MAINE III

USER REPORT AND FIELD SUMMARY

I. INTRODUCTION

A. PURPOSE

The U.S. Fish and Wildlife Service's National Wetland Inventory is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. The Classification of Wetlands and Deepwater Habitats of the United States by Cowardin et al. is the classification system used to define and classify wetlands. Photo interpretation conventions, hydric soils lists, and wetland plant lists are also available to enhance the use and application of the classifications system.

The purpose of the notes to users is threefold: (1) to provide localized information regarding the production of NWI maps, including specific imagery and interpretation discussion; (2) to provide a descriptive crosswalk from wetland codes on the map to common names and representative plant species; and (3) to explain local geography, climate, and wetland communities.

B. STUDY AREA

1. The work area for the Maine III field trip focused on the northern third of the state (see Appendix A) from approximately 46° 00' N to 47° 30' N latitudinally, and from 70° 15' W to 68° 16' W longitudinally. The study area represents three full 1:100,000 and eight partial 1:100,000 scale maps numbering one-hundred and ninety-seven 7.5' U.S.G.S. quads.

2. 1:100,000 Work Areas

Campbellton SW	Presque Isle NW
Edmundston SE	Presque Isle SW
Edmundston SW	Presque Isle SE
Quebec NE	Presque Isle NE
Quebec SE	Woodstock NW
	Woodstock SW

C. U.S.G.S. QUADS WITH CHECKSITES

Presque Isle SE
Island Falls (2)
Mount Chase
Haybrook Mountain
Trout Brook Mountain
Middle Brook Mountain
Mooseleuk Mountain

Presque Isle NE
Presque Isle (2)
Bill Brook
Squaw Pan Lake East
Mapleton
York Ridge
Carr Pond (2)
Fish River Lake
Mooseleuk Lake
Big Machias Lake (2)

Presque Isle NW
Big Brook Lake
Jack Mountain
Beaver Pond SE (2)

Presque Isle SW
Nesowadnehunk
Spider Lake (4)

Quebec NE
Daaquam (2)

Quebec SE
Hardwood Mountain SE (2)

Woodstock NW
Westfield

Woodstock SW
Houlton North
Linneus (2)
Houlton South (2)
Twin Brook
Bridgewater

Edmundston SE
Wheelock (2)
Naigle
St. Agatha
Lille

Edmundston SW
Allagash (2)
Falls Brook Lake

Campbellton SW
Hamlin (2)

D. PERSONNEL

Chip Messenkopf - Task Order Manager - Geonex Martel, Inc.

Lon Cornell - Photo Interpreter - Geonex Martel, Inc.

Wendi Rosier - U.S. Fish and Wildlife Service

Glenn Smith - U.S. Fish and Wildlife Service

Norm Mangrum - U.S. Fish and Wildlife Service

E. FIELD TRIP DATES

September 9-21, 1990

F. AERIAL PHOTOGRAPHY

Emulsion: Color Infrared
Scale: 1:58,000

1:100,000K	Date of Photography	Percent Coverage
Woodstock SW	10/23/85	100.0%
Woodstock NW	10/23/85	100.0%
Presque Isle NE	05/13/86	49.0%
	05/07/84	25.0%
	10/23/85	16.0%
	05/15/86	10.0%
Presque Isle NW	10/31/85	39.0%
	05/13/86	39.0%
	05/15/86	22.0%
Presque Isle SW	10/31/85	37.5%
	05/15/86	37.5%
	05/13/86	25.0%
Campbellton SW	10/23/85	100.0%
Quebec NE	05/15/86	100.0%
Quebec SE	05/15/86	40.0%
	05/26/86	33.0%
	05/14/86	27.0%
Edmundston SW	05/26/86	62.0%
	10/31/85	23.0%
	05/13/86	15.0%
Edmundston SE	05/13/86	42.0%
	05/07/84	29.0%
	05/15/86	16.0%
	10/23/85	13.0%

G. COLLATERAL DATA

1. U.S.G.S. Topographic Maps

2. S.C.S. Soil Surveys

3. Present NWI data

4. Bailey, R.G., 1980, Description of The Ecoregions of The United States.

5. Magee, Dennis W., 1981, Freshwater Wetlands.

6. Tiner, Ralph W., 1988, Field Guide To Nontidal Wetland Identification.

Collateral data included U.S.G.S. topographic maps, climate, vegetation, and ecoregional information.

The user of the map is cautioned that, due to the limitations of mapping primarily through aerial photointerpretation, a small percentage of wetlands may have gone unidentified. Since the photography was taken during a particular time and season, there may be discrepancies between the map and current field conditions. Changes in landscape which occurred after the photography was taken would result in such discrepancies.

Aerial photo interpretation and drafting were completed by Geonex Martel, Inc., St. Petersburg, Florida.

H. MAP ACQUISITION

To discuss any questions concerning these maps or to place a map order, please contact:

Ralph Tiner
Regional Wetland Coordinator
U.S. Fish and Wildlife Service
1 Gateway Center, Suite 700
Newton Corner, Mass. 02158

To order maps only, please contact:

National Cartographic Information Center
U.S. Geological Survey
507 National Center
Reston, VA 22092

1-800-USA-MAPS

Maps are identified by the name of the corresponding U.S. Geological Survey (U.S.G.S.) 1:24,000 scale topographic quadrangle name.

Topographic map indices are available from the U.S.G.S.

II. PHYSICAL DESCRIPTION OF THE PROJECT AREA

A. GEOGRAPHY

The study area is described by Bailey (1980) as the Northern Hardwoods-Spruce Forest Section of the Laurentian Mixed Forest Province. The area of greatest relief is along the central southern boundary within Baxter State Park. This rugged portion of Maine exhibits open low mountains with local relief between 1,000 - 3,000 feet. The remaining mapping area is centrally divided between plains and hills to the east and more rugged open high hills with greater relief to the west.

B. CLIMATE

The study area is characteristic of a northern temperate climate with sufficient rainfall to support vast broadleaf deciduous and needle leaved evergreen forests. Maine is noted for its rapidly changing weather. There are frequent rains in all months, and winters are long and severe. Average annual temperatures range from 35° F to 50° F. Average annual precipitation ranges from 25 to over 45 inches. The growing season is short, the frost free season lasts from 100 to 140 days.

C. VEGETATION

The dominant vegetation over the study area consists of forests of evergreen and deciduous species found in both mixed and pure stands. Generally, the deciduous trees inhabit the lower, warmer zones of better soils while the spruce, pine, and cedar mixes occupy the upper tree stratum on the poorer rocky soils of the highlands. Numerous palustrine wetlands are found in the study area with bogs and marshes the two major types.

D. SOILS

The work area has a wide range of soil types that very greatly from place to place. The influence of glaciation in the study area is characterized by numerous hydric soils composed of peat, muck, and clays found mixed in combinations with sand, silt, gravel, and rock. Generally, Spodsols are dominant in the lower plains with Inceptisols and Alfisols more extensive further inland.

E. WATER REGIME DESCRIPTION

Non-Tidal

(A) Temporarily Flooded - Surface water present for brief periods during growing season, but water table usually lies well below soil surface. Plants that grow both in uplands and wetlands are characteristic of this water regime.

(B) Saturated - The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.

(C) Seasonally Flooded - Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is extremely variable, extending from saturated to a water table well below ground surface.

(E) Seasonally Flooded/Saturated

(F) Semipermanently Flooded - Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

(G) Intermittently Exposed - Surface water is present throughout the year except in years of extreme drought.

(H) Permanently Flooded - Water covers the land surface throughout the year in all years.

(K) Artificially Flooded - The amount and duration of flooding is controlled by means of pumps or siphons in combination with dikes and dams.

D. WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

Table - Cowardin Classification Codes and Descriptions (1 of 3)

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
PALUSTRINE			
PEM1 (A,B,C,E,F)	Palustrine, emergent, persistent	Marsh, seep, wet meadow	Typha latifolia (cattail) Juncus sp. (rush) Carex sp. (rush) Iris versicolor (blue flag)
PAB3 (F,H)	Palustrine, aquatic bed, rooted vascular	Pond weeds	Nuphar lutuem (water lily) Potamogeton spp. (pondweed) Pontederia cordata (pickerelweed)
PAB4 (F,H)	Palustrine, aquatic bed, floating vascular	Pond scum	Lemna sp. (duckweed)
PFO1 (A,B,C,E)	Palustrine, forested, broad leaved deciduous	Forested floodplains, streams, swamps, bogs, fens	Alnus spp. (alder) Acer rubrum (red maple) Betula populifolia (gray birch)
PFO2 (B,E)	Palustrine, forested, needle leaved, deciduous	Bogs, swamps	Larix laricina (larch)
PFO4 (B,C,E)	Palustrine, forested, needle leaved evergreen	Forests, swamps, forested depressions	Chamaecyparis thyoides (Atlantic white cedar) Picea mariana (black spruce) Pinus strobus (Eastern white pine) Thuja occidentalis (Northern white cedar)

D. WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

Table - Cowardin Classification Codes and Descriptions (2 of 3)

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
PALUSTRINE			
PFO5 (F,H)	Palustrine, forested, dead	Dead trees	
PSS1 (B,C,E,F)	Palustrine, scrub-shrub, broad-leaved deciduous	Swamps, bogs, fens, thickets, vegetated stream banks	Cornus amomum (silky dogwood) Myrica gale (sweet gale) Spiraea latifolia (meadowsweet) Alnus spp. (alder)
PSS2 (B,E)	Palustrine, scrub-shrub, needle-leaved deciduous	Bogs, depressions	Larix laricina (larch)
PSS3 (B,E)	Palustrine, scrub-shrub, needle-leaved evergreen	Bogs, fens, depressions	Chamaedaphne calyculata (leatherleaf) Kalmia angustifolia (sheep laurel)
PSS4 (B,C,E)	Palustrine, scrub-shrub, needle-leaved evergreen	Bogs, swamps	Pinus rigida (pitch pine) Chamaecyparis thyoides (Atlantic white cedar) Picea mariana (black spruce)
PSS7 (B,E)	Palustrine, scrub-shrub, mixed needle-leaved and broad-leaved evergreen	Bogs, swamps	Picea mariana (black spruce) Chamaedaphne calyculata (leatherleaf)
PUB (F,H)	Palustrine, unconsolidated bottom	Ponds, sand/ gravel pits, impoundments	Unvegetated mud

D. WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

Table - Cowardin Classification Codes and Descriptions (3 of 3)

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
LACUSTRINE			
L1UB (H)	Lacustrine, limnetic, unconsolidated bottom	Lakes	Unvegetated mud and sand
L2US (A,C,G)	Lacustrine, littoral, unconsolidated shore	Shoreline	Unvegetated mud and sand
L2RS (C,G)	Lacustrine, littoral, rocky shore	Rocky shoreline	Unvegetated bedrock and rubble
RIVERINE			
R2UB (H)	Riverine, lower perennial, unconsolidated bottom	Rivers, streams	Unvegetated mud and sand
R2US (A,C)	Riverine, lower perennial, unconsolidated shore	Gravel bars, flats	Unvegetated mud, sand and gravel
R3UB (H)	Riverine, upper perennial, unconsolidated bottom	Rivers, streams	Unvegetated gravel, sand and stones
R3US (A,C)	Riverine, upper perennial, unconsolidated shore	Gravel bars, flats	Unvegetated sand, gravel and stones

III. FIELD TRIP OBJECTIVES

To correlate photographic signatures with field observations, the identification of all representative wetland communities and their relative periods of inundation and/or saturation. Included in these observations:

1. To determine why numerous bogs noted on pre-field photo review to have an absence of the characteristic orange leatherleaf signature. The signatures in these northern bogs range from off white to yellow, and noticeably smooth. When viewed under on 8x lupe or stereoscope a hazy stippling of small red crowns can be seen.

2. Less numerous, but intriguing, are some bogs in the northwest corner of the study area exhibiting a filigreed network of shallow open water channels. These unique wetlands have the characteristic appearances of "string bogs" seen in the north central portion of Oregon. We want to determine the proper classification of the aquatic system within the mat community.

3. Several impounded lacustrine systems show evidence of extreme fall and spring draw down revealing two distinct signatures of the exposed substrate. The first is a textured white to gray signature, the second a smooth dark brown to olive usually located in the central portion of the impounded system. The object will be to distinguish breaks between exposed unconsolidated shore and rocky shore.

Results:

1. The off-white signatures observed in north western bog communities was discovered to be twig rush (Cladium mariscoides) dominant in a mix of other emergents and various low shrubs. The small red crowns texturing this signature represent small larch shrubs (Larix laricina). The larch dominated the mixed shrub community, averaging two to three feet higher in most cases. The smooth, white Cladium mariscoides dominant bogs are best described by the PEM1Ba label, and when the larch signature is sufficient to split classes, the result will be PEM1/SS2Ba.

2. We could only reach one of the "string bogs" because of limited access in the North Maine Woods portion of the state. The water filled channels supported a dense emergent community of twig rush, and various other species. We assumed the water to be acidic because of the dark tannin coloration and concluded that the PEM1Fa label would distinguish this unique feature of mat community morphology.

3. Field observations during the Maine III and Maine II (Moxie Pond) trips indicated most lacustrine systems in the work area have a rocky shoreline consisting of bedrock, stones, and boulders. On the photography this substrate appears as light grey to white, very textured, with many of the larger individual boulders visible under 4x magnification. We decided the exposed rocky shore would be accurately described as L2RSGh. The very smooth white signature is unconsolidated sand, gravel, and stones seasonally flooded (L2USCh or L2USAh) by impounded spring runoff and precipitation. The dark brown to olive signature observed farthest away from shore and central to the lacustrine body is intermittently exposed mud and sand (L2USGh).

A. FORESTED WETLANDS

1. Temporarily flooded, broad-leaved deciduous forested wetlands (PFO1A) are not common in the work area, and are usually restricted to stream and river edge communities flooded temporarily during seasonal snow melt and spring rains.

   We did investigate one site we considered borderline (Site 19) to be an island of aspen and green ash within an extensively cleared section of agricultural fields. Situated in a natural shallow drainageway, the May 7, 1984 photo indicates some temporary spring flooding. A soil probe revealed a 10YR-2/1 soil type with some mottling which supports the temporarily flooded call.

2. Seasonally flooded, broad-leaved deciduous forested wetlands (PFO1C) were not observed, however they do occur along stream banks and small pockets along major rivers. Generally most seasonal (or temporary) forested and shrub communities, including evergreens (PFO4C, PSS4C), will occur as edge communities in drainage situations and not as large units within depressions.

3. Seasonally flooded/saturated, broad-leaved deciduous forested wetlands (PFO1E) were very common in pure stands (Site 4) and in co-dominant mixes with needle-leaved evergreen species (PFO1/4E, Site 5). Dominant and common species observed were alder (Alnus rugosa), and red maple (Acer rubrum), along with grey birch (Betula populifolia), green ash (Fraxinus pennsylvanica), and balsam poplar (Populus balsamifera). Signatures for the PFO1E communities range from white to "bluish", subtle fuzzy crown and trunk signatures with a smooth white understory of Carex sp. or Scirpus cyperinus.

4. Saturated, needle-leaved deciduous forested wetlands (PFO2B) were observed in the field, and were usually found on the periphery isolated bogs. Site 21 illustrates a saturated forested wetland with Larix laricina dominant over a lush understory of sphagnum, Chamaedaphne calyculata (leatherleaf), Sarracenia purpurea (pitcher plants), and several other species indicative of bog communities. The small "a" modifier will accompany this label (PFO2Ba) to best describe the acidic hydrology associated with isolated bogs in depressions.

5. Seasonally flooded/saturated, needle-leaved evergreen forested wetlands (PFO4E) comprise the greatest number of acres of vegetated wetland communities. Nearly every other community type is surrounded by the PFO4E mapping unit, this in turn makes the outer PFO4E/U breaks, many times, to be the most challenging decisions of the project. Sites 1, 2, 8, and 41 are only a few of the many wetlands we observed to be dominated by Picea mariana and Thuja occidentalis. A rich assemblage of understory shrubs including Acer rubrum, Betula populifolia, Abies balsamea, and Cornus amomum thrive on the hummocky surface where water tends not to pool. In the wetter depressions sphagnum, Mitchella repens (partridge berry), Coptis trifolia (goldenthread), Iris versicolor, and several different ferns are only a few of the many species of emergents on the forest floor.

6. Saturated, needle-leaved evergreen forested wetlands (PFO4B) were observed in isolated depressions (Site 6) and on gentle slopes (Site 34) between ridges where organic hydric soils have accumulated. The dominant species Thuja occidentalis and Picea mariana supported a dense undergrowth of sphagnum, various low shrubs and emergents. Saturated evergreen communities on the periphery of leatherleaf and twig rush bogs (PSS3Ba, PEM1Ba) were given the "a" acid modifier (PFO4Ba) to best describe this particular setting (Site 20).

7. Dead trees (PFO5) were found in a majority of cases to be the result of impounding activities of beavers (PFO5Fb) or man (PFO5Fh, Site 32). The characteristic white trunk and bare crown signature in standing water (Site 32) is Thuja occidentalis stressed and killed by a logging road impeding natural drainage. During field checks this past fall, we found the affected area to be more extensive than indicated on the May 13, 1986 imagery.

B. SHRUB WETLANDS

1. Temporarily and seasonally flooded, broad-leaved deciduous shrub wetlands (PSS1A and PSS1C) were uncommon in the study area, however some mapping units may be found on some stream fringes and narrow floodplains of slower rivers.

2. Seasonally flooded/saturated shrub wetlands (PSS1E) were very common in depressions (Site 13), within drainages (Site 3), and wherever drainage is restricted by man (Site 7) or beavers (Site 40). Common species include Alnus rugosa, Acer rubrum, Spiraea tomentosa, Betula populifolia, and Connus amomum. Signatures range from smooth blue-grey to light brown and stand out in contrast to the extremely smooth and white emergent signatures.

3. Semi-permanently flooded, broad-leaved deciduous shrub wetlands (PSS1F) were observed in narrow drainages with Salix nigra dominant in a community that included Alnus rugosa, Potentilla palustris (marsh cinquefoil), Bidens connata (swamp beggar-ticks), and Lemna minor.

4. Seasonally flooded/saturated broad-leaved evergreen shrub wetlands (PSS3E) occur in drainages, and on the fringes of impounded lacustrine and open water palustrine systems (Site 47). Seasonal flooding due to precipitation and snowmelt require the "E" water regime for many of these fringe communities experience flooded conditions during the growing season.

5. Saturated, broad-leaved evergreen shrub wetlands (PSS3Ba) were very common and easily distinguished by the smooth orange signature (Site 12) of the dominant Chamaedaphne calyculata. These wetland communities are usually formed in isolated depressions or "kettle holes", underlain by deep layers of peat and muck. An even mix of needle-leaved and broad-leaved evergreen species (PSS7Ba) was recorded (Site 45) with Picea mariana and Chamaedaphne calyculata co-dominant in a community that included Larix laricina shrubs, Andromeda glaucophylla, Sphagnum sp., and Sarracenia purpurea. The PSS7Ba signature is more textured and darker than the pure stands of leatherleaf coverage.

6. Saturated, needle-leaved evergreen shrub wetlands (PSS4Ba) were observed (Site 30) to have a very textured orange-purple signature characteristic of black spruce shrub bogs. Plant species associated with this community include Eriophorum alpinum, Vaccinium macrocarpon, and Kalmia angustifolia.

C. EMERGENT WETLANDS

1. Temporarily and seasonally flooded emergent wetlands (PEM1A, PEM1C) were not common in the work area. The seasonally flooded (PEM1C) label will be used in some cases along stream and river edge communities, and in shallow depressions. Site 18 is an unusual community of Onoclea sensibilis in a small depression that is seasonally flooded (May 7, 1984 imagery), but saturated conditions are not present during the growing season.

2. Seasonally flooded/saturated emergent wetlands (PEM1E) describe the majority of emergent communities found in the state. The characteristic signature is very smooth white to light gray (Sites 11 and 9) with Typha latifolia, Scirpus cyperinus, and Carex spp. the dominant species. Site 39 is an example of a Scirpus/Typha emergent wetland influenced by beaver impoundments (PEM1Eb).

3. Semi-permanently flooded emergent wetlands (PEM1F) were observed in the field with Scirpus cyperinus and Typha latifolia (Site 10) in standing water. The signature reflects flooded conditions throughout the growing season and in many cases is caused by water impounded by man or beavers. Site 49 is an example of a classic "string bog" in which the network of stagnant open water channels are crowded with emergent species. In all cases, Cladium mariscoides was dominant with common species Carex spp., Sphagnum sp., Drosera sp., and Sarracenia purpurea. The acidic modifier (PEM1Fa) was chosen to best describe this unusual wetland community.

SUMMARY

The summary/mapping conventions section represents a culmination of three field trips totalling more than five weeks of in-field investigation. Marine and estuarine systems were absent from the Maine III work area and are reviewed in the Maine Re-do field report (Trip 1). The palustrine, lacustrine, and riverine systems, however, share common traits throughout the state. The following summary notes and thoughts should provide users with a comprehensive guide for mapping conventions.

1. Photo interpreters should carefully follow the information available on 7.5' topographic maps. If topos aren't available a 15.0' scale map should be obtained. Care must be taken to investigate all areas with swamp symbols during the initial delineation phase and especially during large scale review. In particular, the most difficult break, the PFO4E/U, will sometimes need adjustment after a second look at the large scale product. As we have seen in most cases, swamp symbols on provisional topographic maps tend to be conservative compared to actual forested wetland coverage.

2. Split classes and subclass labels (EM1/SS1, FO4/SS1 for example) will occur but should be used to describe only the most unique wetland communities when relative densities allow.

3. Most ponds that are polygon size will be labeled as permanent (PUBH) water bodies. If the water is not a natural depression the appropriate "h" or "x" modifier will be used. Smaller "dot" size polygons will be classified as PUBF(x,h). Excavated gravel pits exhibiting a shallow light blue or green return will be labeled PUBFx.

4. Forested wetlands that experience flooding on a semi-permanent basis will either be dead within one growing season or greatly stressed enough to avoid PFO1F or PFO4F calls. The seasonally flooded/saturated (PFO1E, PFO4E) signature has a wide range from standing water to a subtle white emergent understory. Date of photography should be carefully considered where seasonality rules. Semipermanently flooded forested wetlands almost always are the result of beaver dams on man's activities. The resulting wetland of dead trees should be classified PFO5F (h, x, b).

5. The PFO4B labels will be limited to:

   a. Wetlands on obvious slope, supported by topographic information (swamp symbols) and/or hydric soils.

   b. Isolated "Kettle Hole" bogs exhibiting a more smooth, stunted crown signature and without standing water.

   c. On the periphery or within PSS3Ba, PSS7Ba, and similar mat communities, in addition to all PFO4 communities with obvious PSS3 saturated understories.

6. The "a" acid modifier should be added to the PFO4B label in the following situations:

   a. "Kettle Hole" type bogs with an orange to olive PSS3 (leatherleaf) understory.

   b. On the fringe or within leatherleaf bogs and mat communities in the northwest portion of the study area dominated by Cladium mariscoides (twig rush).

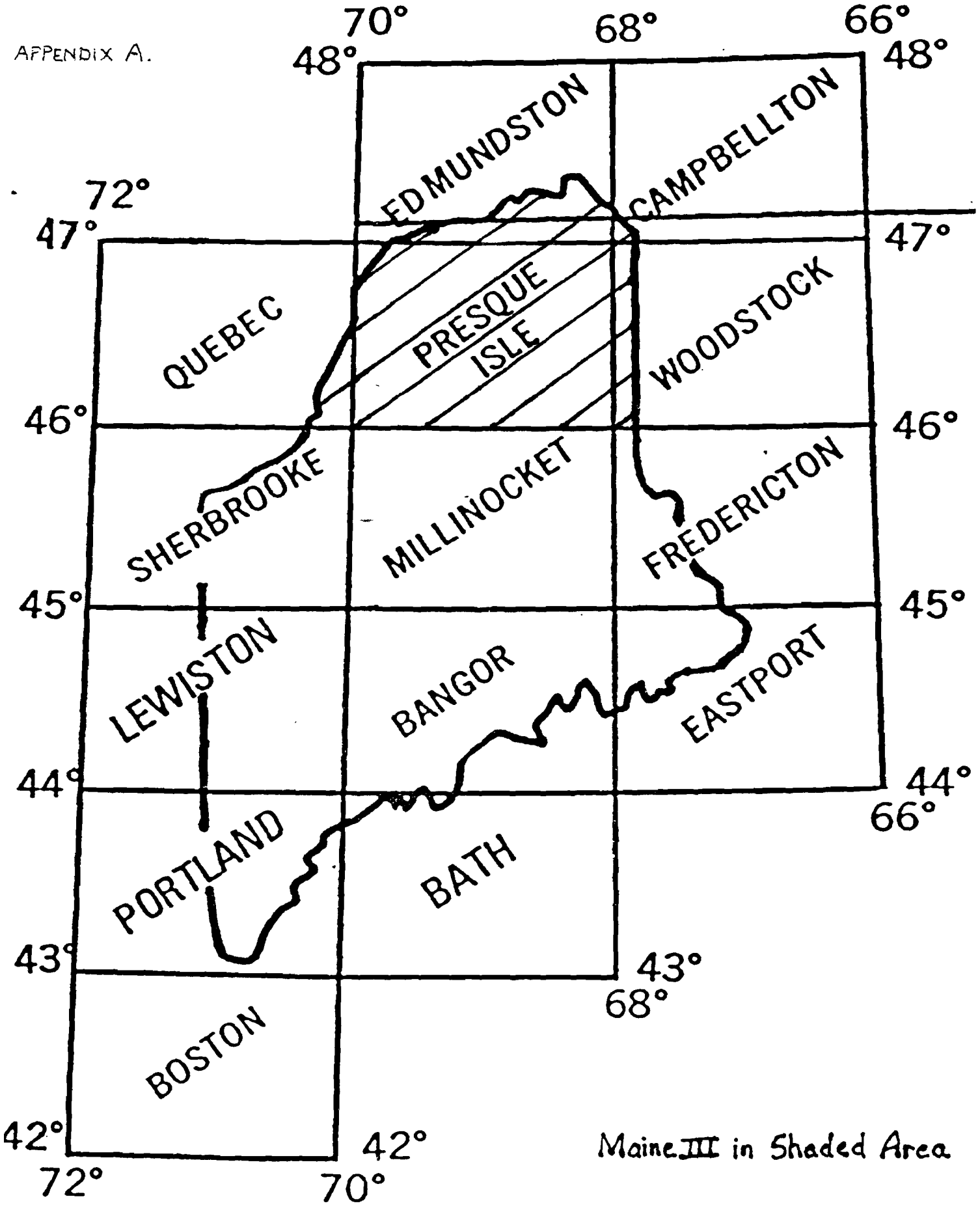
7. Impounded and temporarily drained lacustrine systems should be classified according to signatures revealed by the irregularly exposed substrate. A grainy, textured white to grey return is usually exposed bedrock, cobbles and boulders (L2RSGh). A smooth dark brown to olive signature represents exposed sand and mud (L2USGh) in most cases.

   Photo interpreters must follow the topographic map carefully and follow the normal pool level and swamp symbol breaks so as to not include vegetative communities as exposed substrate. Additionally, a very smooth white signature <u>above</u> normal pool levels may indicate temporarily and seasonally <u>flooded</u> substrate, L2USAh for example.

8. Only pen width (4x0) and larger linears will be delineated using contour information to determine upper and lower perennial riverine status (R3UBH, R2UBH). Obvious pen width vegetated linear will in most cases be considered seasonally flooded (PSS1C for example) especially when crossing numerous contours.

CM/drs.nwi

APPENDIX A.



Maine III in Shaded Area