 2. If several categories should fit the wetland, the highest ranking one should be used in evaluation.

10. Water chemistry. Water chemistry influences the presence, abundance and distribution of aquatic plants and invertebrates that serve as food for wetland wildlife.

While cover and nest sites are probably more critical than food in determining the presence of most species, abundance of food items can influence the carrying capacity of a wetland during the breeding season and its value to migrating waterfowl. Decision-makers have no time to adequately sample and describe food plants and animals, but water chemistry determinations can serve as indices of potential productivity.

Brooks and Deevey (1963) pointed out that New England surface waters are very dilute and extremely soft for the most part. Analysis of water chemistry data provided by the Massachusetts Division of Fisheries and Game produced support for this generalization (Golet 1972). These data suggest that average total alkalinity in excess of 70 ppm $CaCO_3$ and pH values above 7.5 can be considered high. Specifications for pH (Table 2) are based upon clear-cut groupings of the graphed data for 95 ponds and lakes. Alkalinity specifications derive from the classes of Brooks and Deevey (1963). Total alkalinity is the better index of productivity; pH is less reliable, and should be used only if alkalinity data are not obtainable.

This system of wetland classification and evaluation allows one to objectively group wetlands according to their wildlife value and to identify key areas for preservation and acquisition. Use of the system assumes, however, acceptance of the stated standard for evaluation: maximum wildlife production and diversity. The above criteria would not be suitable for use by a state fish and game agency attempting to identify valuable wood duck (Aix sponsa) production areas. For that case, more specialized criteria would be required.

Two major constraints guided the development of this system. First, it was designed for use by decision-makers. A special effort was made to produce criteria that are as uncomplicated and objective, and yet as sensitive, as possible. The necessary data for most of the evaluation can be obtained from recent aerial photographs, topographic maps and surficial geology maps. Wetland subclass, vegetative interspersion and water chemistry are key descripters which require unavoidable, but limited, field work. Shortage of time and expertise would render a more sophisticated system useless to the decision-maker.

The choice to consider virtually all wildlife species during evaluation imposed another major constraint. Although wildlife production and diversity are both reasonable goals, they are not strictly compatible. It is impossible to maximize the production of all species at one, since each has a different set of habitat requirements. The broadness of the criteria reflect the overriding influence of compromise.

1978
WETLAND EVALUATION FORM

Wetland location: Carlstadt, N.J.
Wetland owner: Russo Development Corp.

EVALUATION PERFORMED BASED ON SITE CONDITIONS IN 1978

RESOURCE VARIABLES	DATA	S.C.*	RANK	PTS
WETLAND CLASS RICHNESS	Four Classes: EM,SM,SF,M	5	2.5	12.5
DOMINANT WETLAND CLASS	Meadow (M)	5	1.0	5.0
SIZE CATEGORY (ACRES)	51-100 acres (52.2)	5	2.0	10.0
SUBCLASS RICHNESS	Four Subclasses: EM4 ,SM1,SF1 & M1	4	2.0	8.0
SITE TYPE	Bottomland streamside	4	3.0	12.0
SURROUNDING HABITAT TYPES (PERCENT OF TOTAL SHORELINE)	Forest: 0; Agric. & open land: 50; Salt Marsh: 0; Water: 0; Recreation: 0; Urban: 50; Waste Disposal: 0	4	2.0	8.0
SIGNIFICANT COEFFICIENT		SUBTOTAL I:		55.5

E OF VARIABLES	DATA			R.C.	RANK	PTS.
	PERCENT COVER	DISTRIBUTION	TYPE			
COVER TYPE	90	occasional small patches of non cover (water)	3	3	2.0	6.0
	EDGE TYPES[a]	UNIT SIZE	DISTRIBUTION			
Vegetative Interspersion	2			3	2.0	6.0
	CLASS	STREAM-LINKED	DISTANCE (MILES)			
Wetland Juxtaposition	same	yes	adjacent	2	3.0	6.0
				SUBTOTAL 2		18.0
				SUBTOTAL 1		55.5
				TOTAL		73.5

[a] Numbers refer to sub-forms of vegetation described in Part I of dissertation

Rank	
low:	35.0-50.0
med:	50.5-60.0
high:	60.5-70.0
outstanding:	70.5-105

WETLAND EVALUATION FORM

Wetland location: Carlstadt, N.J.
Wetland owner: Russo Development Corp.

EVALUATION BASED ON CONDITIONS IN SEPTEMBER 1987

RESOURCE VARIABLES	DATA	S.C.*	RANK	PTS
WETLAND CLASS RICHNESS	Four Classes: DM,SM,SF,M	5	2.5	12.5
DOMINANT WETLAND CLASS	Shallow Marsh (SM)	5	2.5	12.5
SIZE CATEGORY (ACRES)	<10 acres	5	1.0	5.0
SUBCLASS RICHNESS	Four Subclasses: DM4,SM1,SF1 & M1	4	2.0	8.0
SITE TYPE	Bottomland Streamside	4	3.0	12.0
SURROUNDING HABITAT TYPES (PERCENT OF TOTAL SHORELINE)	Forest 0; Agric. or Open Land 50; Salt Marsh 0; Water 0; Recreation 0; Urban 50; Waste Disposal 0	4	2.0	8.0
SIGNIFICANT COEFFICIENT		SUBTOTAL I:		58.0

E VARIABLES	DATA			S.C.	RANK	PTS.
	PERCENT COVER	DISTRIBUTION	TYPE			
COVER TYPE	80	Peripheral Band	2	3	1.5	4.5
	EDGE TYPES*	UNIT SIZE	DISTRIBUTION			
Vegetative Interspersion	2			3	2.0	6.0
	CLASS	STREAM-LINKED	DISTANCE (MILES)			
Wetland Juxtaposition	same	yes	adjacent	2	3.0	6.0
				SUBTOTAL 2		16.5
				SUBTOTAL 1		58.0
				TOTAL		74.5

* Numbers refer to sub-forms of vegetation described in Part I of dissertation

Notes: Rank
low: 35.0-50.0
med: 50.5-60.0
high: 60.5-70.0
outstanding: 70.5-105