ID	Water body Name or Type	Crossing
W-131	Palustrine- Herbaceous	Wetland
W-132	Palustrine- Herbaceous	Wetland
W-133	Palustrine- Herbaceous	Wetland
W-134	Canals	No Impact
W-135	Canals	No Impact
W-136	Canals	No Impact

4.2.5 Crossing Impact Minimization

The Contractor shall ensure that temporary culverts and flumes are sized and installed of sufficient diameter to accommodate the existing flow of water and those that may potentially be created by sudden increased runoffs from seasonal rainfall events. Flumes shall be installed with the inlet and outlet at natural grade if possible.

Where bridges, culverts or flumes are installed across the working area, the Contractor shall be responsible for maintaining them (e.g. preventing collapse, clogging or tilting). All flumes and culverts shall be removed as soon as possible upon completion of construction. All disturbed bottoms shall be restored to pre-construction grades.

The width of the temporary access road across culverts and flumes and the design of the approaches and ramps shall be adequate for the size of vehicle and equipment access required. The ramps shall be of sufficient depth and constructed to prevent collapse of the flumes, and the approaches on both sides of the flume shall be feathered.

Where culverts are installed for access and a water body is expected or possibly shall be constructed by the dry flume method, the culvert shall be of sufficient length to convey the stream flow through the construction zone.

The Contractor shall maintain temporary equipment bridges to minimize soil from entering the water body.

Except where rock is encountered and at non flowing open cut crossings, all necessary equipment and materials for pipe installation must be on-site and assembled prior to commencing trenching in a water body. All staging areas for materials and equipment shall be located at least 10 feet from the water body edge. The Contractor shall preserve as much vegetation as possible along the wetland edge.

4.3 HYDROSTATIC TESTING

4.3.1 Testing Equipment Location

The Contractor shall provide for the safety of all pipeline construction personnel and the general public during hydrostatic test operations by placing warning signs in populated areas. The Contractor shall locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the maximum extent practicable and shall implement those sediment and erosion control measures identified in the Project Turbidity and Sediment Control Plan.

4.3.2 Test Water Source and Discharge Locations

PREPA and/or its designated pipeline contractor will be responsible for acquiring all permits required by federal, state and local agencies for procurement of water and for the discharge of water used in the hydrostatic testing operation. Pipeline contractor must be supplied with a copy of the appropriate withdrawal/discharge permit for hydrostatic test water if required. The Contractor shall keep the water withdrawal/discharge permit on site at all times during testing operations.

Any water obtained or discharged shall be in compliance with permit notice requirements and with sufficient notice for the designated project Testing Inspector to make water sample arrangements prior to obtaining or discharging water. In some instances sufficient quantities of water may not be available from the permitted water sources at the time of testing. Withdrawal rates may be limited as stated by the permit. Under no circumstances shall an alternate water source be used without prior authorization unless specifically addressed in project permits.

The Contractor shall be responsible for obtaining any required water analyses from each source to be used in sufficient time to have a lab analysis performed prior to any filling operations. The sample bottle shall be sterilized prior to filling with the water sample. The analysis shall determine the pH value and total suspended solids. Each bottle shall be marked with:

- Source of water with pipeline station number
- Date taken
- Laboratory order number

4.4 Typical Environmental Engineering Plan View and Cross-Section Drawings

Please See Appendix F For Drawings

4.5 Erosion and Sediment Control Plan

Please See Appendix G For Erosion and Sediment Control Plan

4.6 SWPPP

Please See Appendix H for Stormwater Pollution Prevention Plan for Via Verde Pipeline.

4.7 Frac-Out Plan

Please See Appendix I for Spill Control Plan (Frac-Out Plan).

5. References

Acevedo-Rodríguez, P. and Woodbury, R. O. 1985. *Los bejucos de Puerto Rico.* Volume 1. General Technical Report S0-85. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station. 331 pp.

Birdlife International. 2000. America's Endangered Birds (Libro Rojo de CIPA/IUCN). Oficina Regional para las Américas, Quito, Ecuador.

Boccheciamp, R.A. 1978. *Soil Survey of San Juan Area of Puerto Rico.* U.S.D.A. Soil Conservation Service. 141 pp. plus appendices.

Boccheciamp, R.A. 1982. *Soil Survey of Arecibo Area of Puerto Rico.* U.S.D.A. Soil Conservation Service. 180 pp. plus appendices.

Boccheciamp, R.A. 1979. *Soil Survey of Ponce Area of Puerto Rico.* U.S.D.A. Soil Conservation Service. 88 pp. plus appendices.

Department of Natural and Environmental Resources, et al. 2001. *Guide to Identify Common Wetland Plants in the Caribbean Area: Puerto Rico and the U.S. Virgin Islands.* Published by the University of Puerto Rico. 268 pp.

Department of Natural and Environmental Resources. 2004 Regulation to govern the Chase in the Commonwealth of Puerto Rico, exotic species, the wildlife management and conservation. Regulation No. 6765

Dominguez Christopher, Carlos, 2000. Forestry historical panorama of Puerto Rico. Published by the University of Puerto Rico, Rio Piedras, P.R. 680pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual.* U.S. Army Engineer Waterways Experimental Station, Vicksburg, M.S. Tech. Rpt. Y-87-1. 100 pp. plus appendices.

Environmental Laboratory. 2009. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region.* U.S. Army Engineer Research and Development Center, Vicksburg, M.S. ERDC/EL TR-09-8. 119 pp. plus appendices.

Ewel, J. J. and J. L. Whitmore. 1973. *The Ecological Life Zones of Puerto Rico and the United States Virgin Islands*. Research Paper ITF-18. U. S. Department of Agriculture, Forest Service, Institute of Tropical Forestry, Río Piedras, P.R.

Gould, W., et al. 2007. Puerto Rico Gap Analysis Project – Final Report. USGS, Moscow, ID and the USDA Forest Service International Institute of Tropical Forestry, Río Piedras, PR. 159pp. plus appendices.

Gretag Macbeth. 2000. *Munsell Soil Color Charts*. Munsell Color, New Windsor, NY.

Hutchinson, Ian. 1988. *Salinity Tolerance of Plants of Estuarine Wetlands and Associated Uplands*. Washington State Shorelands and Coastal Zone Management Program: Wetlands Section. Report in fulfillment of contract No. C0088137.

Hilton-Taylor, C. (compiler) 2000. *2000 IUCN Red List of Threatened Species.* IUCN, Gland, Switzerland Cambridge, UK.xviii. 61pp.

Liogier, H. A. 1985. *Descriptive Flora of Puerto Rico and Adjacent Islands.* Vol. I. Editorial Universitaria de Puerto Rico, Río Piedras, P.R. 357 pp.

Liogier, H. A. 1988. *Descriptive Flora of Puerto Rico and Adjacent Islands.* Vol. II. Editorial Universitaria de Puerto Rico, Río Piedras, P.R. 481 pp.

Liogier, H. A. 1991. *Descriptive Flora of Puerto Rico and Adjacent Islands.* Vol. III. Editorial Universitaria de Puerto Rico, Río Piedras, P.R. 461 pp.

Liogier, H. A. 1985. *Descriptive Flora of Puerto Rico and adjacent islands*. Vol. IV. Published by the University of Puerto Rico, Río Piedras, PR.

Liogier, H. A. 1997. *Descriptive Flora of Puerto Rico and Adjacent Islands.* Vol.VI. Editorial Universitaria de Puerto Rico, Río Piedras, P.R. 436 pp.

Liogier, H. H. y L. F. Martorell. 1999. *Flora of Puerto Rico and Adjacent Islands: a Systematic Synopsis.* 2nd Ed. Editorial Universitaria de Puerto Rico, Río Piedras, P.R. 382 pp.

Little, E. L. and Wadsworth, F. H. 1964. *Common Trees of Puerto Rico and the Virgin Islands.* Agricultural Handbook No. 249. U.S. Department of Agriculture, Forest Service. Washington, D.C. 556 pp.

Little, E. L. y R. O. Woodbury. 1974. *Trees of Puerto Rico and the Virgin Islands.* Second Volume. U. S. Department of Agriculture Handbook No. 449-S. Río Piedras, P. R. 1024 pp.

Little, E. L. y F. H. Wadsworth. 1999. *Common Trees of Puerto Rico and the Virgin Islands.* A private reprinting by the authors from Forest Service. U.S. Department of Agriculture Handbook No. 249. Río Piedras, P. R. 556 pp.

Más, E.G. and García Molinari, O. 1990. *Guía Ilustrada de Yerbas Comunes en Puerto Rico.* Agricultural Extension Service, University of Puerto Rico, Recinto Universitario de Mayagüez, Colegio de Ciencias Agrícolas, McGraw Hill Publishing Company, New York, NY. 103 pp.

Murphy, P.G. and A.E. Lugo. 1986. *Structure and Biomass of a Subtropical Dry Forest in Puerto Rico.* Biotropica, Vol. 18(2). Pp. 89-96.

Opler, P. A. and V. Malikul. 1992. *Eastern Butterflies.* Peterson Field Guides. Houghton Mifflin Company, New York, NY. 396 pp.

Raffaele, H. A., J. Wiley, O. Garrido, A. Keith and J. Raffaele. 1998. *A guide to the birds of the West Indies.* Princetown University Press, Princetown, New Jersey. 411 pp.

Ramey, Víctor. 2001. *Grasses, Sedges and Rushes of Wetlands.* Identification Deck. With notes about wildlife use. University of Florida. Institute of Food and Agricultural Sciences. 85 pp.

Rivero, J. 1998. *The amphibians and reptiles of Puerto Rico.* Second Edition Revised. Published by the University of Puerto Rico, Río Piedras, P.R. 510 pp.

Tiner, Ralph W. 1999. *Wetland Indicators: a guide to wetland identification, delineation, classification and mapping.* CRC Press LLC. 363 pp.

United States Department of Agriculture. Soil Conservation Service. Caribbean Area. San Juan Puerto Rico. 1993. *Hydric Soils of the Caribbean.* In Cooperation with the National Technical Committee for Hydric Soils.

U.S. Fish and Wildlife Service. 2000. *Endangered Species List (Puerto Rico/Virgin Islands).* Division of Endangered Species. U.S. Fish and Wildlife Service. 2007. Caribbean Endangered Species Map. Ecological Services in the Caribbean.

Oficina de Patrimonio Natural de Puerto Rico. 2000. *Lista de Elementos Críticos de la División de Patrimonio Natural.* Departamento de Recursos Naturales y Ambientales. San Juan, P.R

US Army Corps
of Engineers

FEDERAL AND COMMONWEALTH JOINT PERMIT APPLICATION FOR WATER RESOURCE ALTERATIONS IN WATERS, INCLUDING WETLANDS, OF PUERTO RICO

Effective Date of Implementation: October 1, 1999

GOVERNMENT OF PUERTO RICO
OFFICE OF THE GOVERNOR
PLANNING BOARD

Attachment A.

FEDERAL AND COMMONWEALTH JOINT PERMIT APPLICATION FORM FOR WATER RESOURCE ALTERATIONS IN WATERS, INCLUDING WETLANDS, OF PUERTO RICO

FOR AGENCY USE ONLY

USACE Application # _____ Date Application Received _____
PRPB CZM Application # _____ Date Application Received _____
EQB WQC Application # _____ Date Application Received _____
DNER SLUC Application # _____ Date Application Received _____
DNER WF Application # _____ Date Application Received _____
DNER WC&WI Application # _____ Date Application Received _____
DNER ECEFP Application # _____ Date Application Received _____
Government Agency Acting as Sponsor in accordance with Section 4C of Law: _____

1. Type of Permit or Certification Requested (check all that apply):
   - [x] U.S. Army Corps of Engineers Permit to place Fill in Waters of the U.S. (Section 404), Work in Navigable Waters of the U.S. (Section 10) and/or Transport Dredged Material for Ocean Disposal (Section 103)
   - [x] CZM Certification
   - [x] Water Quality Certification
   - [ ] Submerged Land Use Concession
   - [ ] Water Franchises
   - [ ] Well Construction and Water Intakes
   - [ ] Earth Crust Extraction Formal Permit - include information requested in Enclosure A

2. Type of activity for which you are applying (check all that apply)
   - [x] New construction or work including dredging or filling in, on or over waters of the U.S., including wetlands, navigable waters and/or other surface waters.
   - [ ] Alteration or operation of an existing work, construction or system which was not previously permitted.
   - [ ] Modification of previously permitted project. Provide previous permit numbers.
   - [ ] Removal, Extraction, Excavation and dredging of earth crust components.
   - [ ] Extraction of water

3. Applicant's Name and Address

Name Autoridad de Energia Electrica (Attn: Eng. Francisco E. Lopez)

Last Name, First Name (if individual). Corporate Name. Name of Government Agency

Address P.O. Box 364267

Municipality San Juan , Zip 00936-4267

Telephone 787-521-4959 Fax 787-521-4880

Name of the Property Owner (If different from applicant): See Appendix E

(If applicant not the owner, explain contractual relationships. Include Owner's address):

4. Agent's Name and Address

Name Larry Evans, BCPeabody Consulting, P.A.

Address 509 Guisando de Avila, Suite 100

Tampa, Florida

Municipality _____ Zip 33613

Telephone 813-961-7300 Fax 813-961-9300

5. Name of Waterway at Work Site

Waterways have been provided in Section 2.4.2.

6. Name of project, including phase if applicable:

Via Verde NG Pipeline

Is this application a part of a multi-phase project? ☐ Yes ☑ No

Project location (Indicate Wards, Municipality, etc. Use additional sheets, if needed);

Please see Section 1.4 Project Description, including location and Appendix D for a location Map.

Ward and Municipality (ies) Please See Section 1.4

"Finca" _____

Road _____, Km. _____, Hm. _____

Street address, road, or other location

Coordinates in Center of Project: Latitude: 18°27'24.17"N

Longitude: 66°40'15.93"W

Lambert Coordinates: X _____

Y _____

Directions to locate Site:

Due to the size of the project, directions will be made available upon request.

7. If there have been any pre-application meetings, including at the project site, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.
USFWS, Boqueron Office-- Edwin Muniz, Marelisa Rivera-- June 8, 2010
USACE, Jacksonville Regulatory District –Mike Holly-- June 10, 2010
USACE, Antilles Regulatory Office-- Edgar Garcia, Sindulfo Castillo-- June 28, 2010
USACE, Antilles Regulatory Office-- Edgar Garcia, Sindulfo Castillo-- August 5, 2010
USACE, Jacksonville Regulatory District– Mike Holley, Bev Lawrence, Donnie Kinnard-- August 2, 2010

8. Please identify by number any Commonwealth and/or Federal permit pending, issued or denied for projects at the location, and any related enforcement actions. (Provide Copies)

Agency	Date	No.\Type of Application	Action Taken
		N/A	
		N/A	
		N/A	

9. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding applicant). Please attach a plan view showing the owner's names and adjoining property lines. Attach additional sheets if necessary.

a. Please see Appendix E for adjoining property owners.

b.

c.

d.

e.

f.

g.

h.

10. Proposed Use (Check one or more as applicable) ☐ Private ☑ Public ☐ Commercial ☑ Industrial ☐ Agricultural

Explain:

11. Description of Work (Be specific, use additional sheets as necessary; Include Purpose and Need of the Project

Please see the attached Section 1.3 for Project Purpose and Need, and Section 1.4 for the Project Description.

12. Total Extent of Work in USACE Jurisdictional Open Waters or Wetlands: (Use additional sheets and provide complete breakdown of each category if more space is needed)

- Fill: _____ acres _____ cuerdas _____ cubic yards _____ cubic meters
- Excavation: 143.92 acres _____ cuerdas _____ cubic yards _____ cubic meters
- Dredging: _____ acres _____ cuerdas _____ cubic yards _____ cubic meters
- Docks, Piers, and Over Water Structures:
  Dimensions N/A

Please see attached Section 2.4.3, for Wetlands and Open Waters temporary impacts

- Total Number of Slips N/A Total Number of Mooring Pilings N/A
- Total area of structure over water and wetlands/seagrasses N/A

- Seawall length N/A ft (mts) Seawall material N/A
- Riprap lenght N/A ft (mts) Type of riprap material N/A

13. Proposed Submerged Land Use:
Submerged Land N/A sf N/A sm Maritime Zone No sf _____ sm
Length of use requested (months, years, ect.):_____

14. Proposed Mining: ☐Sand ☐Gravel ☐Stone ☐Fill ☐Other_____
Excavation: N/A cuerdas/acres Rate: _____ m^3 __day __ week __ month
Total amount:: _____ m^3 Duration: ____ years Slope: _____V:_____H Depth:_____mts
Equipment: _____

15. Water Extraction:
Amount of proposed extraction: N/A MGD _____GPD
_____hrs/day _____days/week _____weeks/year
Safe Yield (Q 99): _____MGD
Method of extraction: Surface Water:_____ pipe diameter (in)_____pump capacity(gpm)
Source: ___ River ___ Sea ___Stream
Name of the Source:_____ Number of people served: _____
Other Water extractions located upstream and downstream from proposed intake:

15. (Continued)

Water Discharges/Outfalls located upstream and downstream from proposed intake:_____

Proposed use of Water: ☐Domestic ☐Government ☐Fisheries ☐Commercial ☐Institutional ☐Industrial ☐ Agricultural ☐Recreational ☐ Other

Brief Description of the proposed use of the water. Specify as applicable the type of crop, acreage number of animals, products, merchandize, number of dwellings, number of employees, etc:

For water intakes include the following information:

Intake Dimensions: Height_____(ft) Width_____(ft)

Pipe Diameter _____(inches)

Type of Structure: ☐Dam ☐Gallery ☐Other_____

Note (Hydraulic - Hydrology Study (H&H): For intake structures, dam or gallery, etc, which alters the natural water level, the applicant should submit an H&H study describing the actual water level and the projected change in water levels after the work is completed.

16. Indicate the zoning of the project site: Please see Appendix D, Declaracion de Impacto Ambiental, Section 3.6.2 for zoning.

Indicate the current land use of the project site: Please see Appendix A, "Land Use" Map

Indicate the current floodzone classification of the project site: Please see Appendix D, Declaracion de Impacto Ambiental, Section 3.1- Zona y cota de inundacion

Specify if the proposed project is in compliance with the Puerto Rico Planning Board Regulation Number 13: Yes

17. Indicate the proponent Agency with respect to compliance with Article 4(c) of Law #9 of June 18, 1970:_____

(Please provide evidence of compliance with Article 4(c) to expedite the process)
Appendix D- Declaracion de Impacto Ambiental

18. Indicate if any of the following natural or artificial systems are locate within the proposed project site or in the sites adjacent to the project (Use Additional Sheets as necessary):

System	Location (Indicate distance from proposed project)
Rivers and streams with continuous flow	Located within project site
Rivers and/or streams with intermittent flow	Located within project site
Maritime Zone/ Submerged Lands	No
Lakes or Lagoons	No
State and Federal Natural Reserves	
Coral Reefs	No
Mangroves and Salt Flats	Located within project site
Seagrasses	No
Other Wetlands (Swamps, bogs, marshes)	Located within project site
Mudflats, riffles, pools	No
Wildlife Refuges	
Areas of Special Interest	No
Springs	No
Estuaries	No
Artificial ponds	No
Irrigation Systems	No
Dams	No
Bridges	No
Cultural Resources	Yes, See Attached Cultural Resource Survey in Appendix D
Coastal Dunes/Barriers	Located within project site
Other:	

Describe those systems identified that are located within the proposed project site or adjacent to the project site (Use additional sheets as Necessary):

Please see attached Section 2.4 for descriptions of the systems identified above.

By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto, does not relieve me of any obligation for obtaining any other required Federal or Commonwealth permit prior to commencement of construction. I agree, or I agree on behalf of my corporation, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of 18 U.S.C. Section 1001.

Larry Evans

Typed/Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

Signature of Applicant/Agent Date

Senior Environmental Expert, BCPeabody Consulting, P.A.

(Corporate Title if applicable)

AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:

I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirement which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of 18 U.S.C. Section 1001.

Eng. Francisco E. Lopez

Typed/Printed Name of Applicant Signature of Applicant Date

Head, Environmental Protection and Quality Assurance Division

(Corporate Title if applicable)

CERTIFICATION OF CONSISTENCY WITH THE PUERTO RICO COASTAL ZONE MANAGEMENT PROGRAM

I certify that the proposed activity complies with the enforceable policies of the Puerto Rico approved coastal management program and will be conducted in a manner consistent with such program.

Eng. Francisco E. Lopez

Typed/Printed Name of Applicant

Signature of Applicant/Agent Date

Head, Environmental Protection and Quality Assurance Division

(Corporate Title if applicable)

Please note: The applicant's original signature (not a copy) is required above.

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the PRPB, EQB, DNER, and the USACE necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

Eng. Francisco E. Lopez

Typed/Printed Name

Signature Date

Head, Environmental Protection and Quality Assurance Division

Corporate Title (If applicable)

Gobierno de Puerto Rico
Departamento de Recursos
Naturales y Ambientales

P.O Box 9066600

Pta. de Tierra Station

n Juan P.R. 00906-6600

Tel. (787) 724-8774

Fax (787) 723-4255

REQUISITOS PARA SOLICITUD DE PERMISOS CONJUNTA DE EXTRACCION DE MATERIALES DE LA CORTEZA TERRESTRE

La Ley Número 132 del 25 de junio de 1968, según enmendada, conocida como "Ley de Arena, Grava y Piedra", confiere jurisdicción al Secretario del Departamento de Recursos Naturales para reglamentar el otorgamiento de permisos para la extracción, excavación, remoción y dragado de los componentes de la corteza terrestre que no esté reglamentado como mineral económico en terrenos públicos y privados, dentro de los límites geográficos del Estado Libre Asociado de Puerto Rico. Para comenzar el trámite de su solicitud de permiso de extracción deberá cumplir con la radicación de los documentos que apliquen, que se enumeran a continuación. Los mismos deben someterse en la Oficina de Secretaría personalmente, ubicada en el primer piso de la sede del Departamento de Recursos Naturales y Ambientales, Parada 3 ½, Avenida Muñoz Rivera, Puerta de Tierra, San Juan o por correo al Box 9066600, Puerta de Tierra Station, San Juan, PR 00906-6600.

Toda solicitud que no venga acompañada de los documentos correspondientes será devuelta y se entenderá que no ha sido presentada ante este Departamento, según lo establece la Ley Número 170 conocida como "Ley de Procedimiento Administrativo Uniforme" y el reglamento promulgado a su amparo (formularios con encasillados en blancos serán devueltos). Para culquier información adicional, pueden comunicarse con la Oficina de Secretaría a través del 724-8774 extensiones 4010, 4011.

Toda solicitud de permiso debe cumplir con los siguientes requisitos para radicarse;

REQUISITOS PARA RADICAR UNA SOLICITUD DE PERMISO BAJO SOLICITUD CONJUNTA

1. ___Llenar en todas sus partes del formulario "Joint Permit". Radicar 13 copias.

2. ___Cheque certificado o giro postal por la cantidad de $250 a favor del Secretario de Hacienda.

ENCLOSURE A

3. ___Cinco (5) copias del sector correspondiente del cuadrángulo topográfico del USGS (escala 1:20,000). Habiendo resaltado clara y exactamente el sitio propuesto en cada una de las copias. Favor de identificar el nombre del cuadrángulo de referencia. El mismo puede ser adquirido en la Autoridad de Carreteras.

4. ___Evaluación Ambiental que cumpla con las disposiciones de la Sección 3 del Reglamento sobre Declaraciones de Impacto Ambiental, de 1 de junio de 1984 de la Junta de Calidad Ambiental o una DIA cuando el caso lo amerita.

5. ___En caso de que el área dónde se propone la extracción sea adyacente a las aguas costaneras se incluirá una carta marina del área indicando el deslinde marítimo terrestre, las elevaciones del terreno sumergido, configuraciones de las costas adyacentes, localización de arrecifes, dirección de las corrientes marinas, estructuras costeras adyacentes, días de navegación y facilidades portuarias.

6. ___Croquis detallado indicando elevaciones del área a excavarse, estructuras cercanas o colindantes, perfiles de ríos o de aguas sumergidas, localización exacta de la maquinaria a utilizarse, áreas de almacenaje, áreas de distribución o cualesquiera otras facilidades requeridas para la operación, tales como: instalación de tuberías, muelles, caminos, accesos, tomas de agua, pozos, desagues, depósitos de desperdicios.

7. ___Si el área de extracción colinda con la zona marítimo terrestre deberá acompañar plano indicando el deslinde de la zona marítimo terrestre.

8. ___Si la extracción propuesta es en ríos deberá acompañar plano de deslinde que incluya:

   a. un punto bien monumentado (BM) como referencia vertical en el proyecto.

   b. deberá marcar debidamente los perfiles transversales en sus extremos para ser revisados en cualquier momento.

9. ____De ser el proponente una corporación deberá acompañar lo siguiente:

   a. facultades corporativas o certificación de incorporación.

b. Nombre, dirección postal y seguro social de todos y cada uno de los directores y accionistas de la corporación peticionaria.

c. Certificación de vigencia de la corporación emitida por el Secretario de Estado referente a la existencia y al cumplimiento de haber radicado los informes corporativos anuales. La misma no podrá tener más de treinta (30) días de haber sido expedida. Este documento es mejor conocido como "Good Standing".

10.____Si la extracción propuesta es en río deberá someter documento notarizado del dueño de la finca que servirá de acceso, autorizando el mismo.

11.____De ser el proponente una sociedad deberá acompañar lo siguiente:

a. Documento donde informe nombre, dirección postal y seguro social de todos y cada uno de los miembros de la sociedad.

b. Copia certificada de la escritura pública mediante la cual se creó la sociedad peticionaria.

c. Certificación del Departamento de Hacienda sobre radicación de planilla contributiva.

12.____Memorial explicativo indicando lo siguiente:

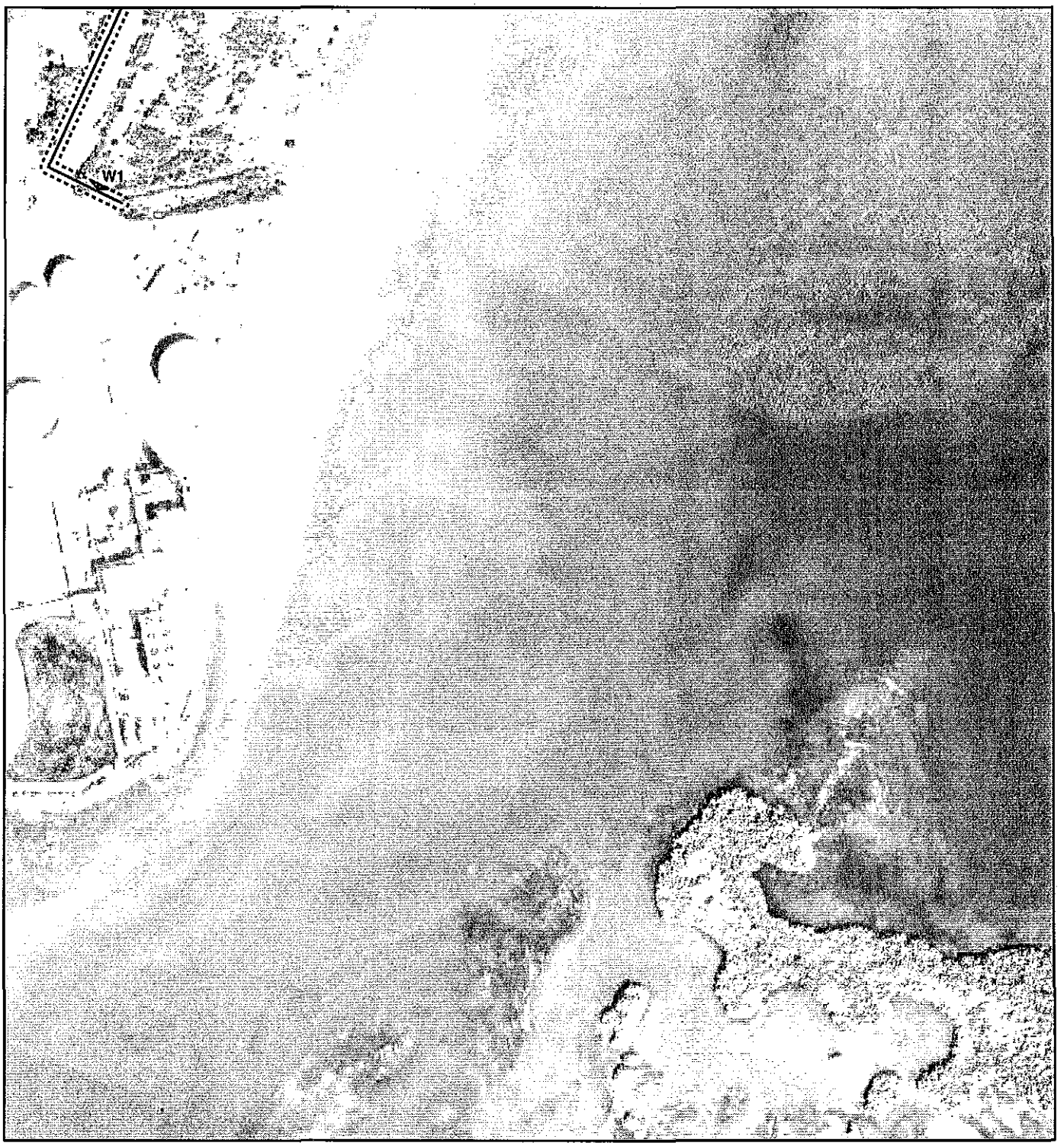
a. Descripción de las áreas destinadas a almacenaje, procesamiento y distribución de los componentes de la corteza terrestre que sean removidos, excavados y/o dragados. Si hubiese áreas alternas deberán incluirse.

De ser la solicitud una renovación deberá acompañar los documentos enumerados en los incisos número 1, 2, 4, 9C. El inciso 3, deberá ser actualizado.

De no existir cambios en los demás incisos deberá acompañar Declaración Jurada que así lo exprese.

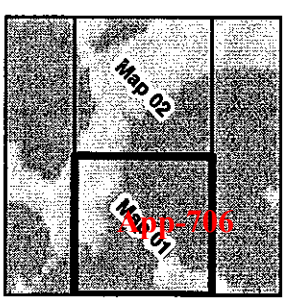
En caso de renovación de permiso en ríos las transversales deberán ser trazados (dibujados sobre las transversales del pasado año y referidas al mismo "DATUM". Este requisito debe ser certificado por un agrimensor y/o ingeniero admitido a ejercer la agrimensura en Puerto Rico (deberá presentar evidencia de ésto).

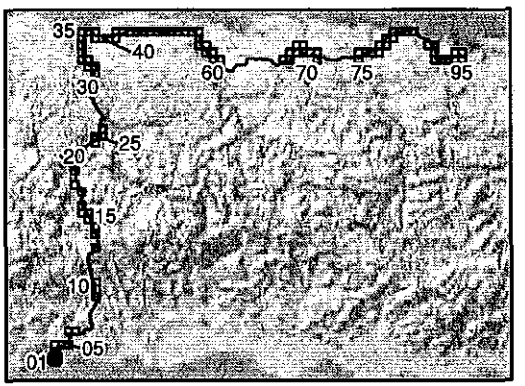
Appendix B to Joint Application

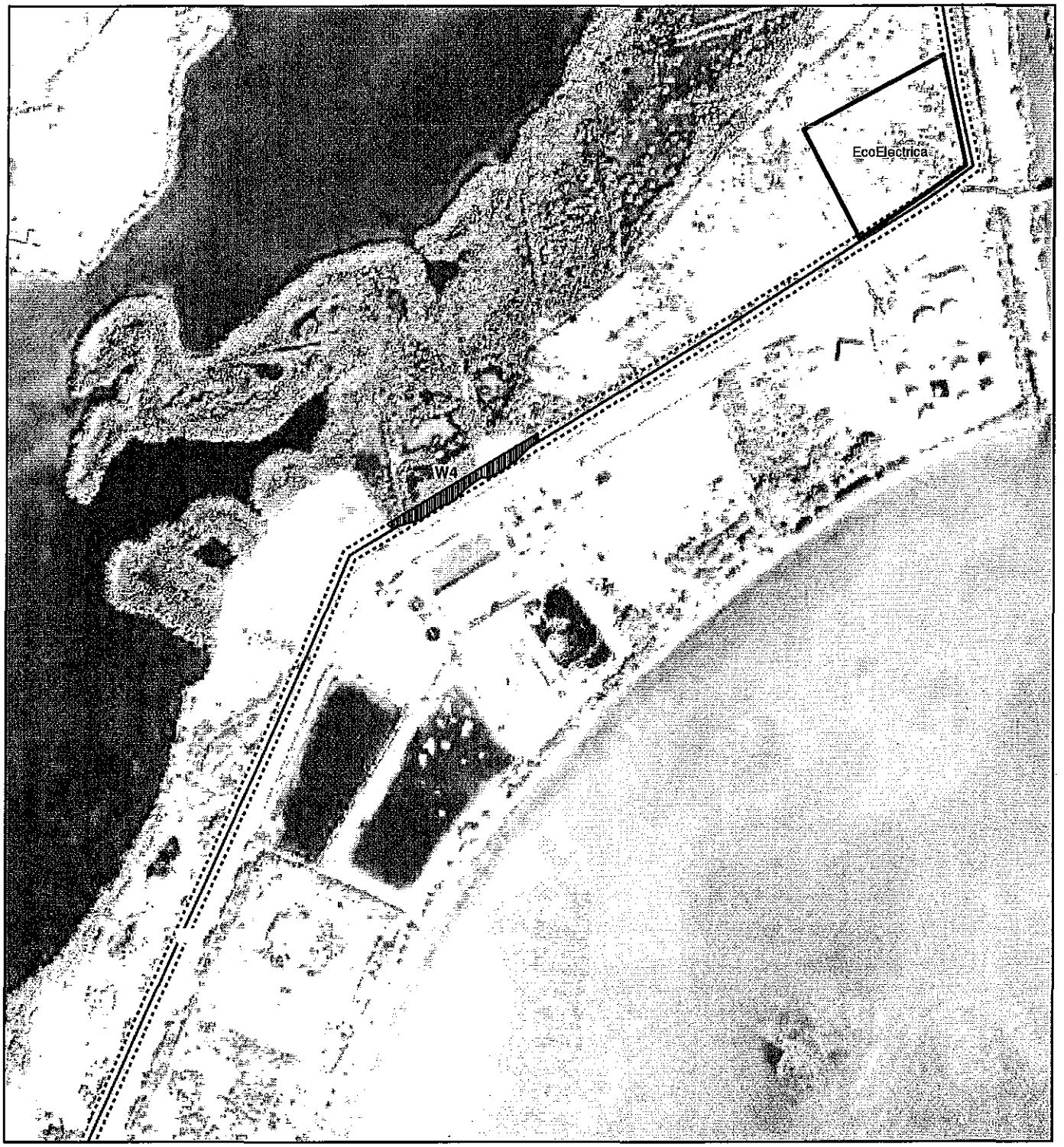


Map 01

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

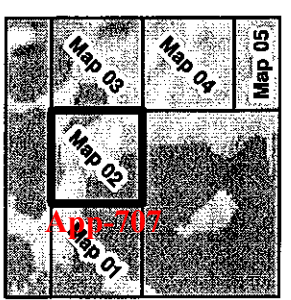


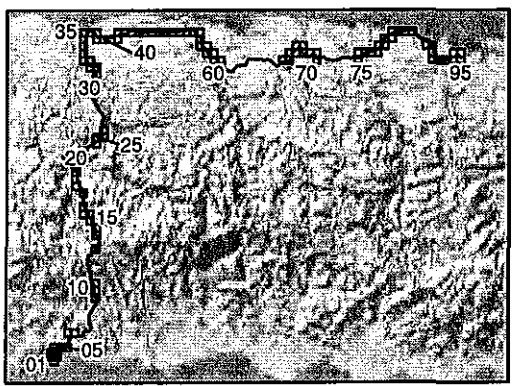


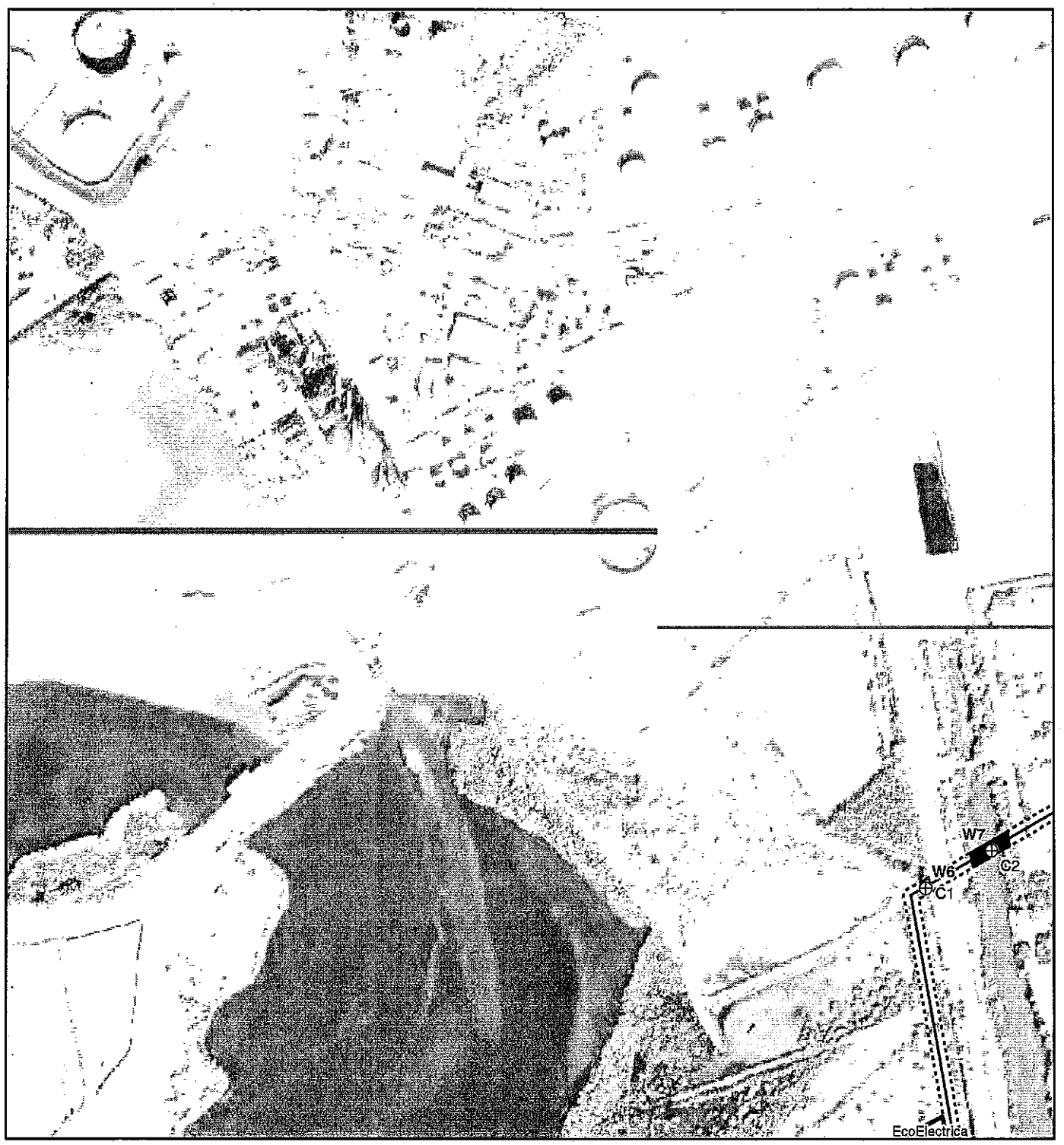


Map 02

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

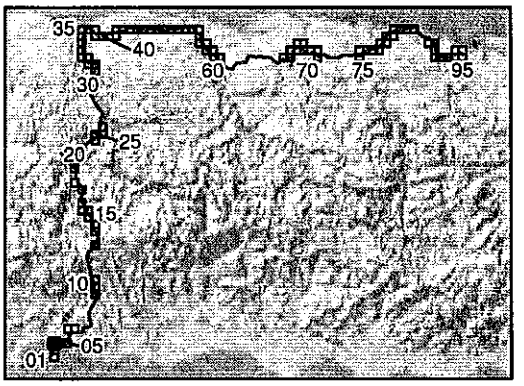






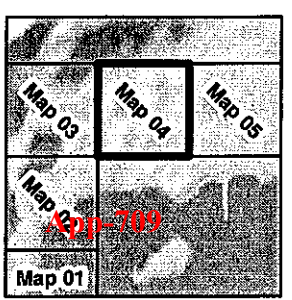
Map 03

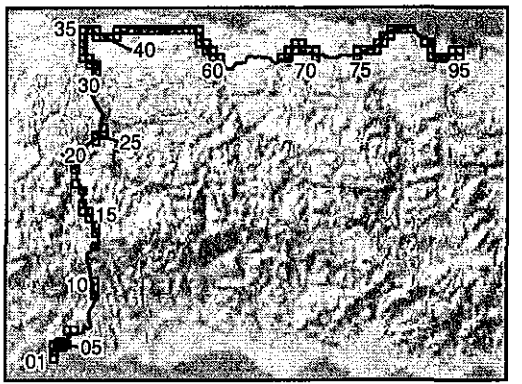
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

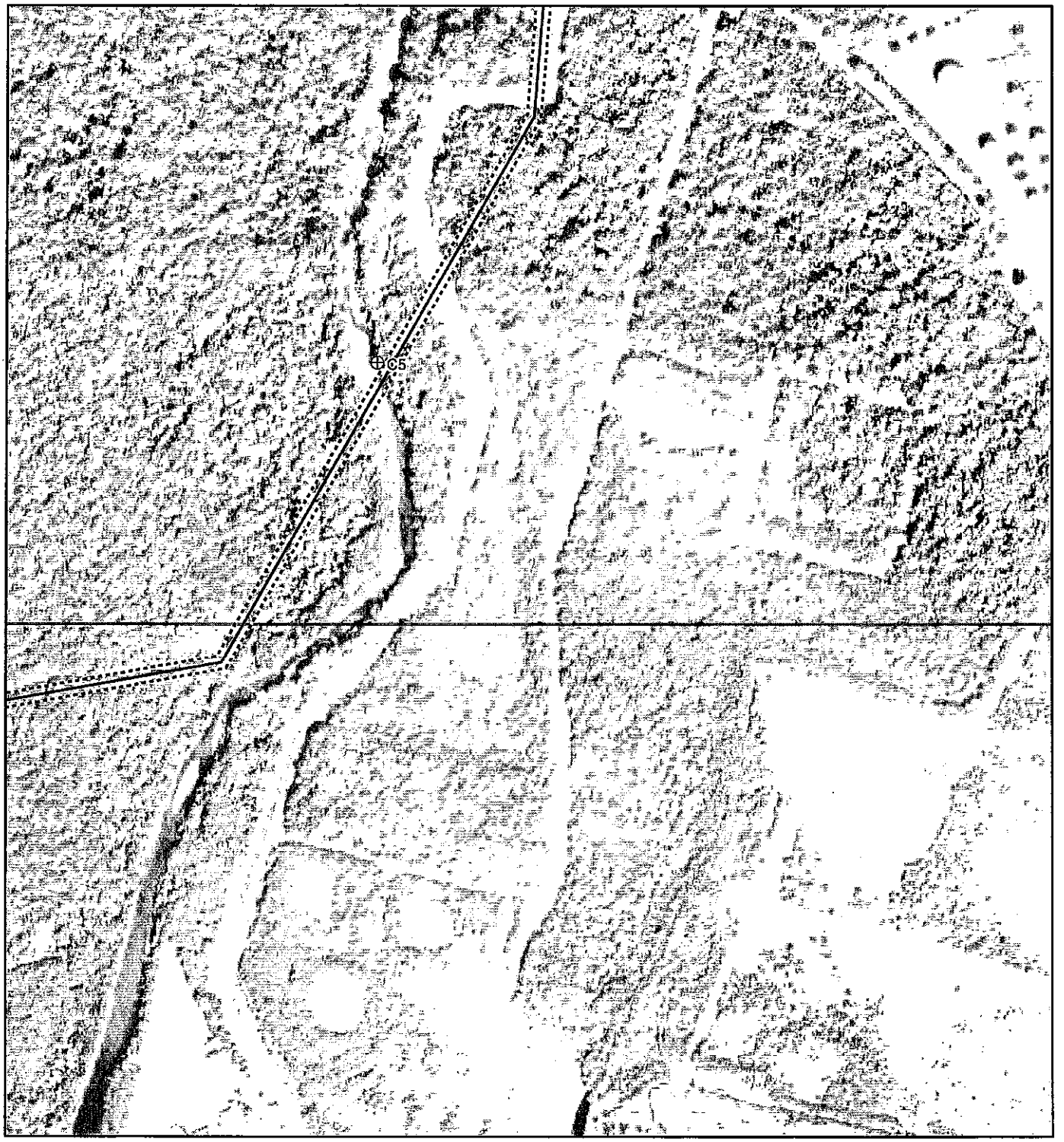


Map 04

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

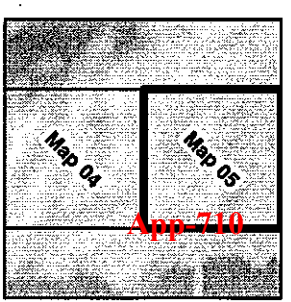


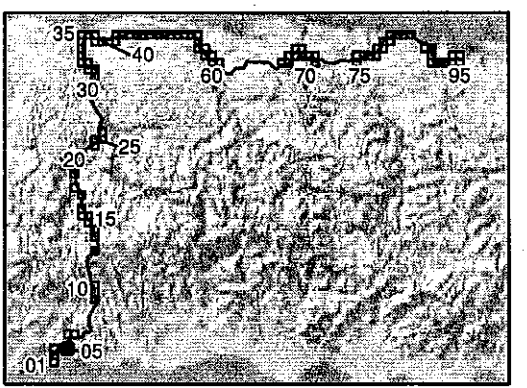


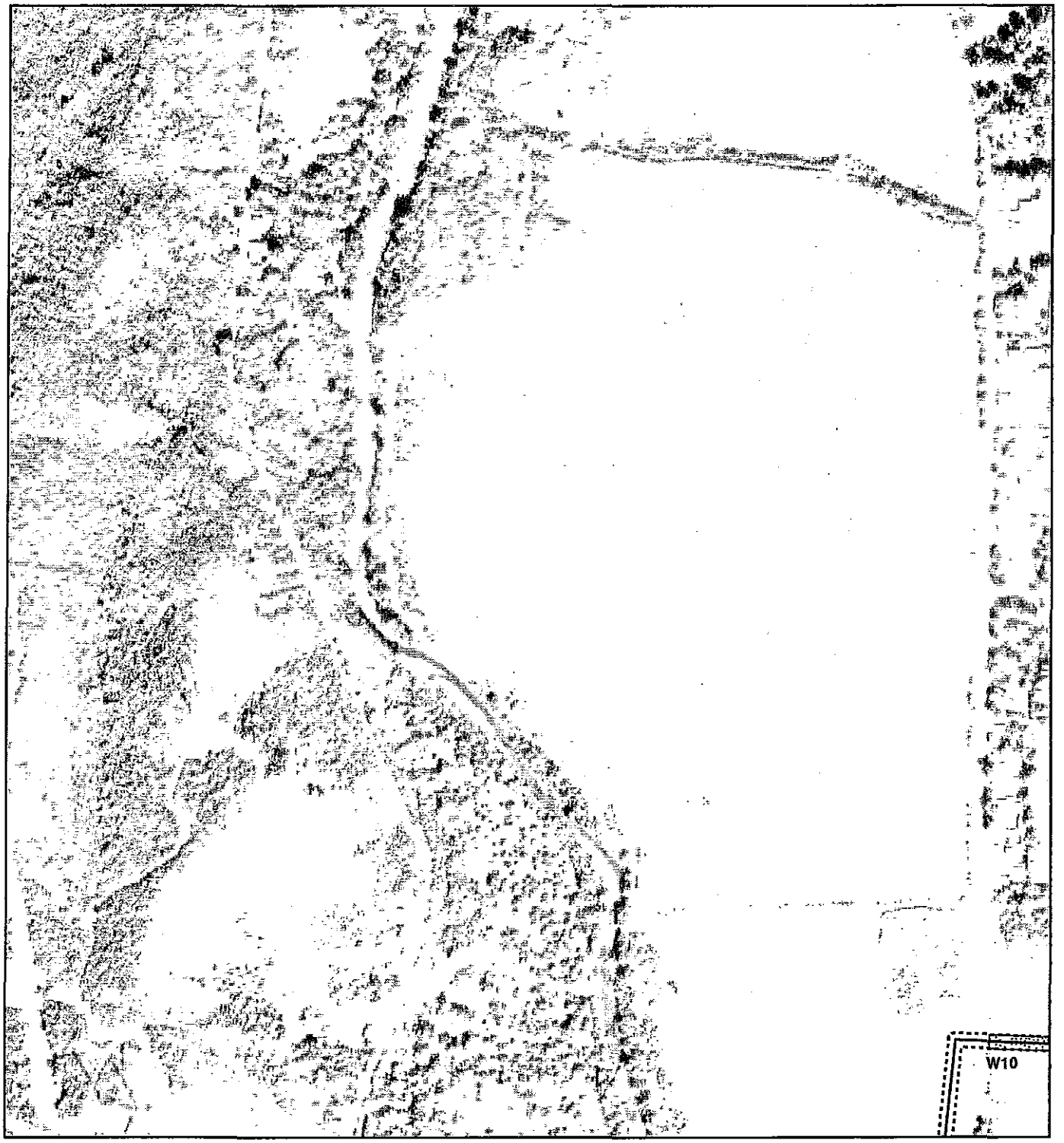


Map 05

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

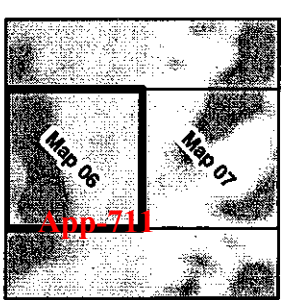


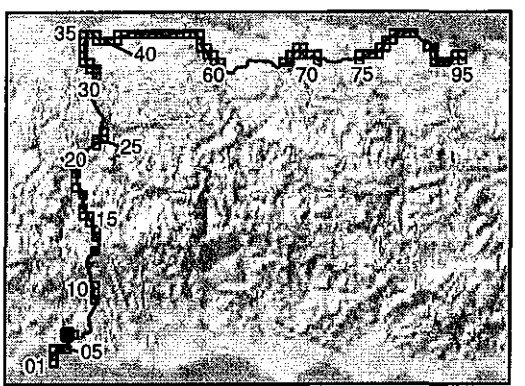




Map 06

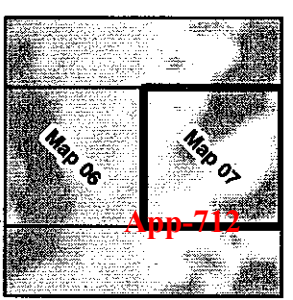
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

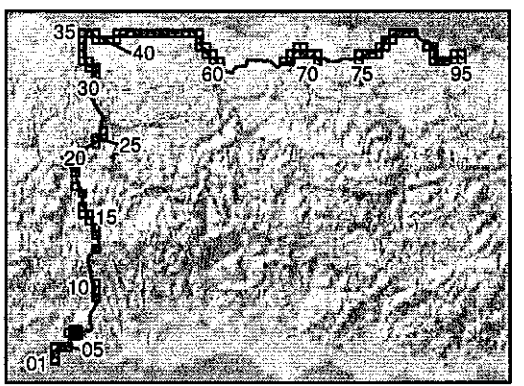




Map 07

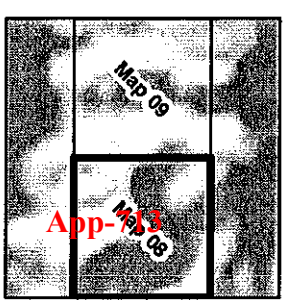
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

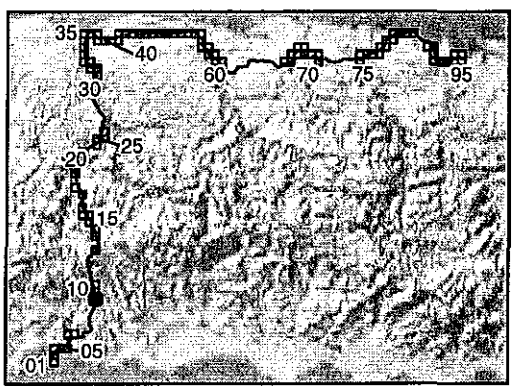




Map 08

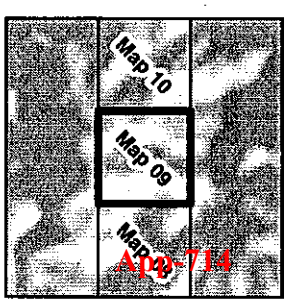
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

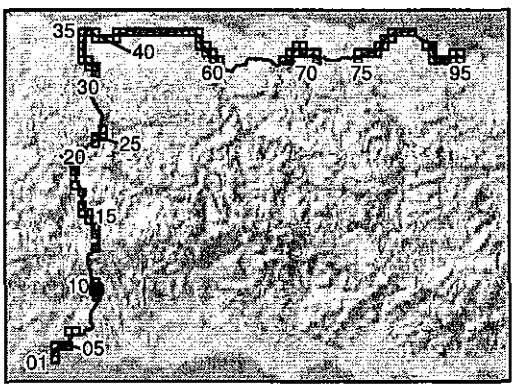




Map 09

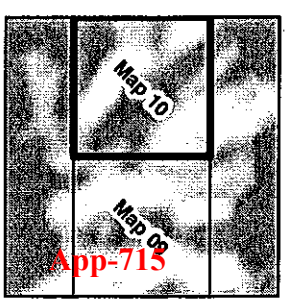
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

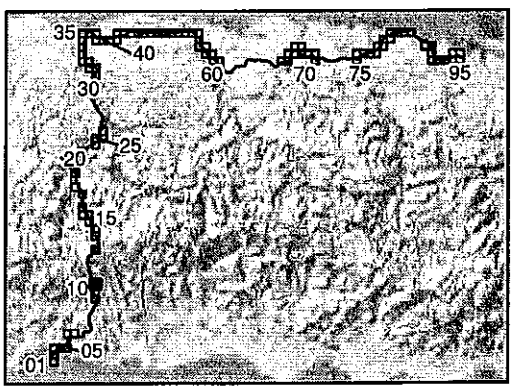


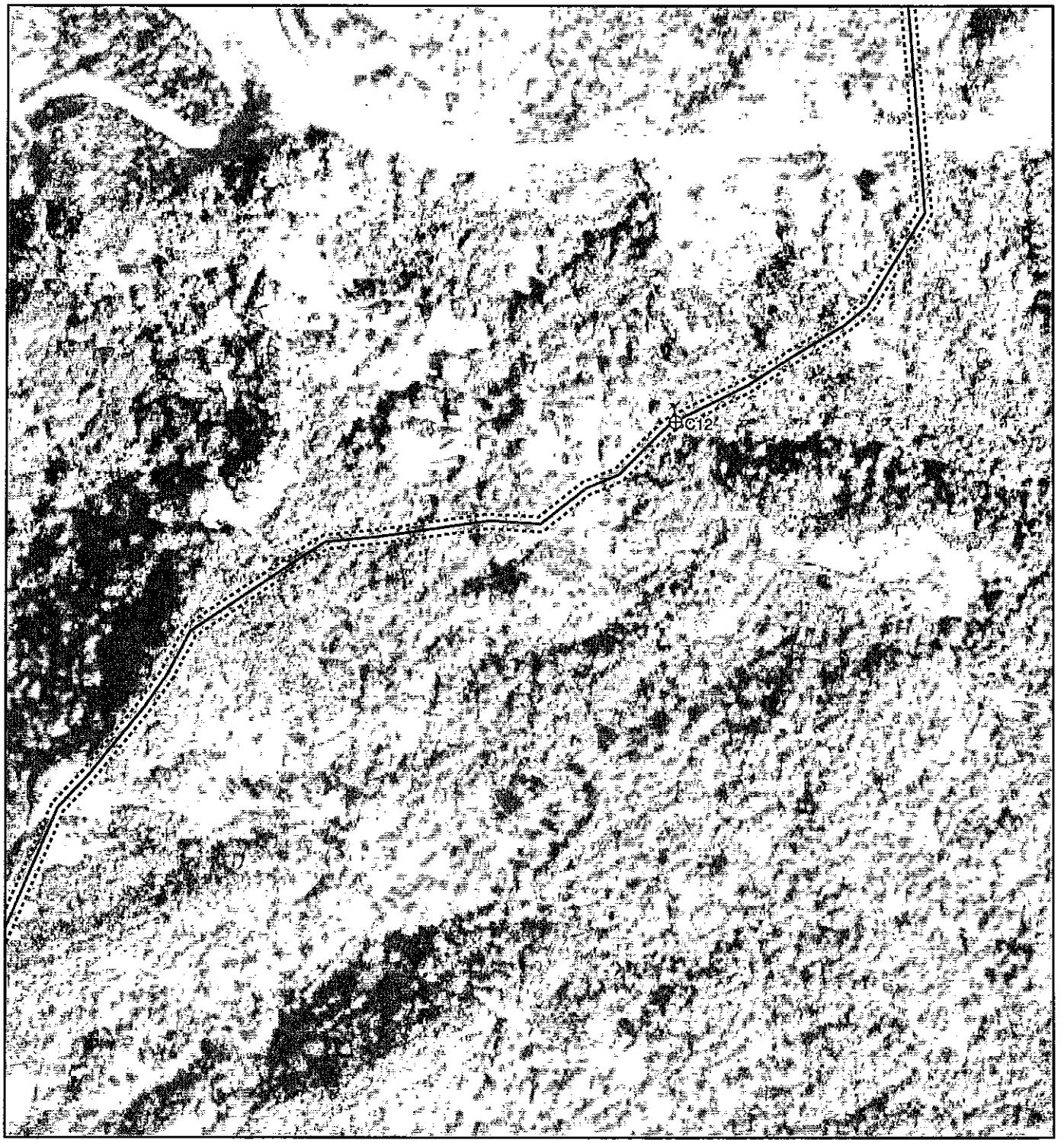


Map 10

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

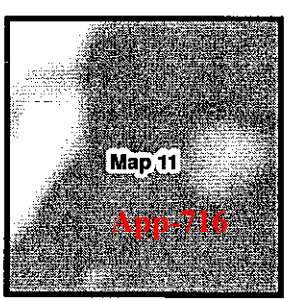


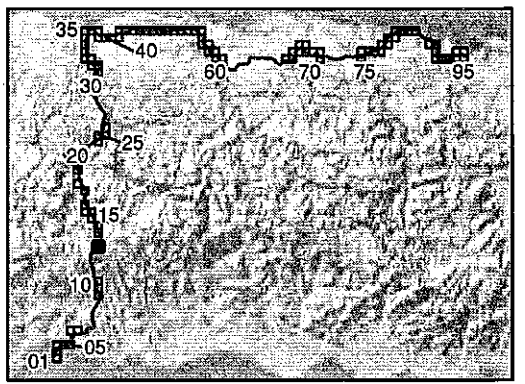


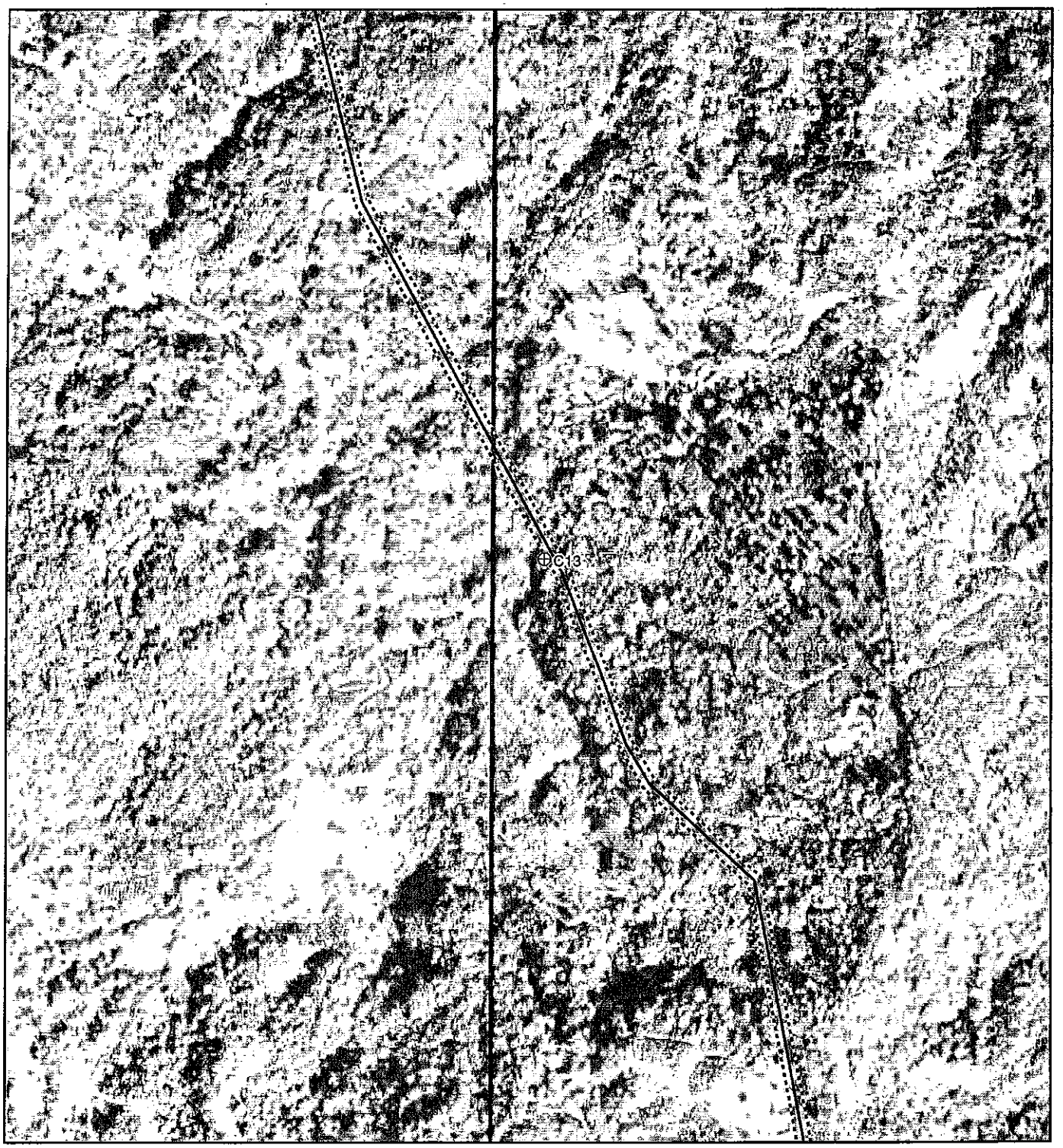


Map 11

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

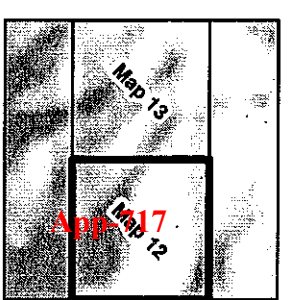


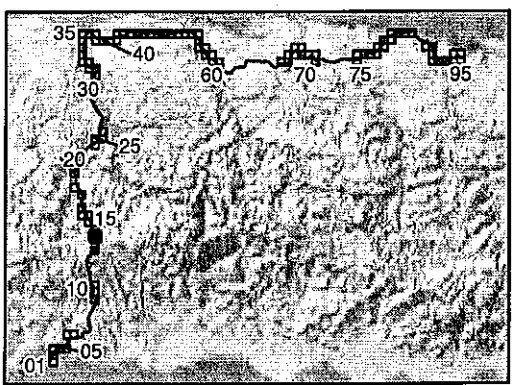


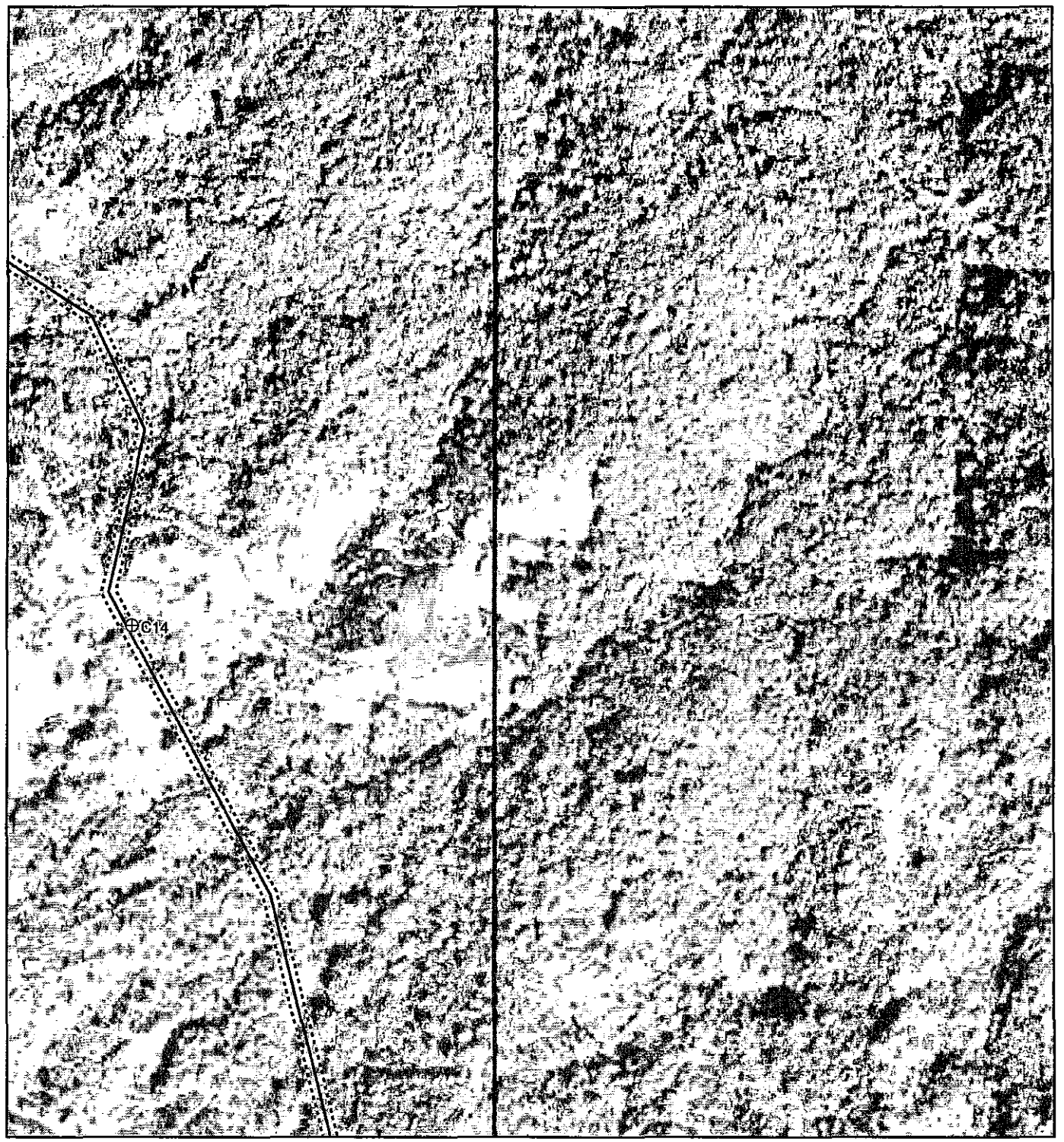


Map 12

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

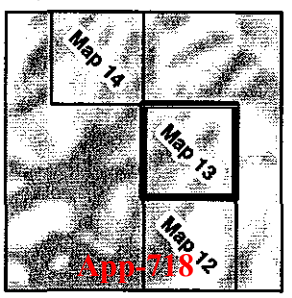


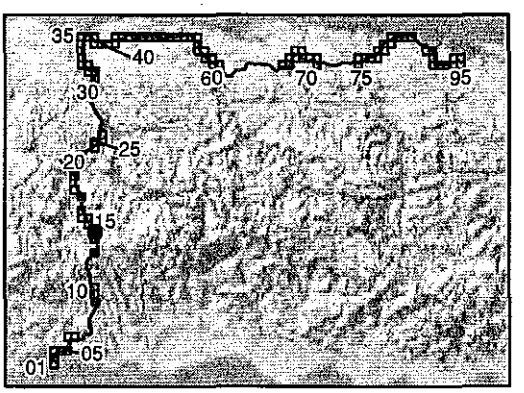


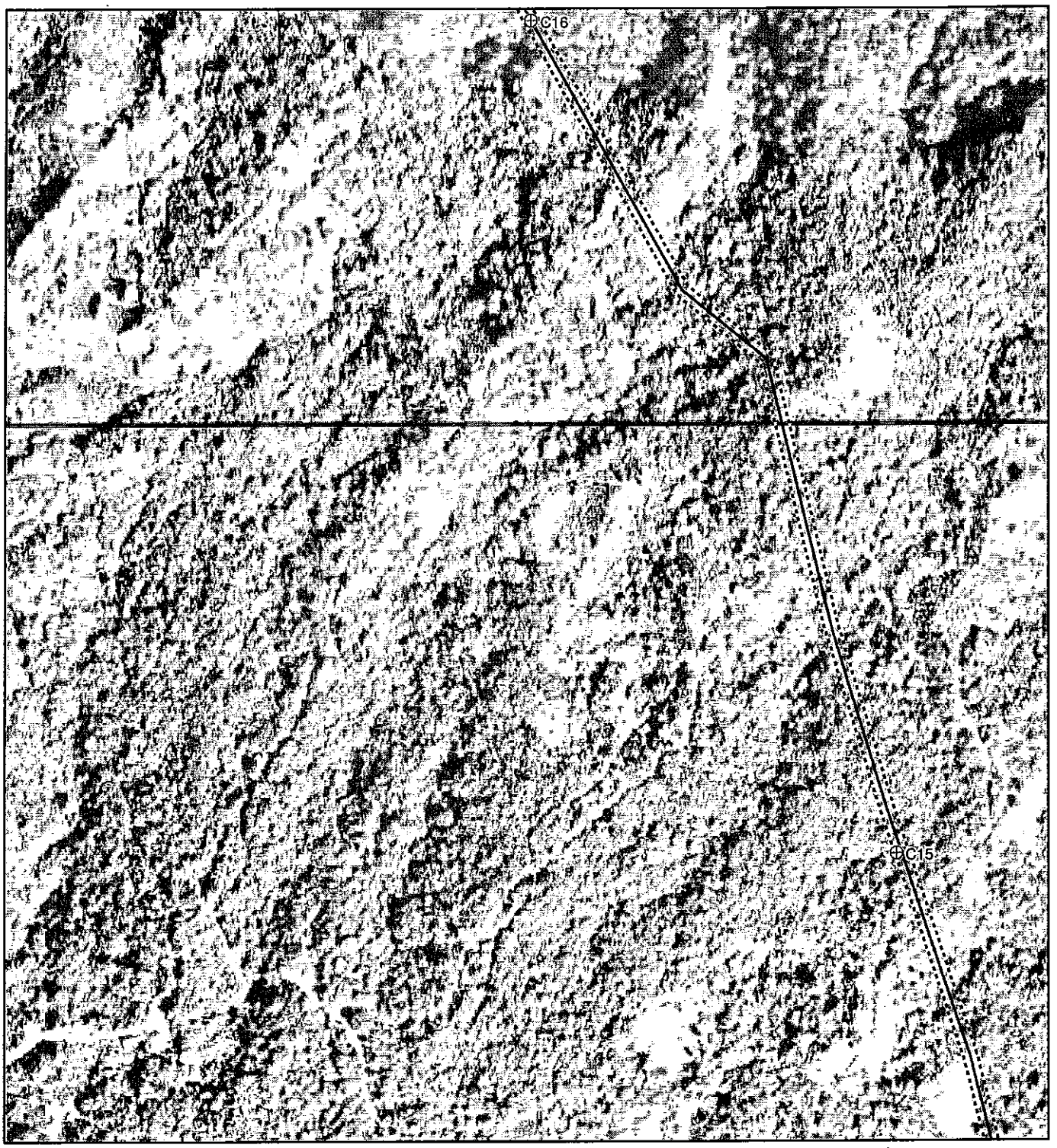


Map 13

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

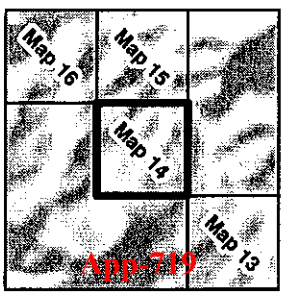


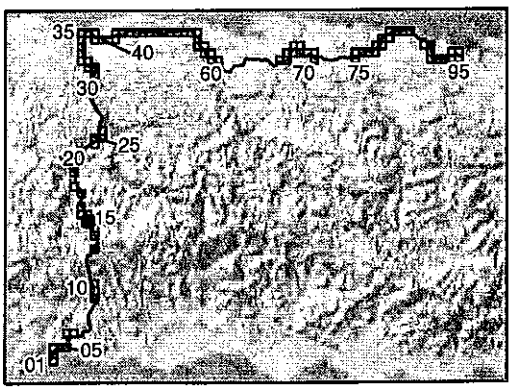




Map 14

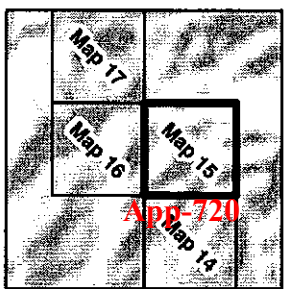
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

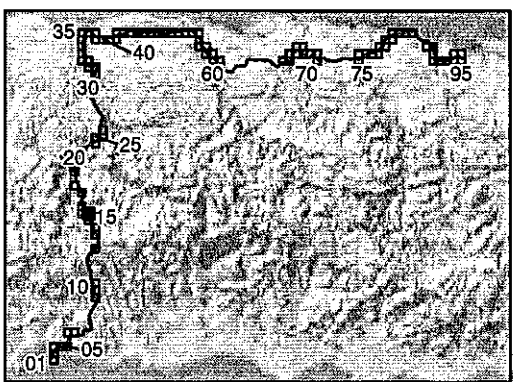


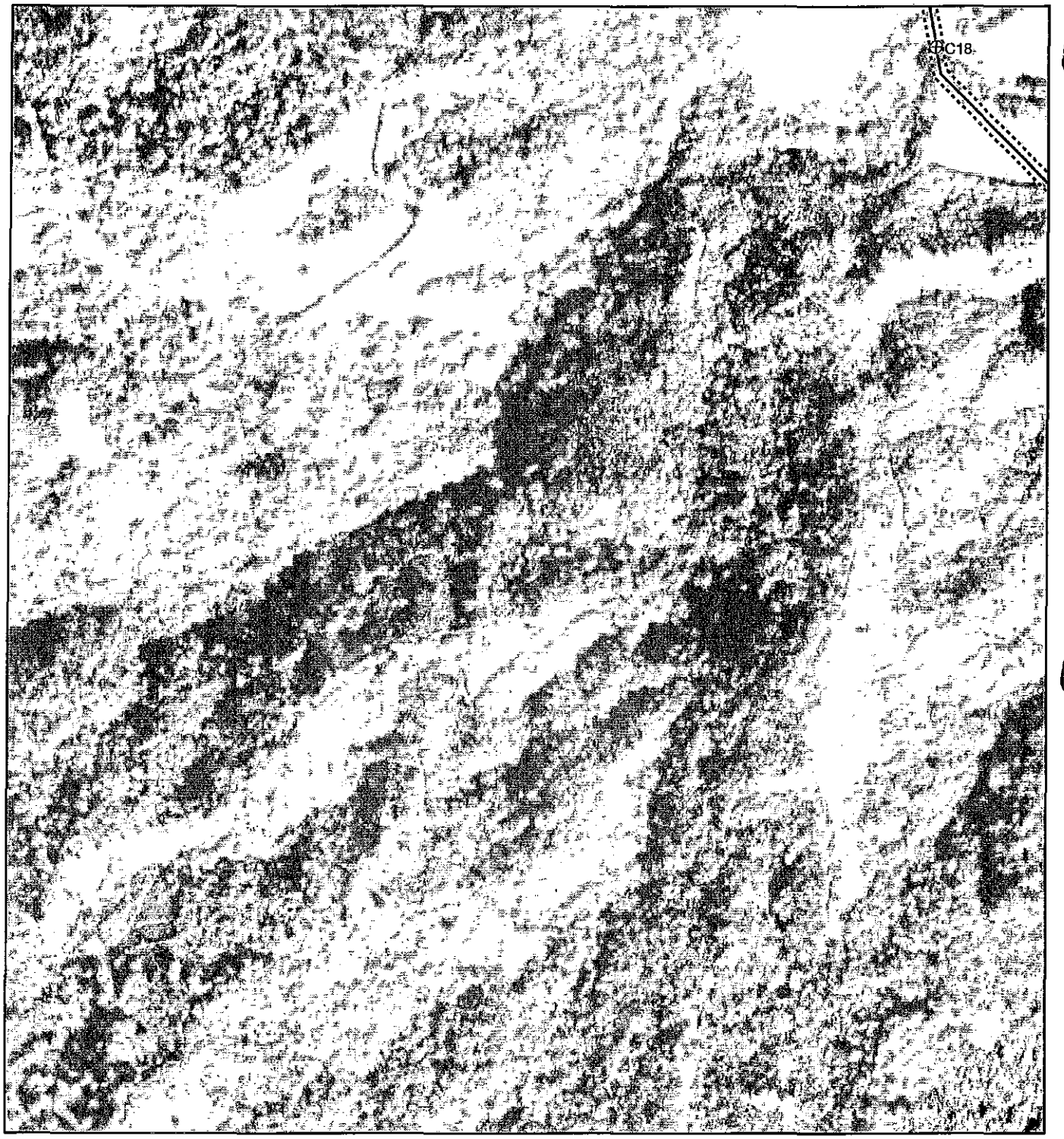


Map 15

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

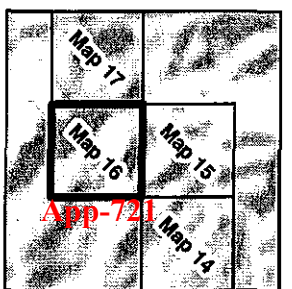


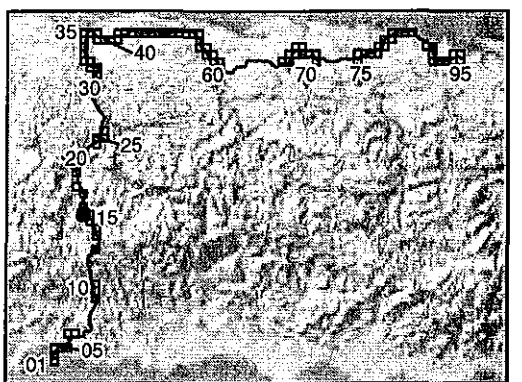


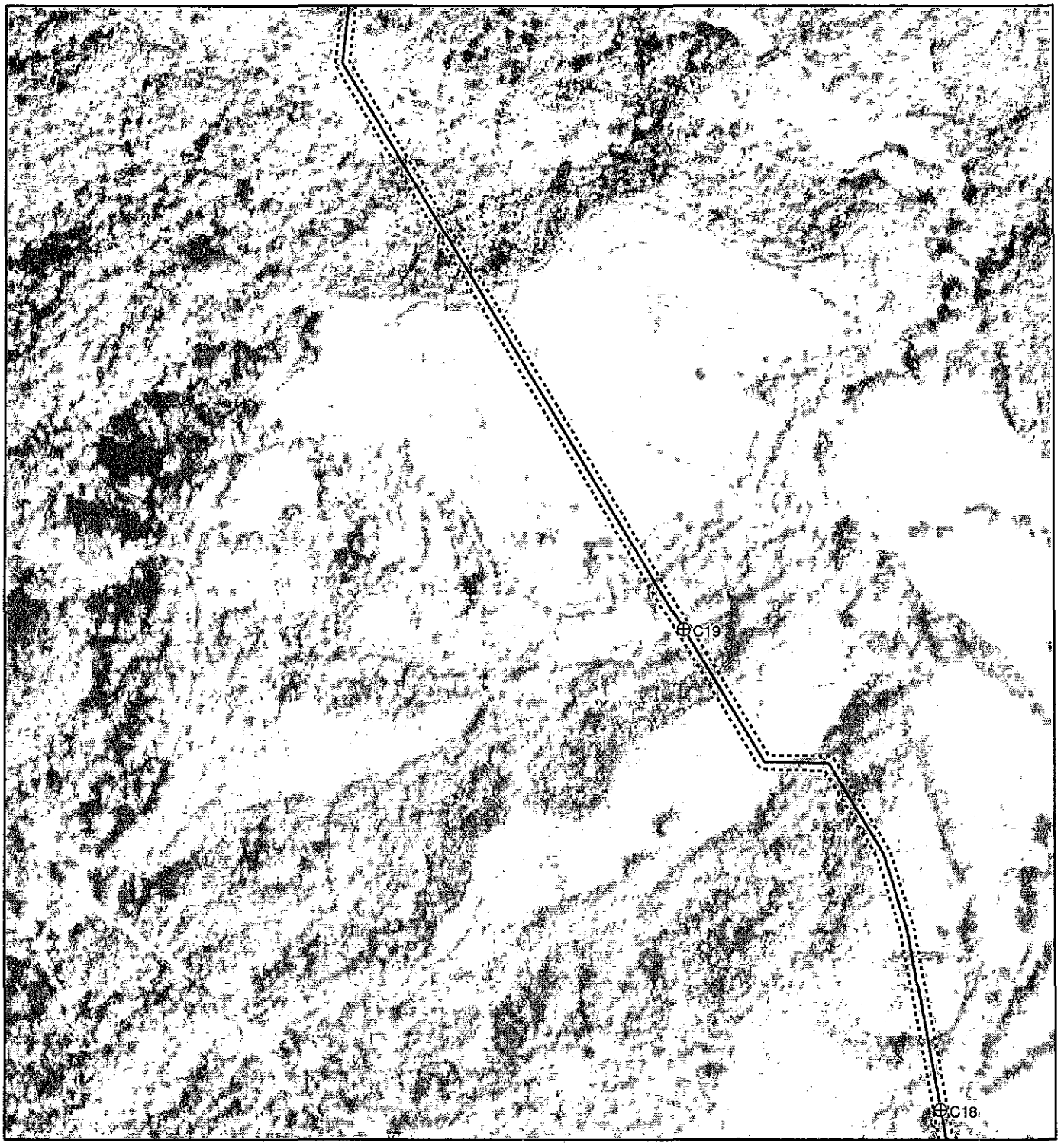


Map 16

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

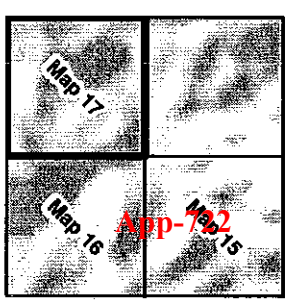


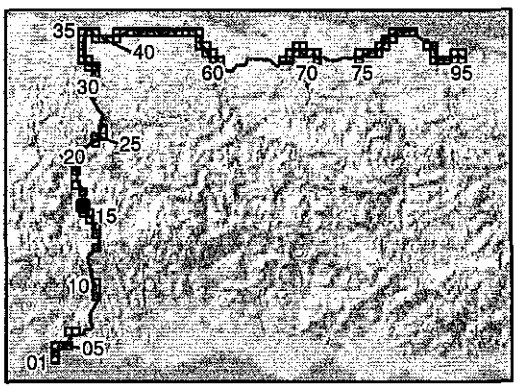


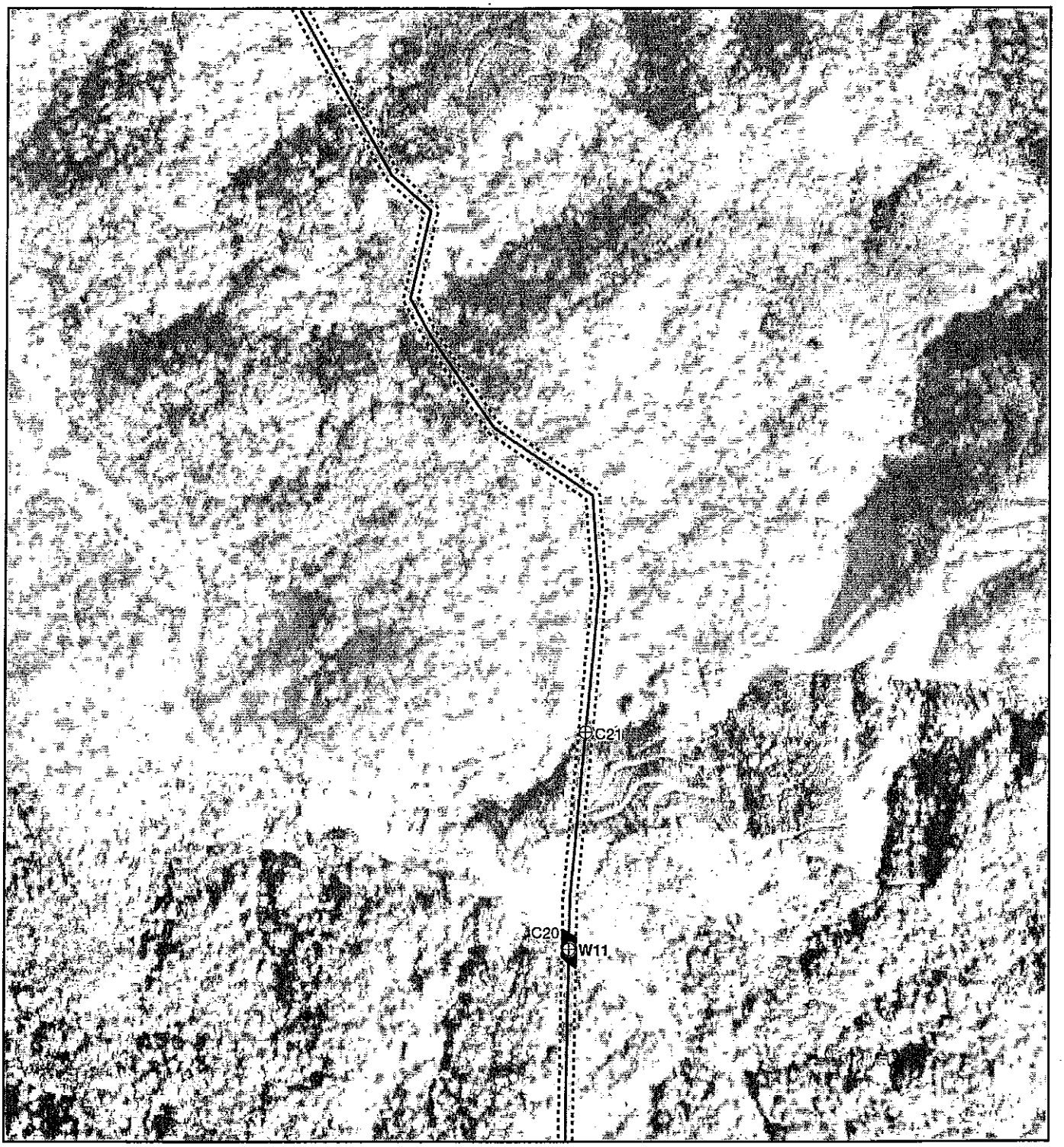


Map 17

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

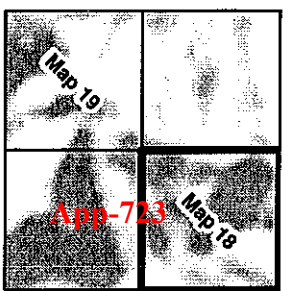


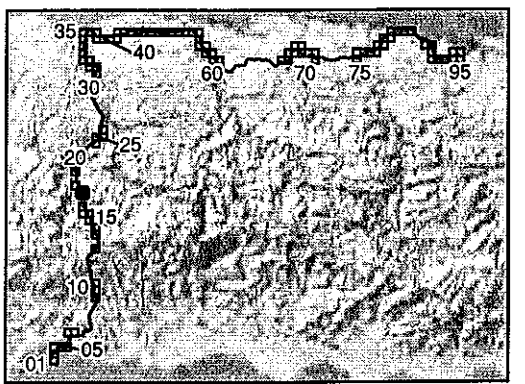




Map 18

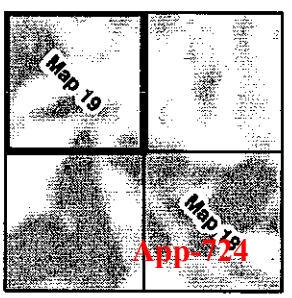
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

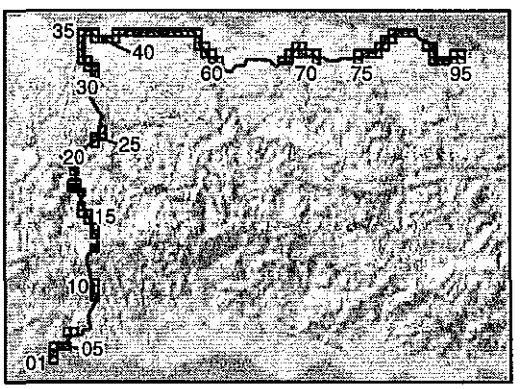


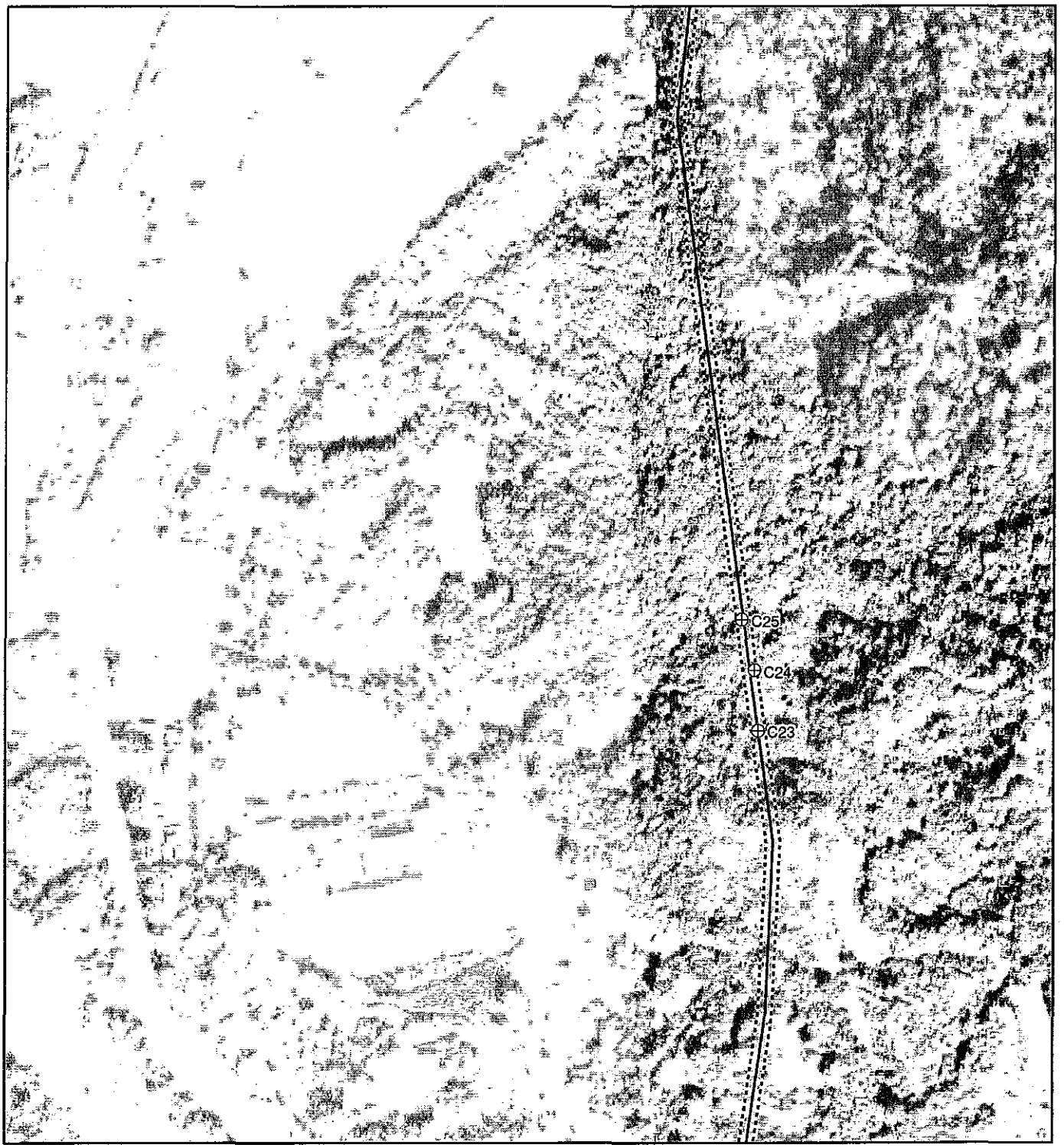


Map 19

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

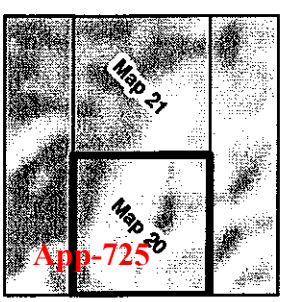


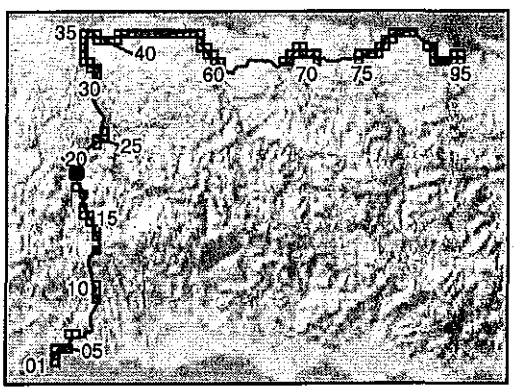


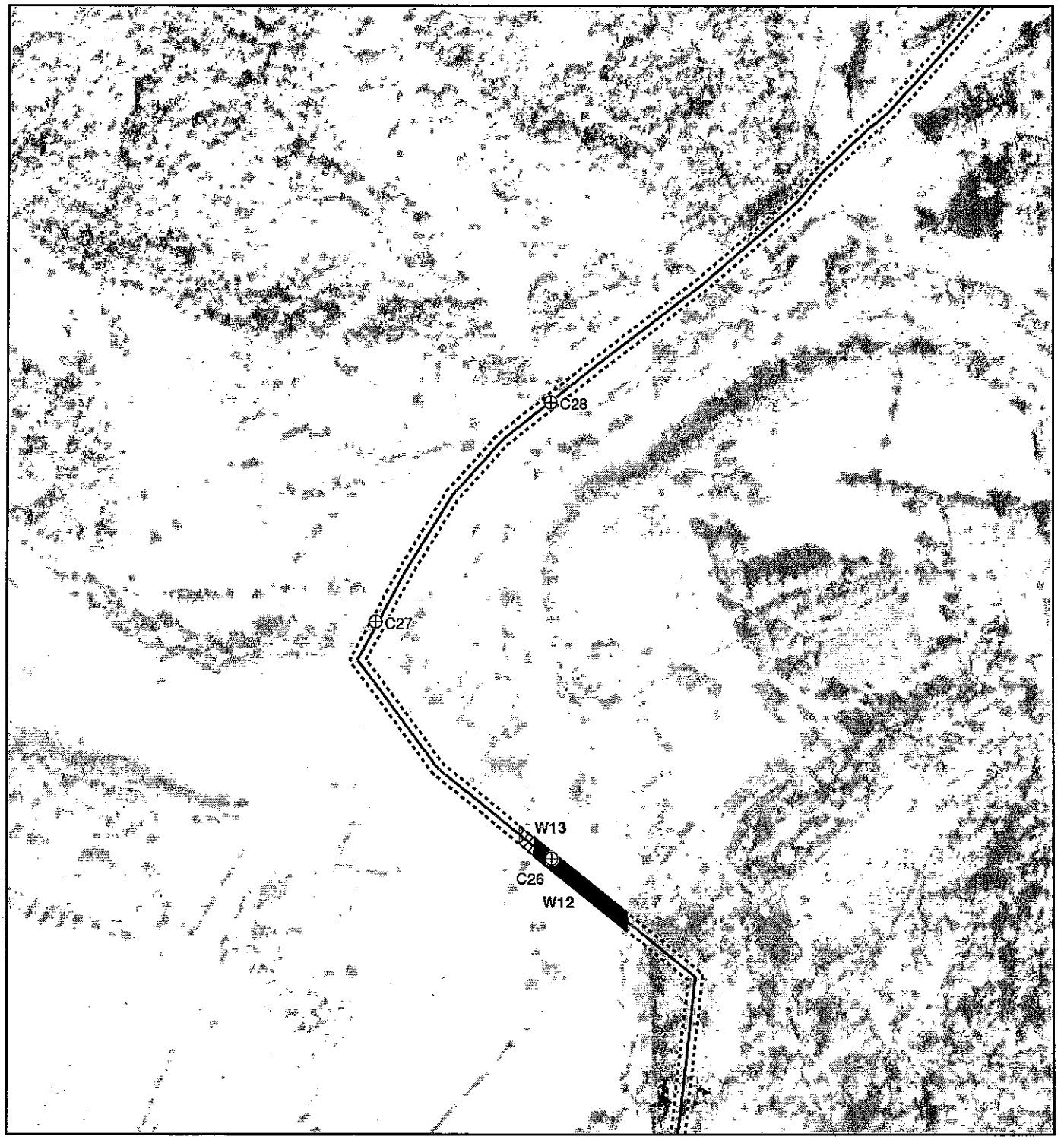


Map 20

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

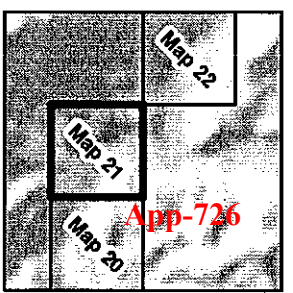


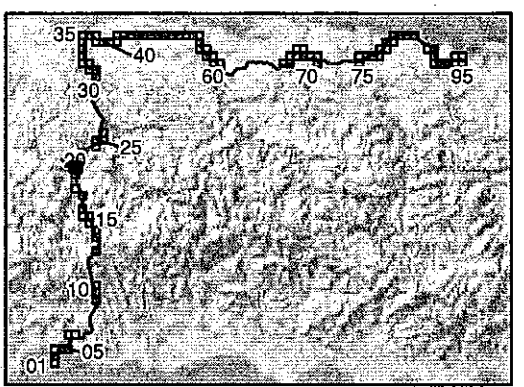


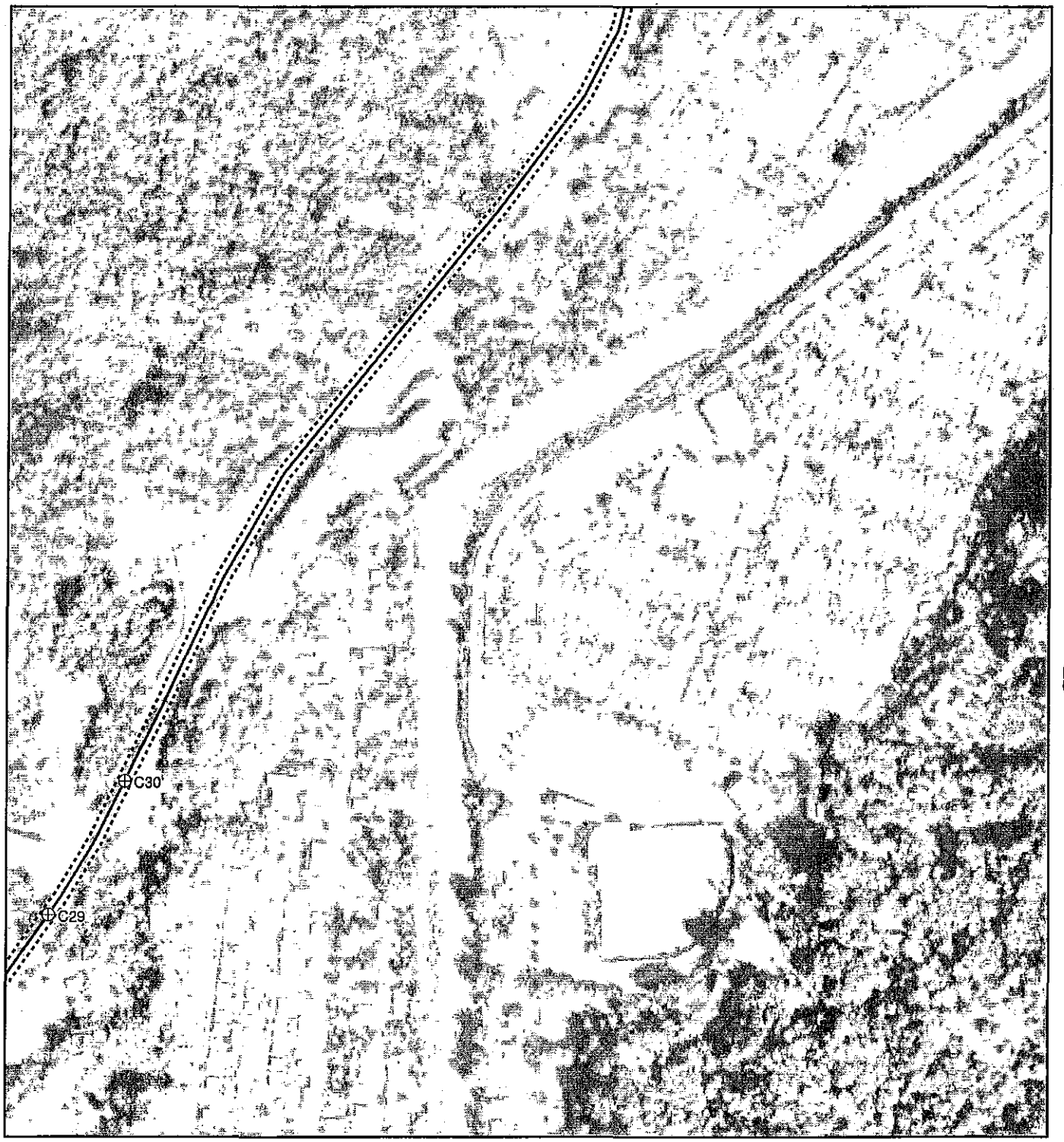


Map 21

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

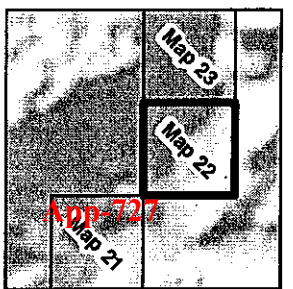


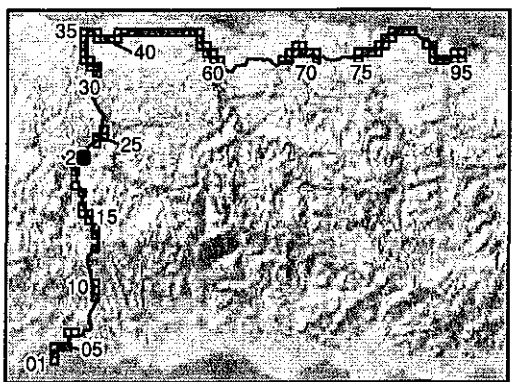




Map 22

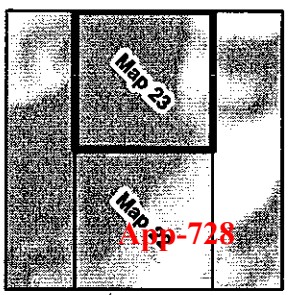
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

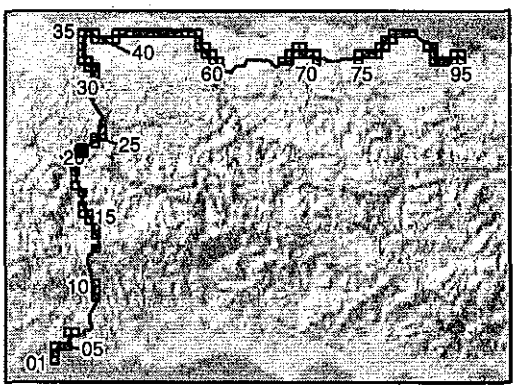


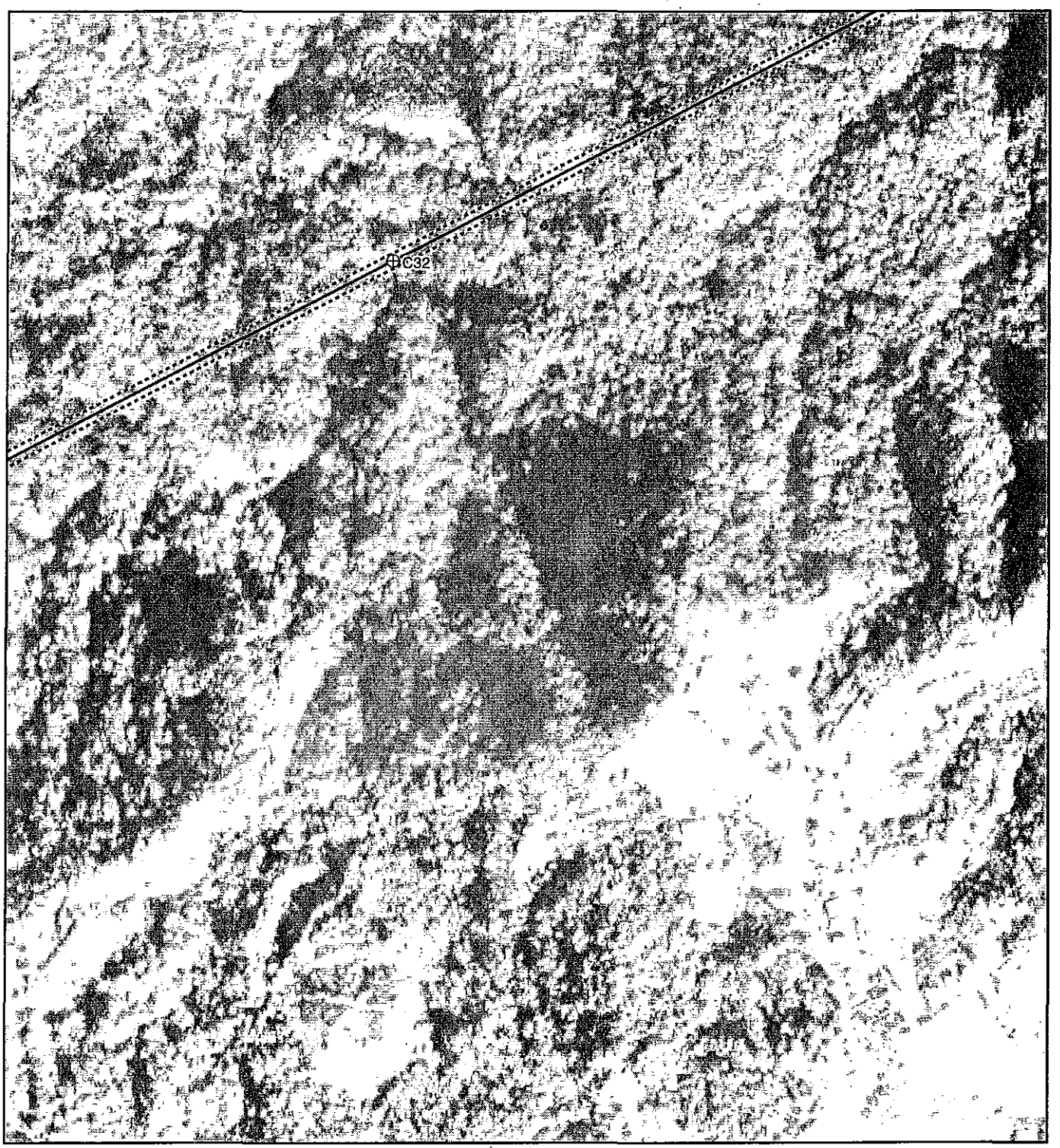


Map 23

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

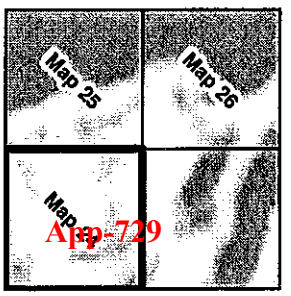


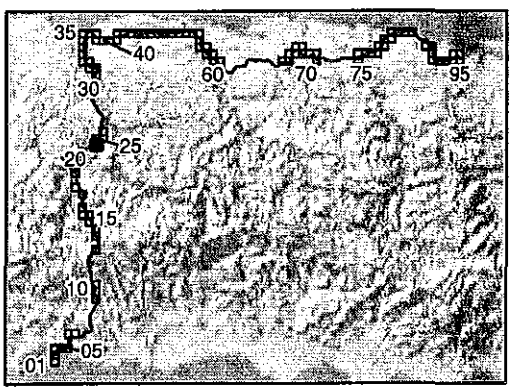




Map 24

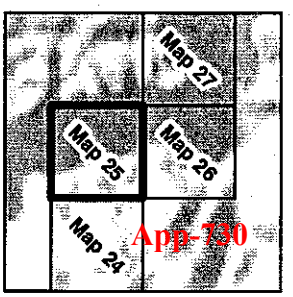
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

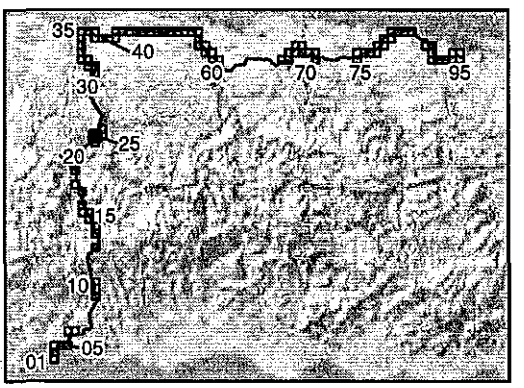




Map 25

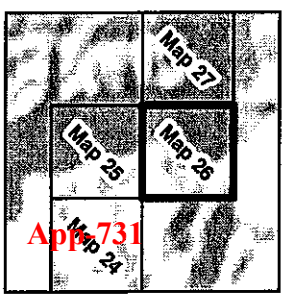
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

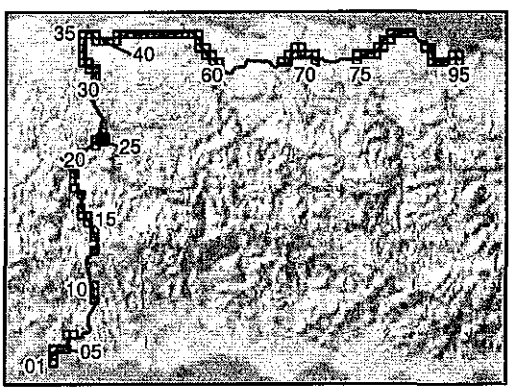




Map 26

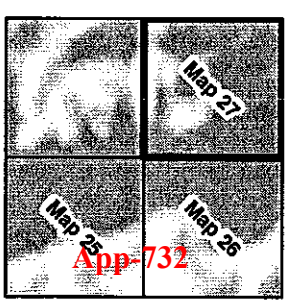
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

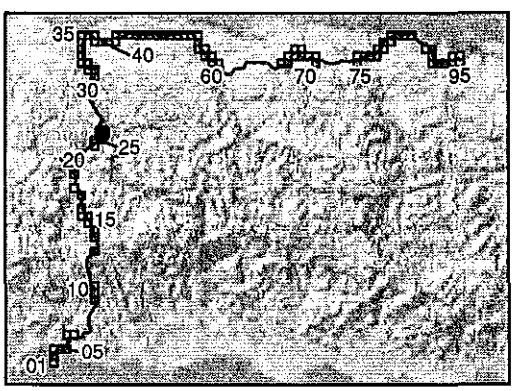




Map 27

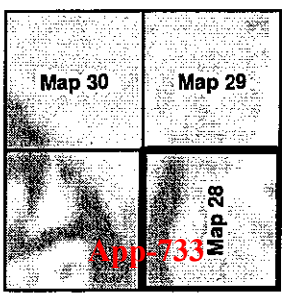
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

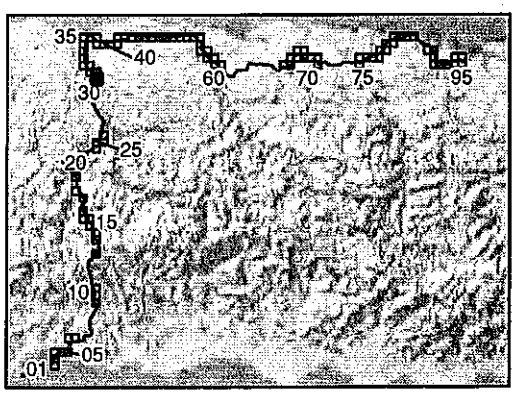




Map 28

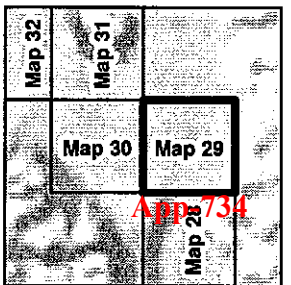
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

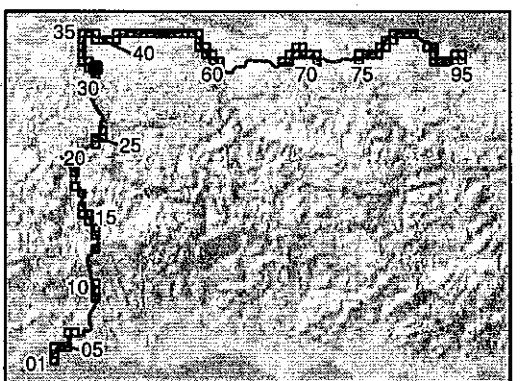




Map 29

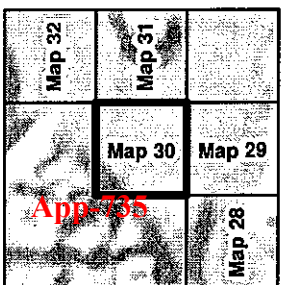
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

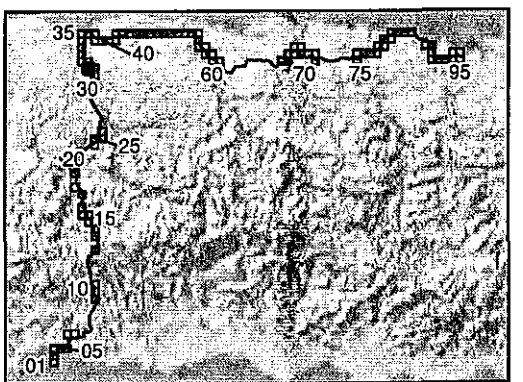




Map 30

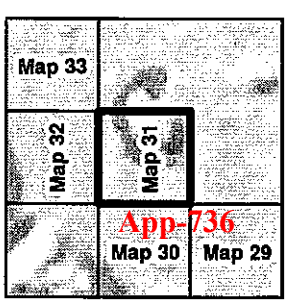
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

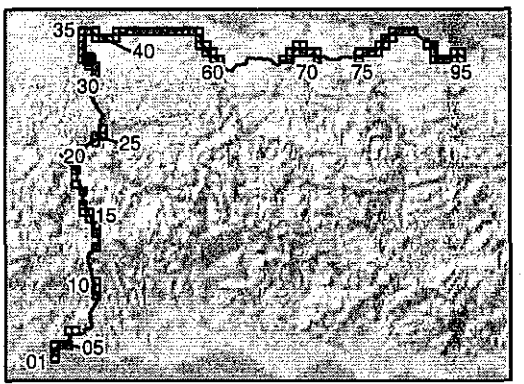


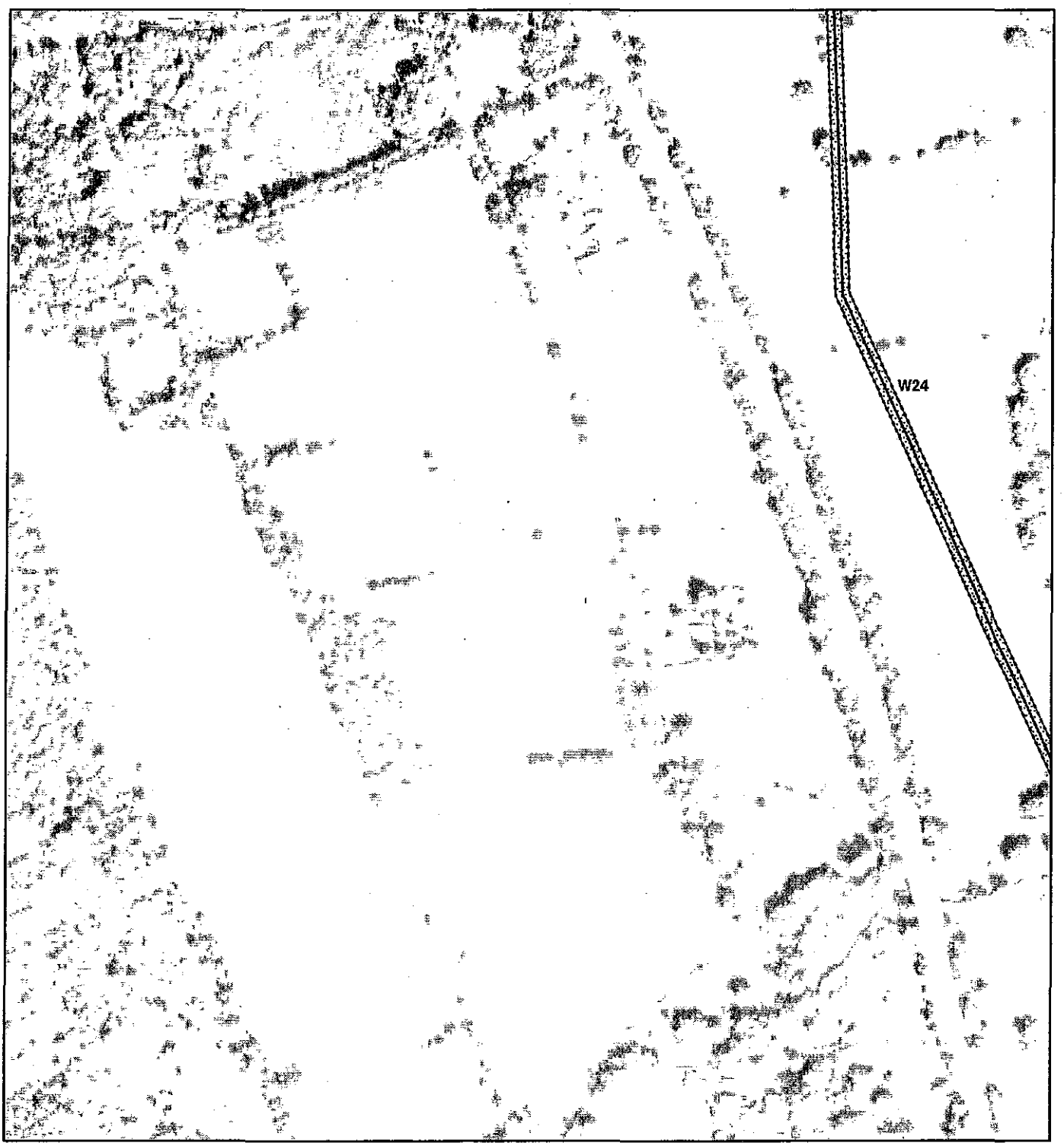


Map 31

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

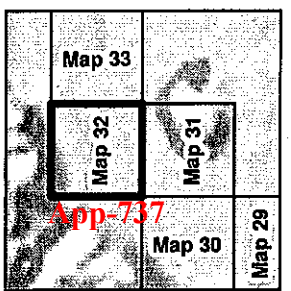


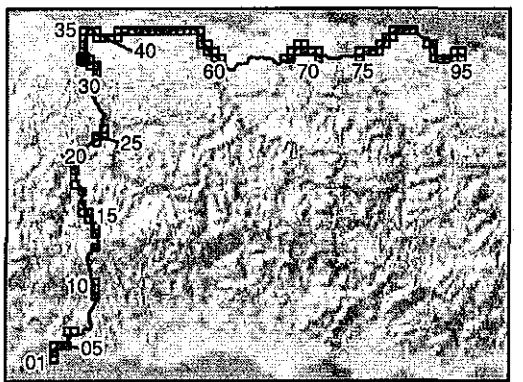




Map 32

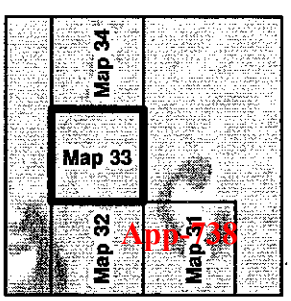
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

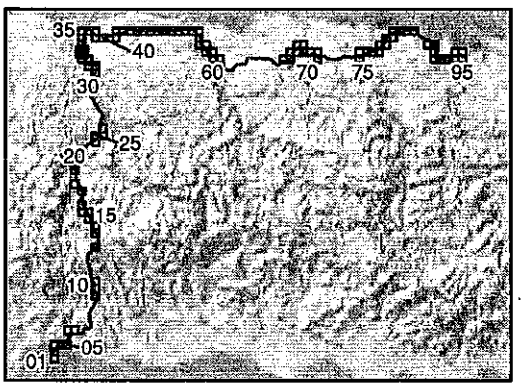


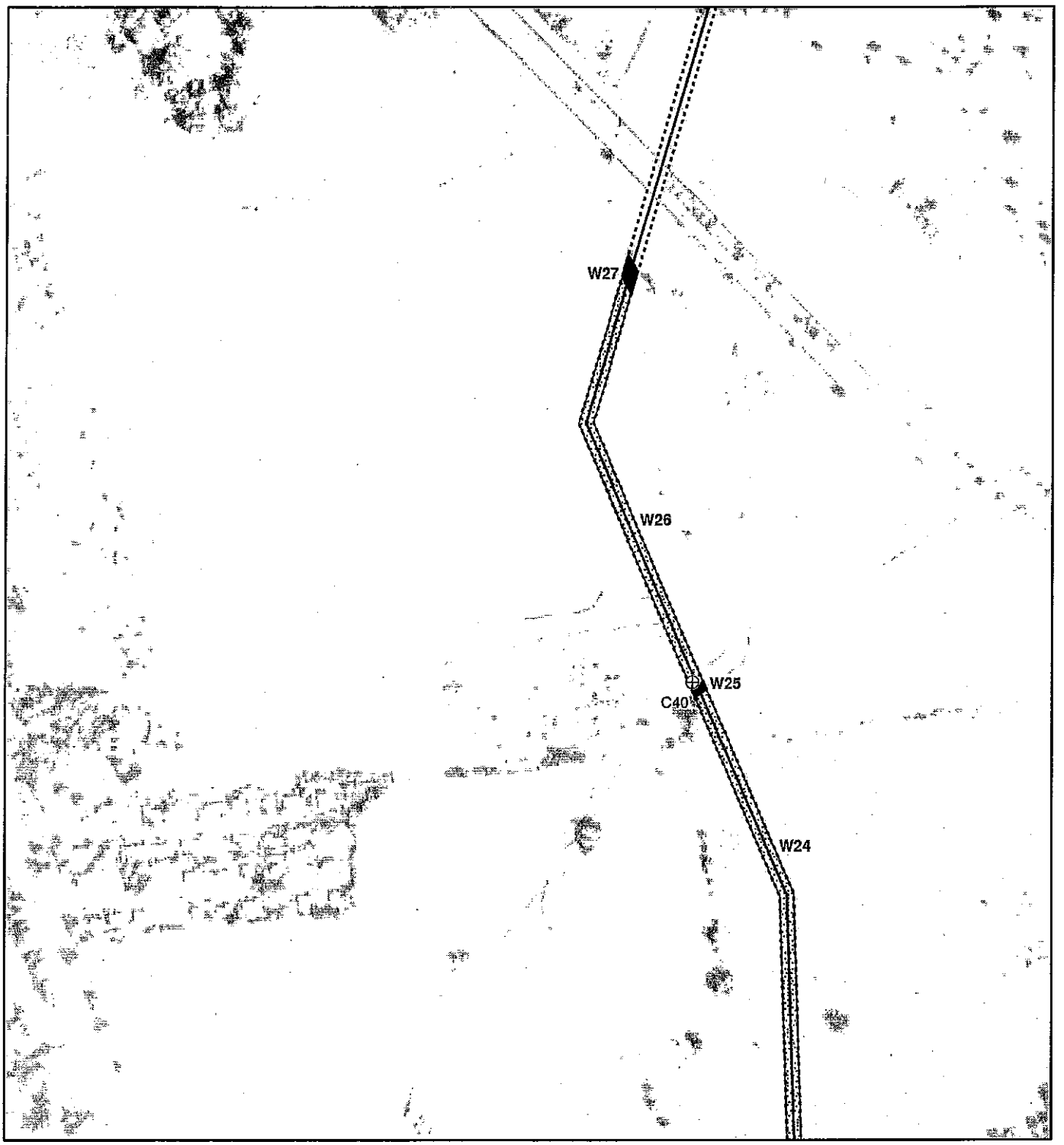


Map 33

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

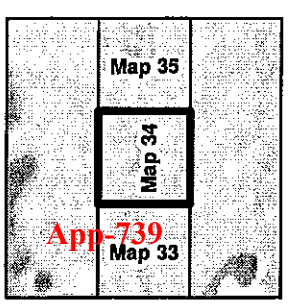


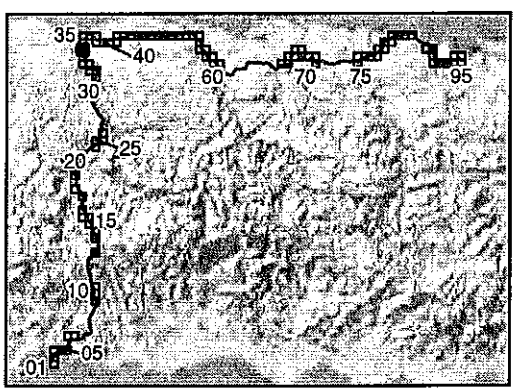




Map 34

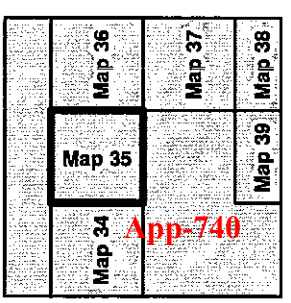
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

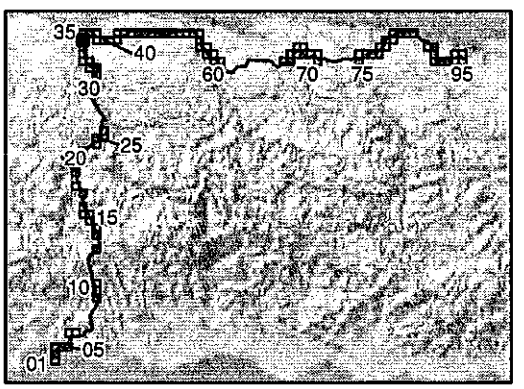




Map 35

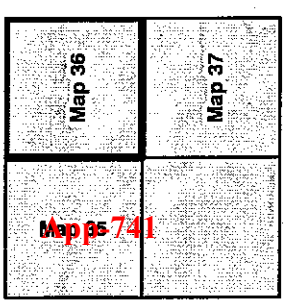
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

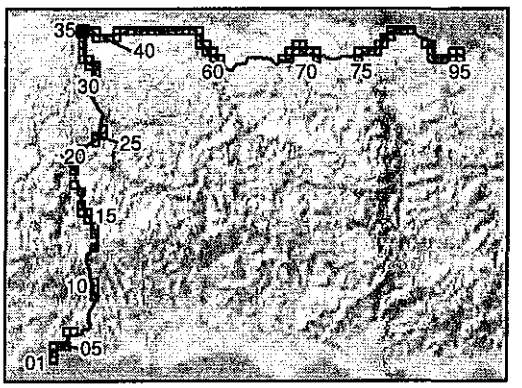


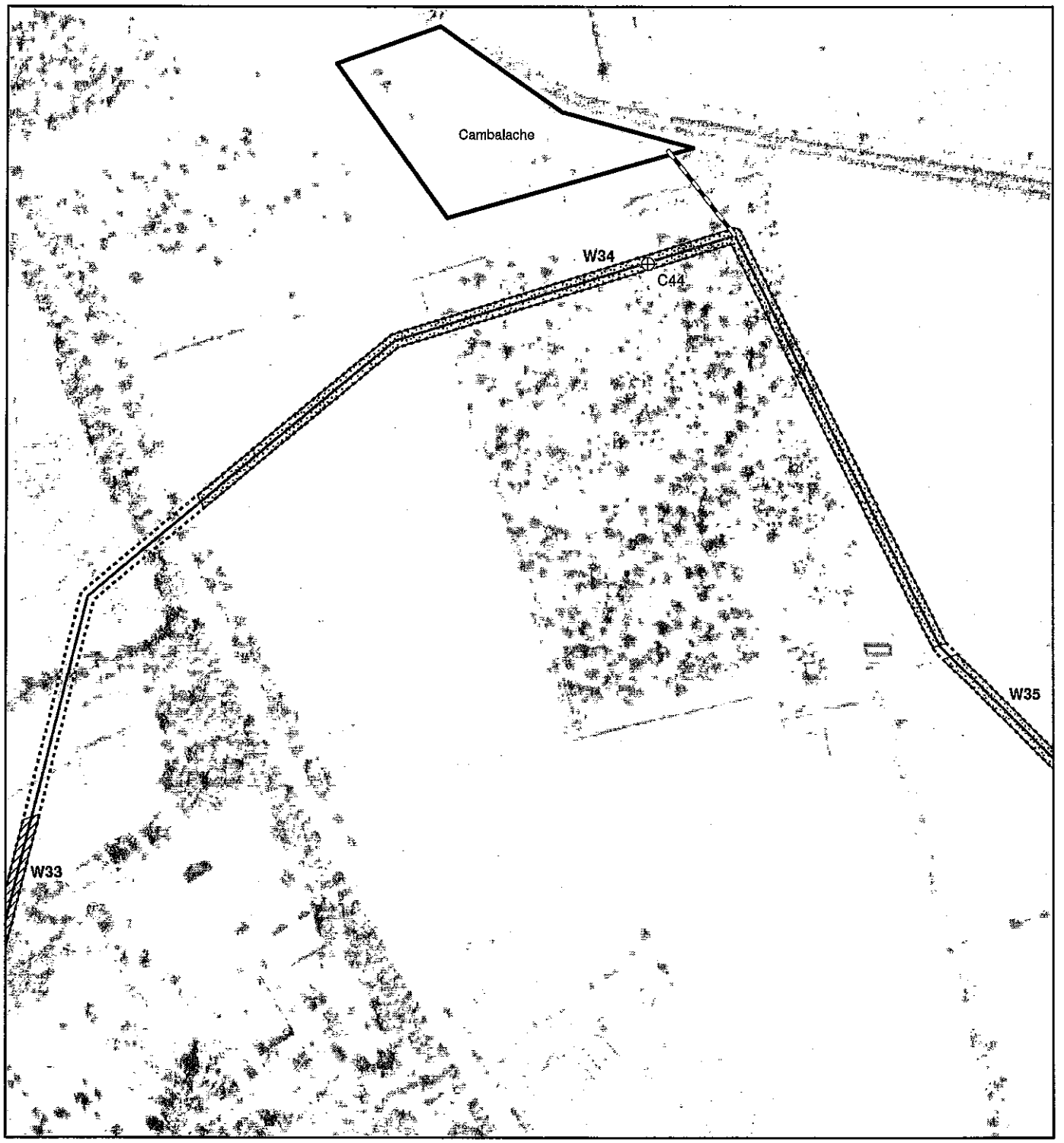


Map 36

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

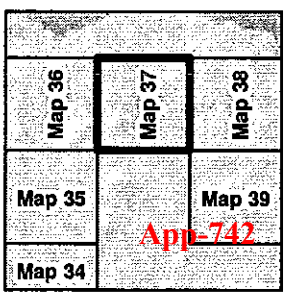


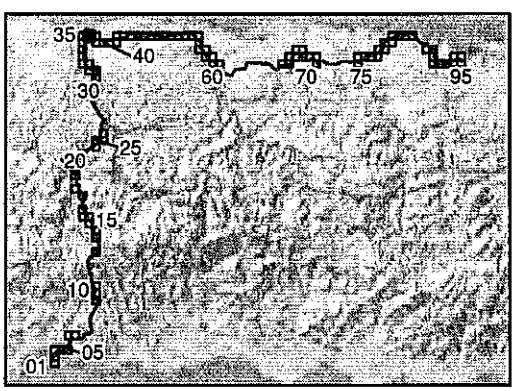




Map 37

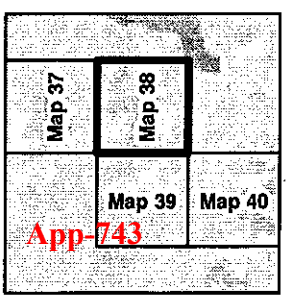
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

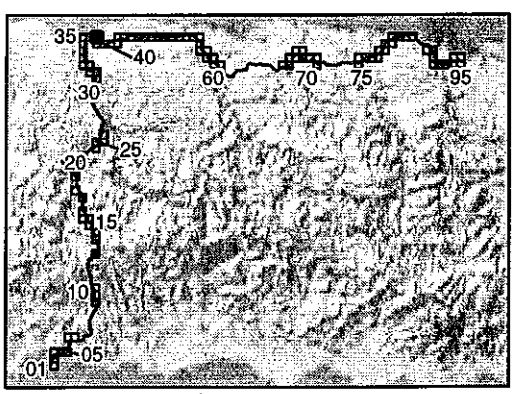




Map 38

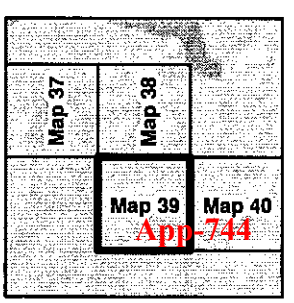
- ⊕ Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

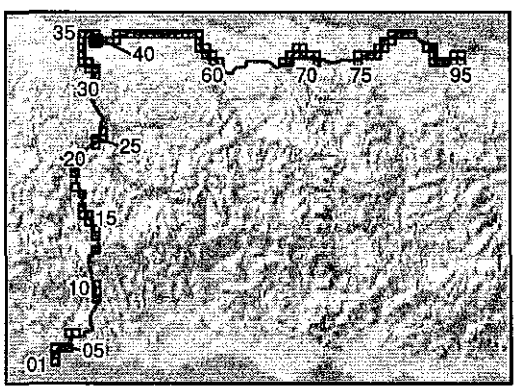




Map 39

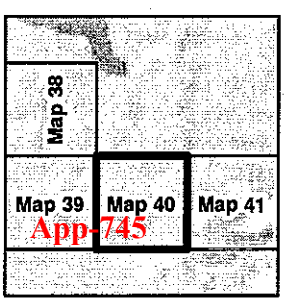
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

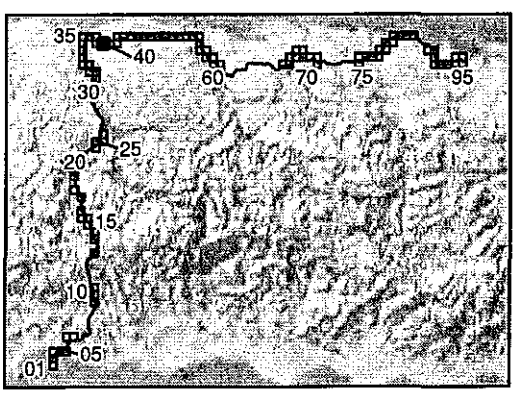


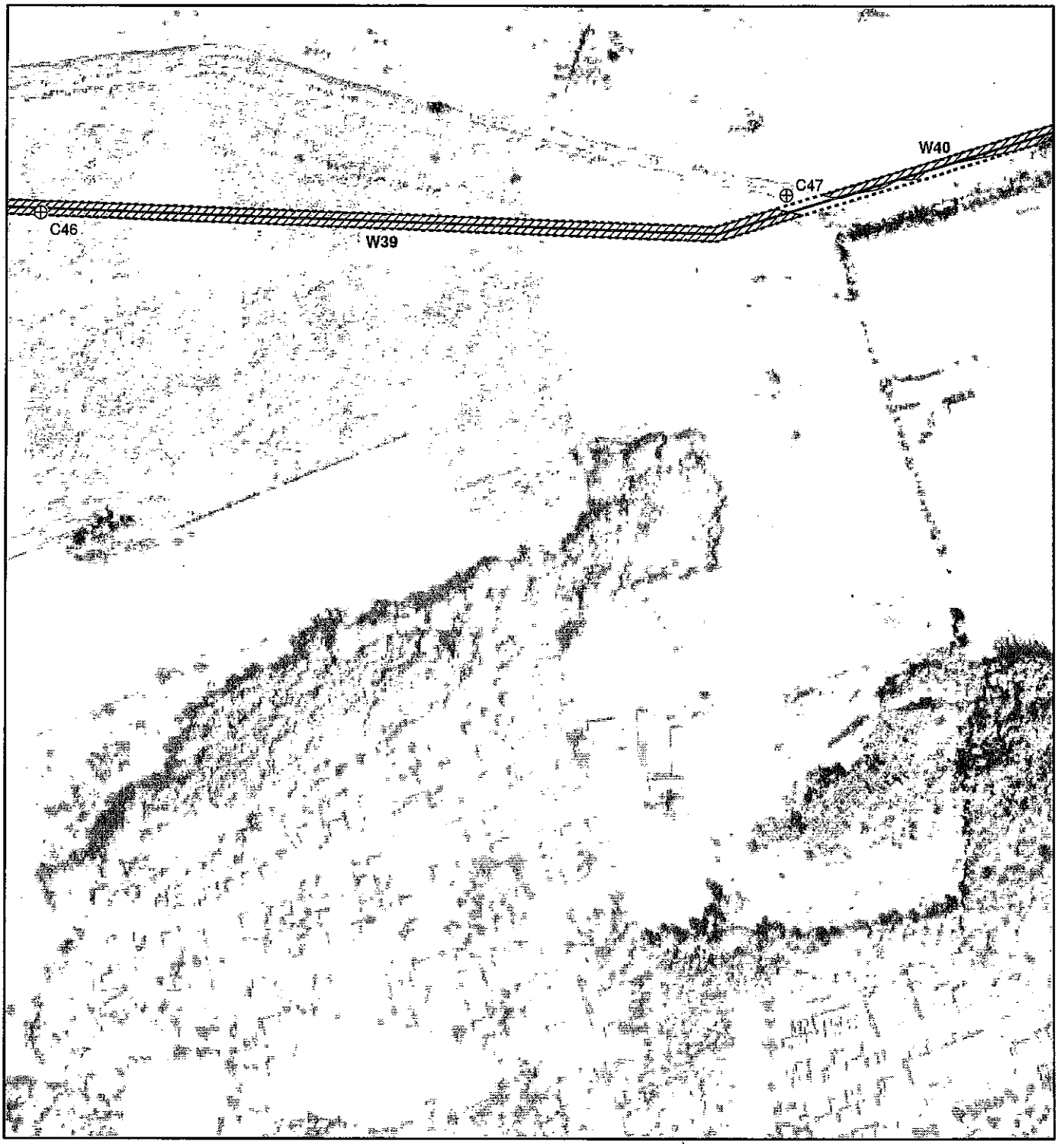


Map 40

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

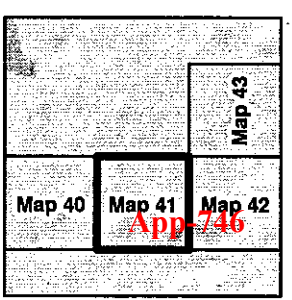


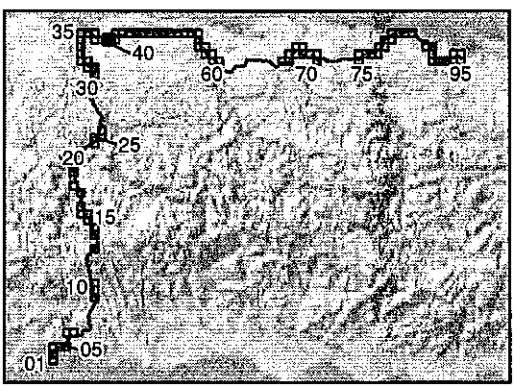




Map 41

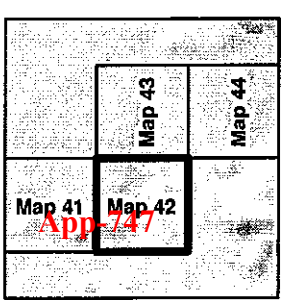
Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

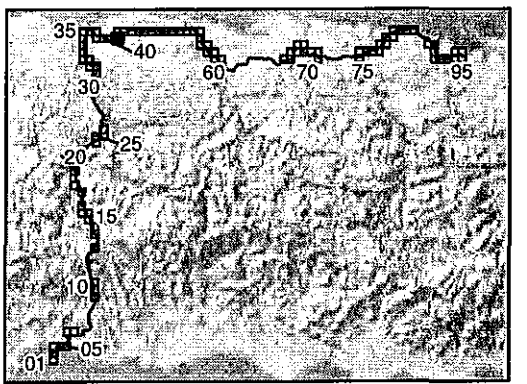




Map 42

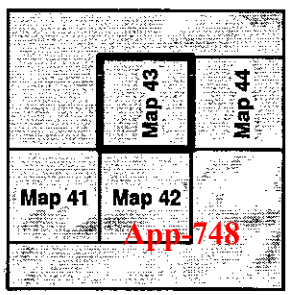
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

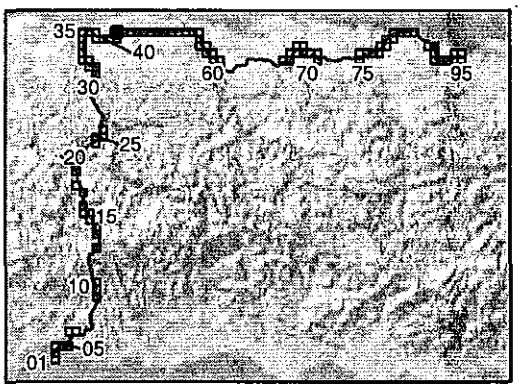




Map 43

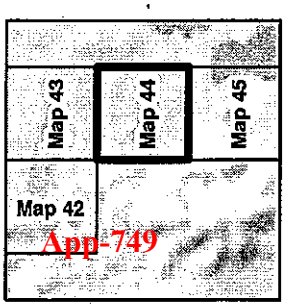
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

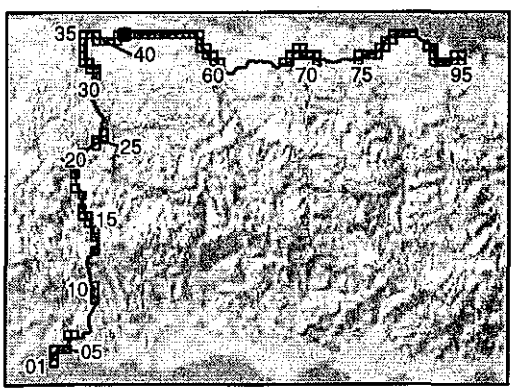




Map 44

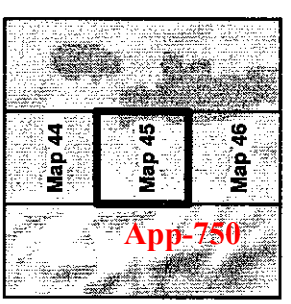
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb.
- Palustrine Man Herb

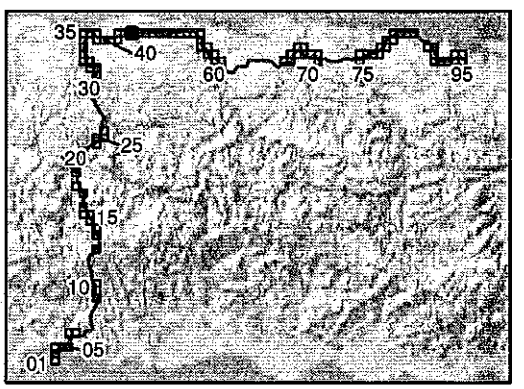


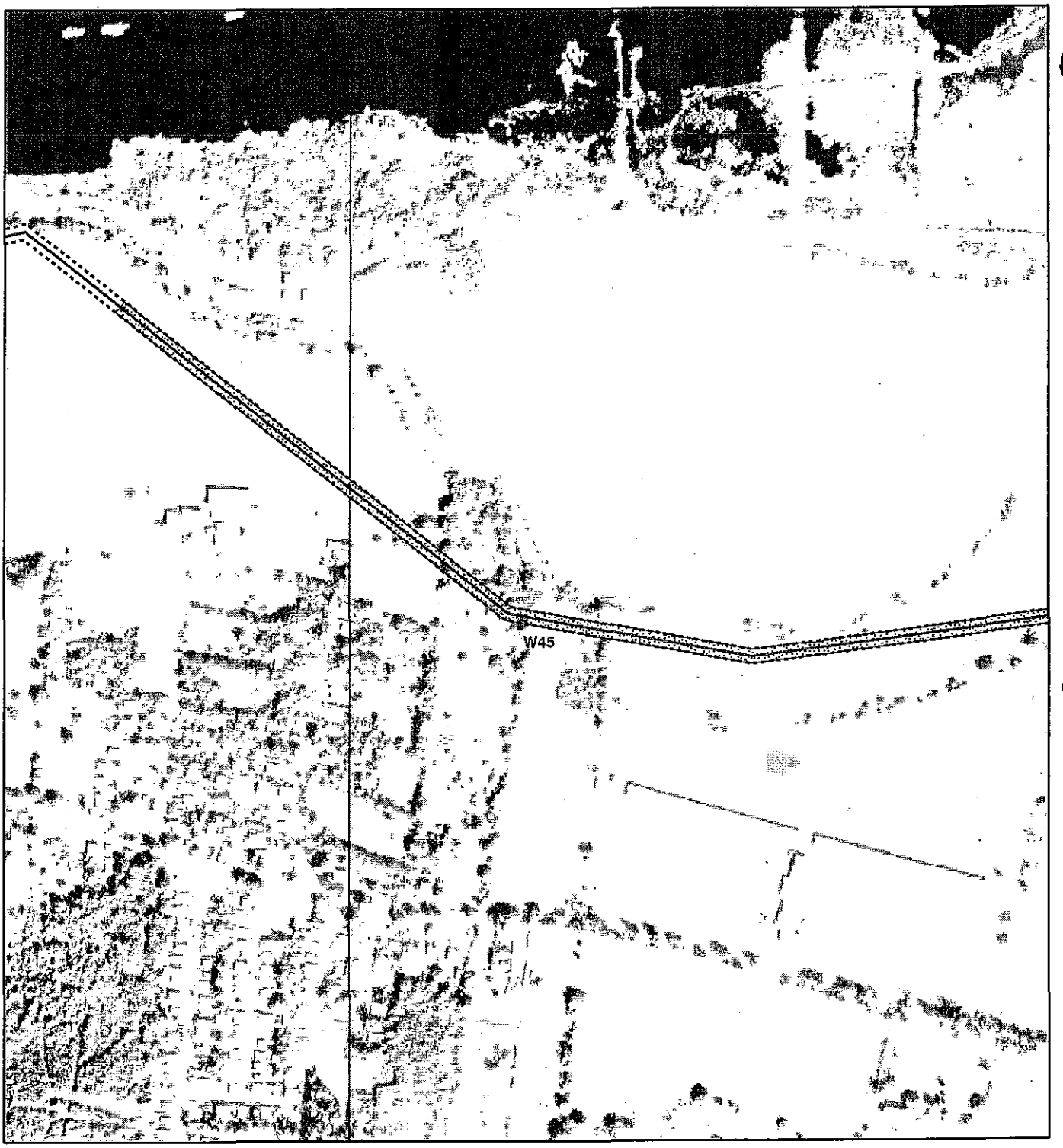


Map 45

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

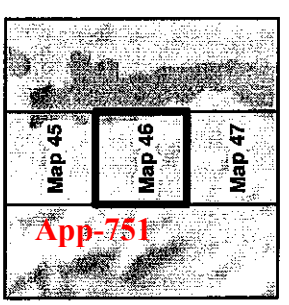


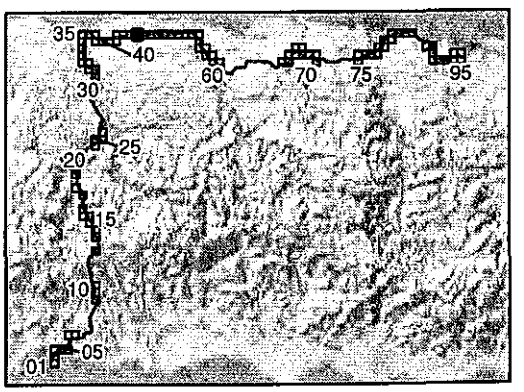




Map 46

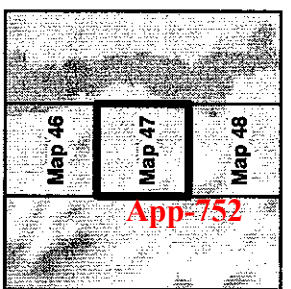
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

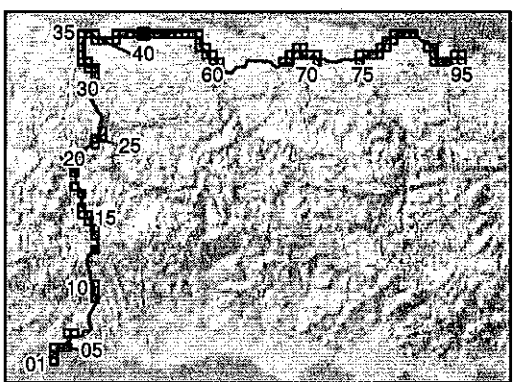




Map 47

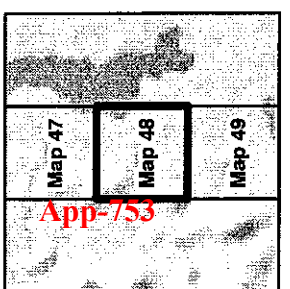
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

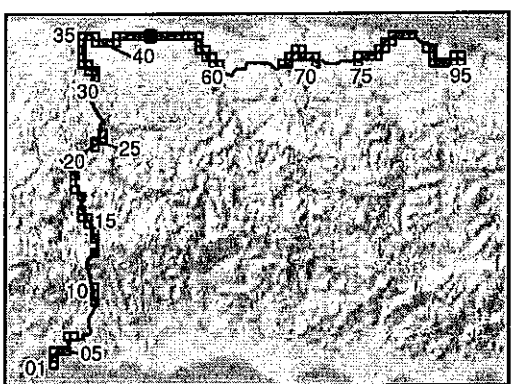




Map 48

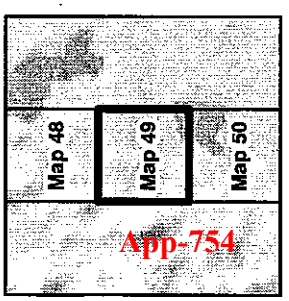
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

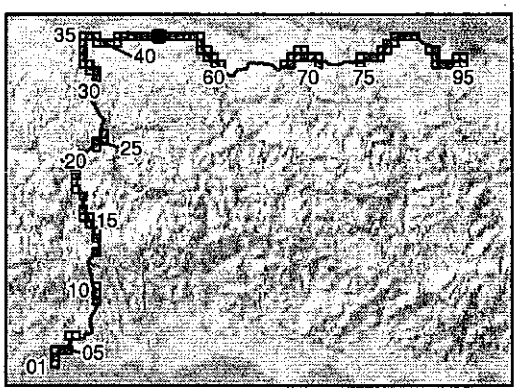




Map 49

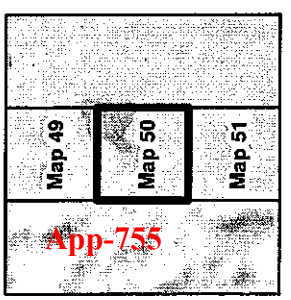
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

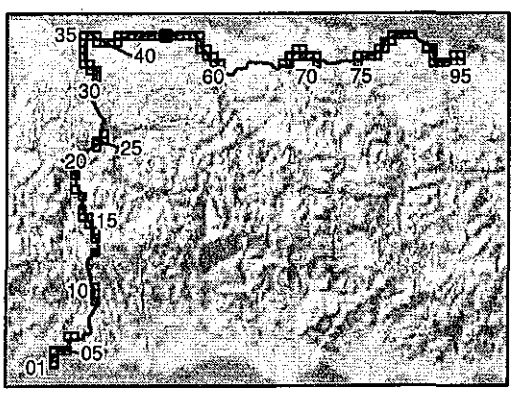


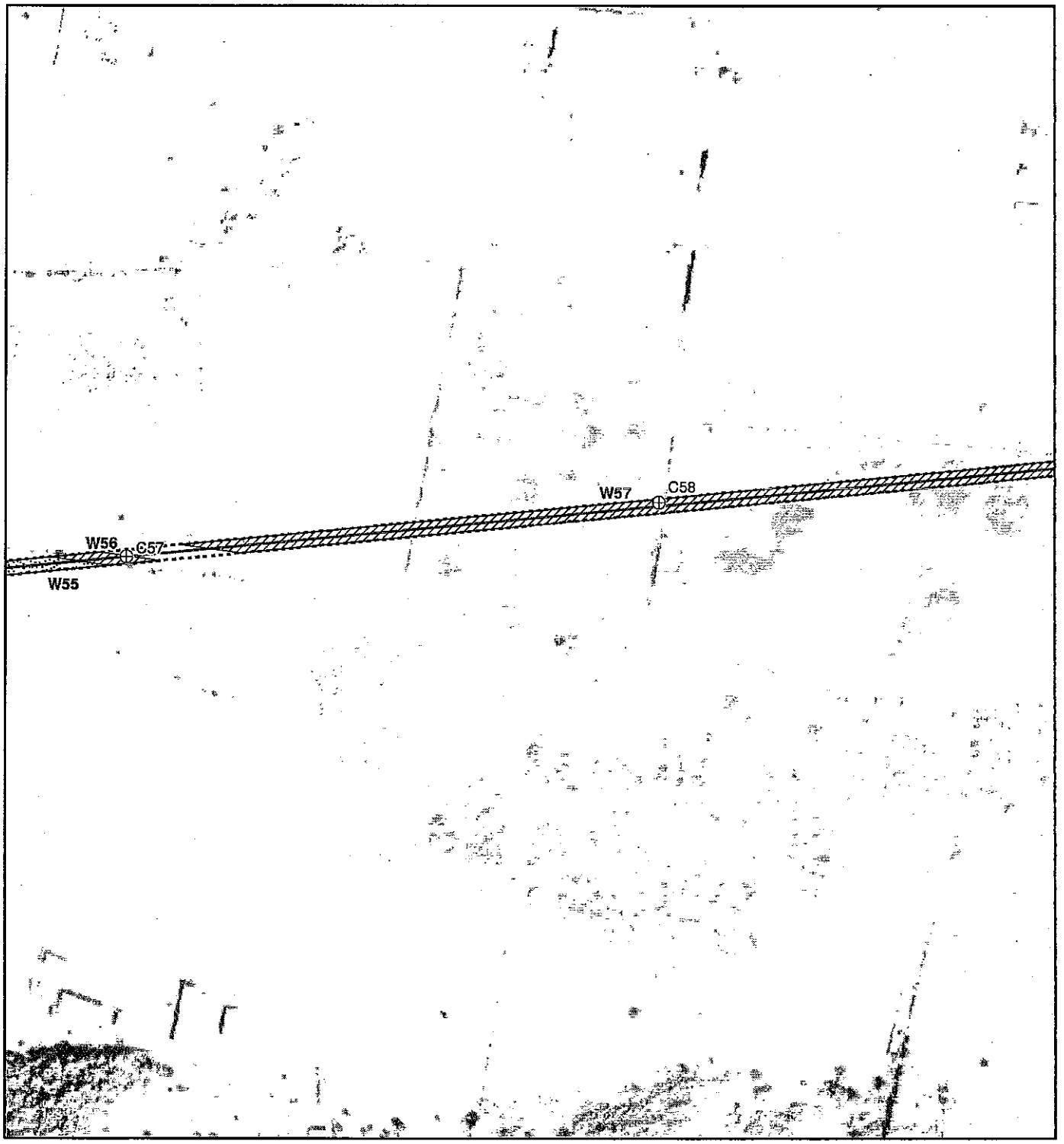


Map 50

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

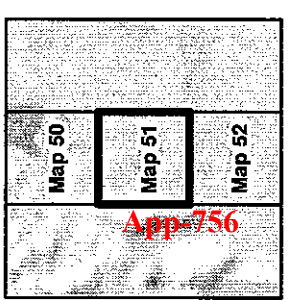


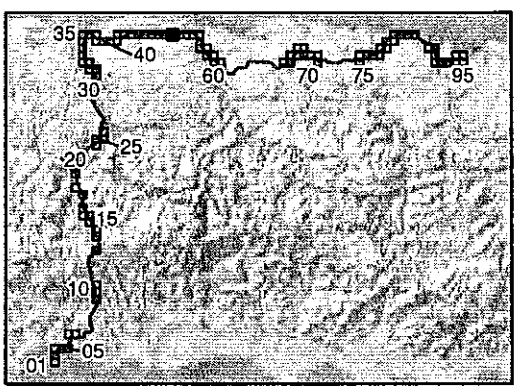


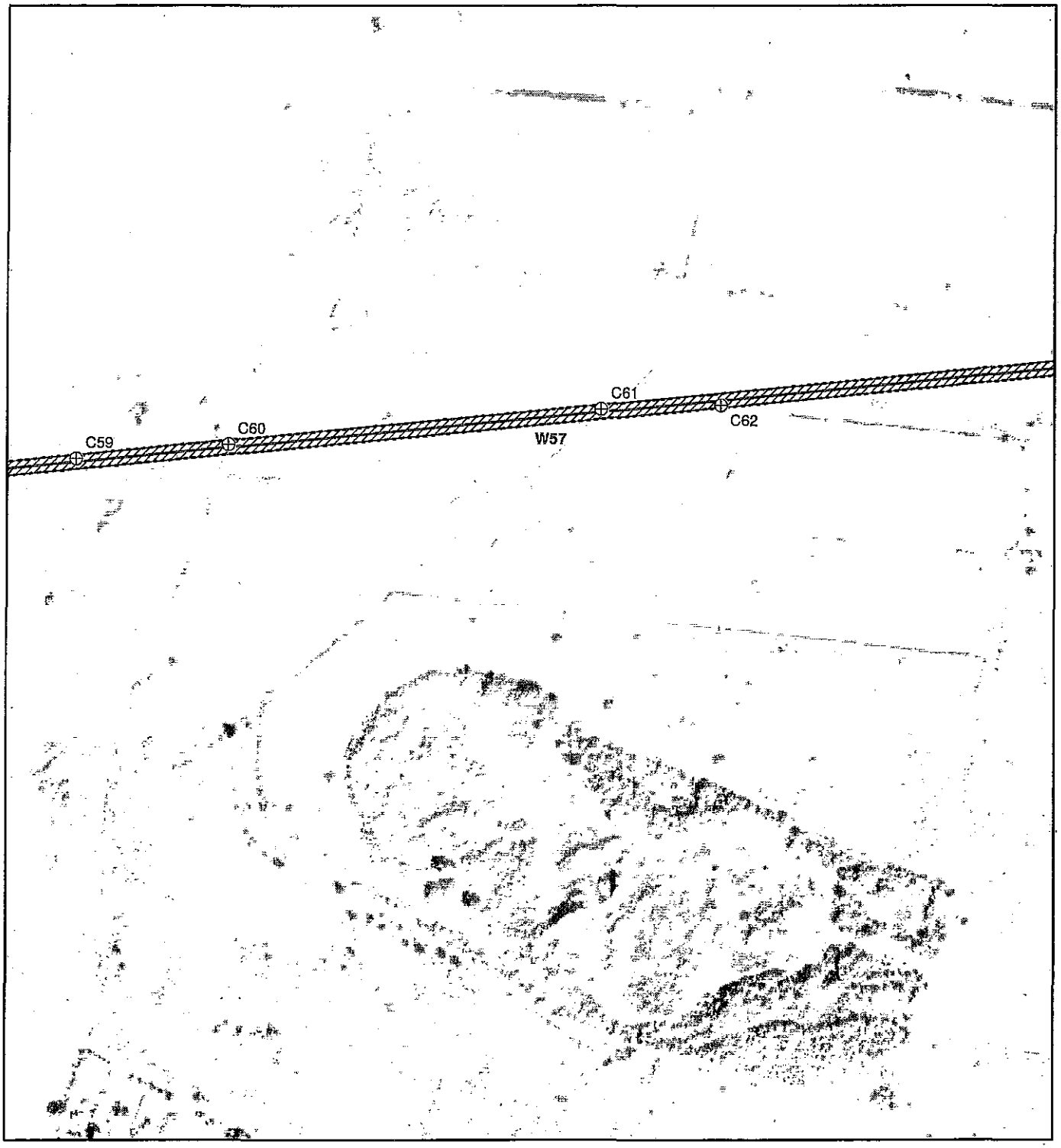


Map 51

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

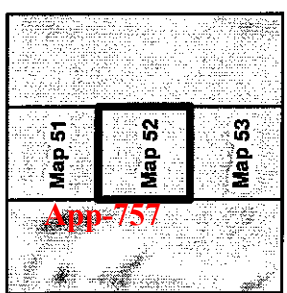


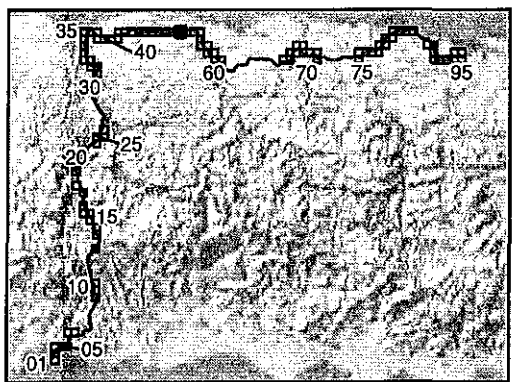




Map 52

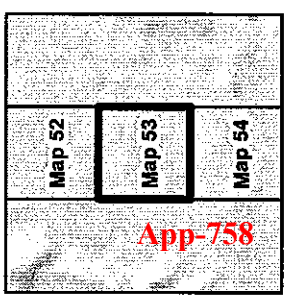
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

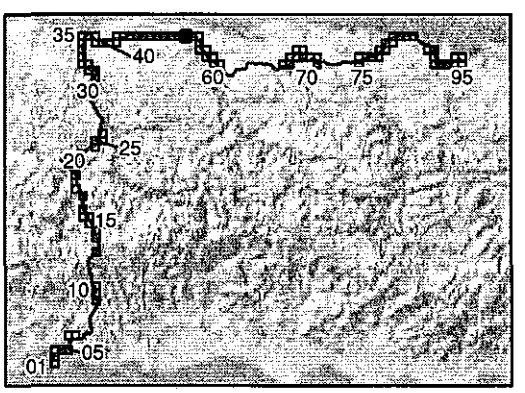


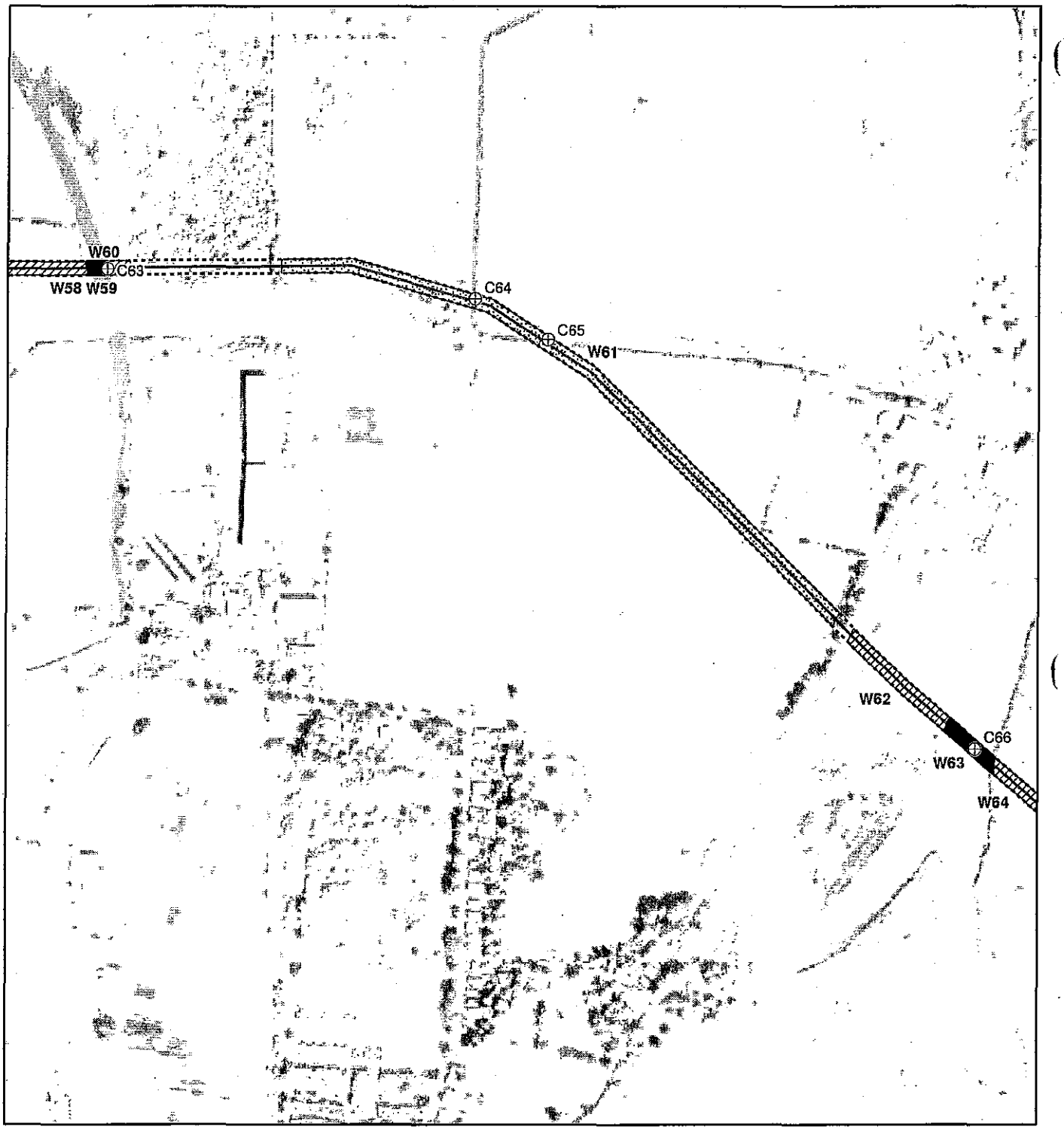


Map 53

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

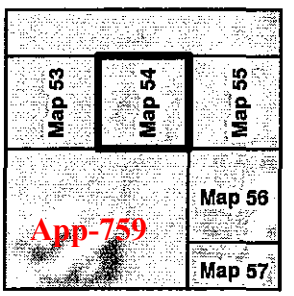


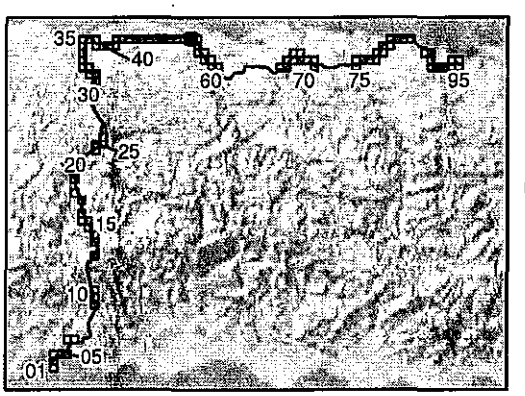


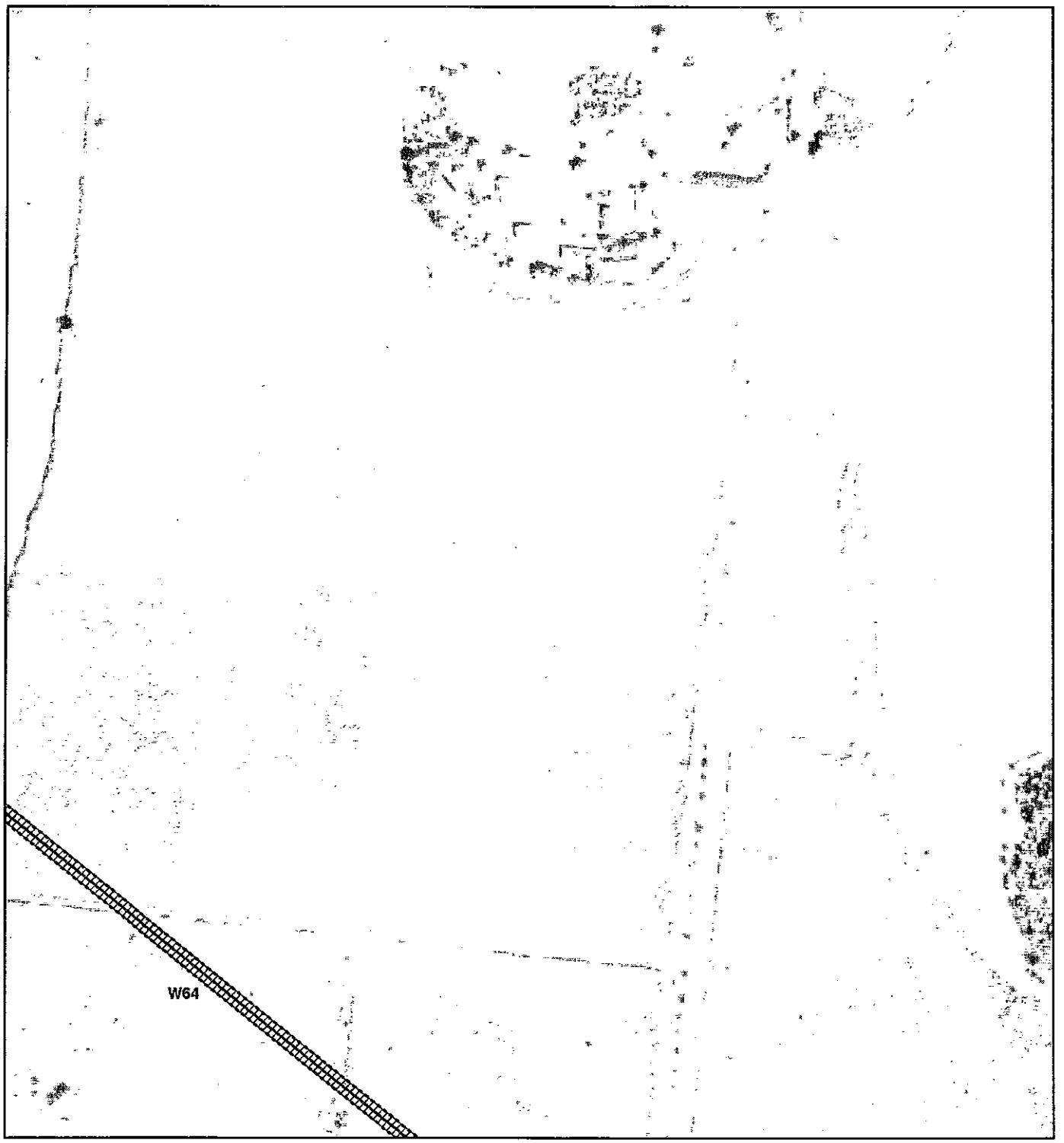


Map 54

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

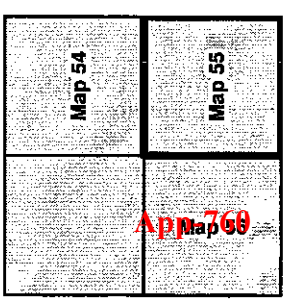


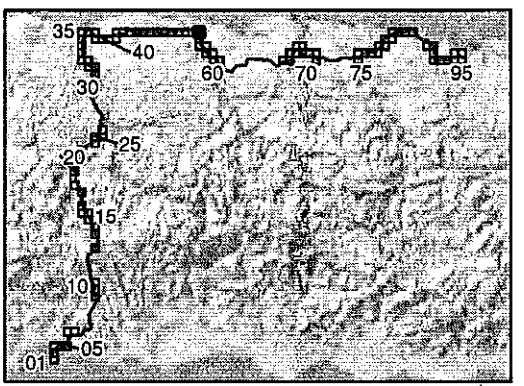


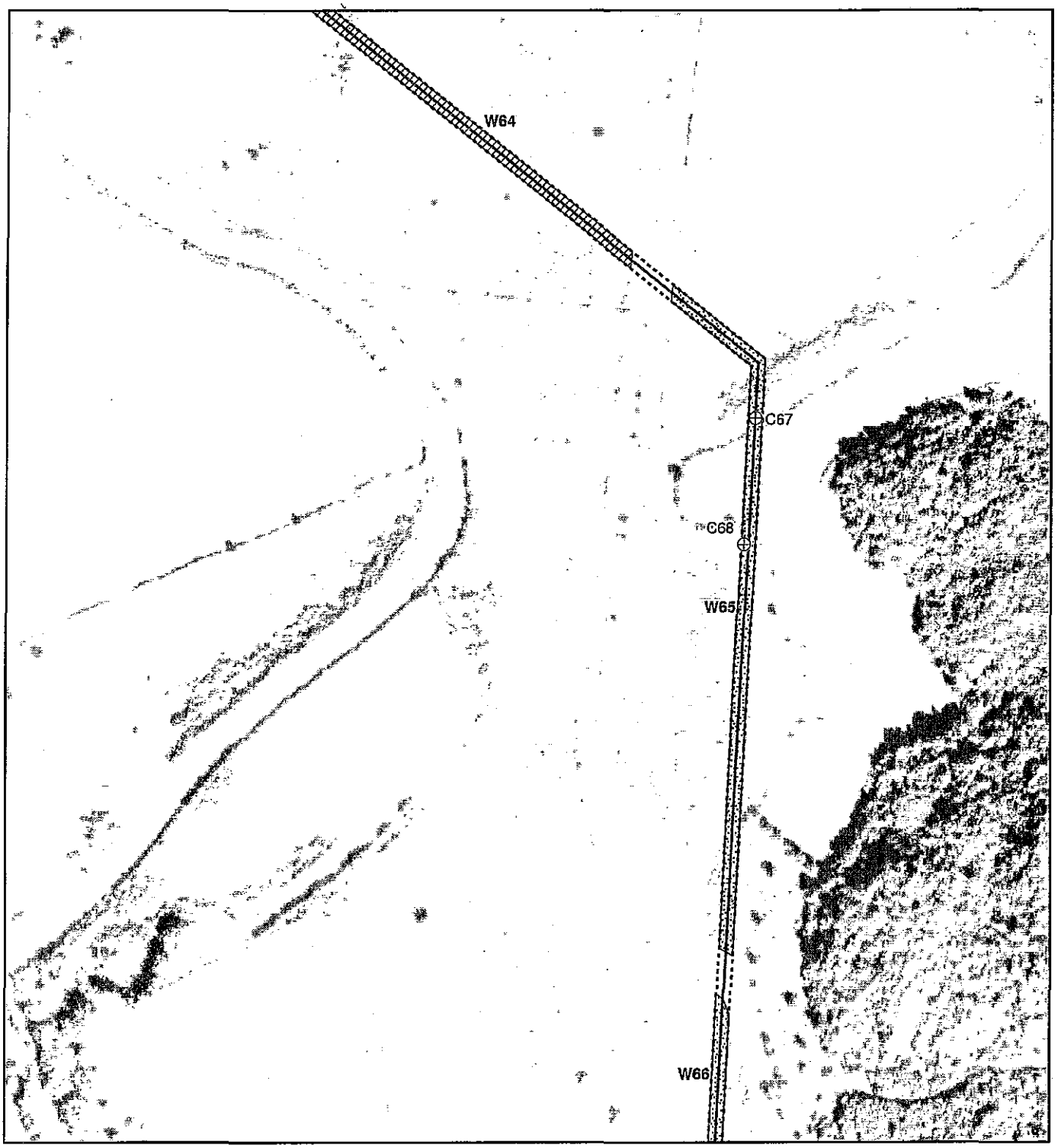


Map 55

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

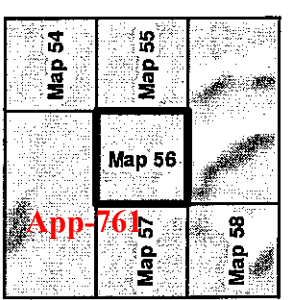


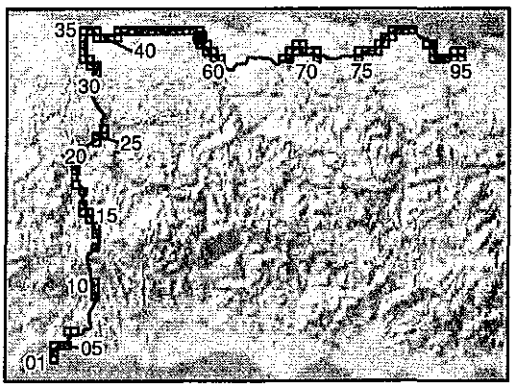


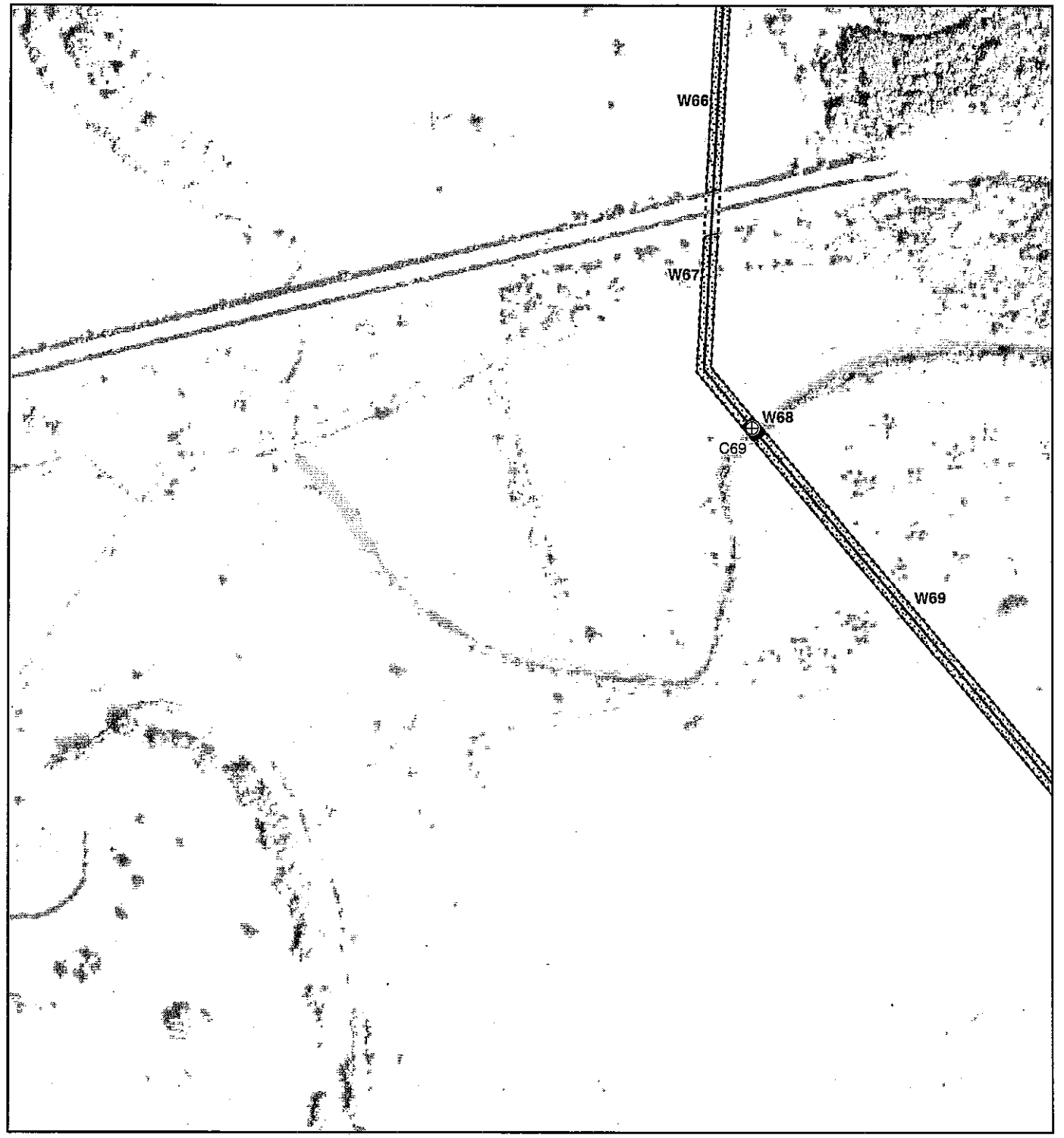


Map 56

- ⊕ Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

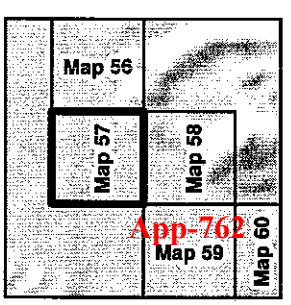


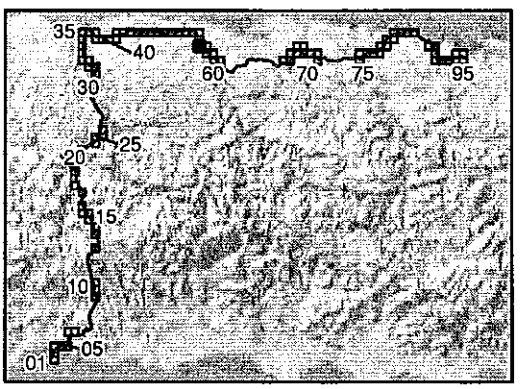


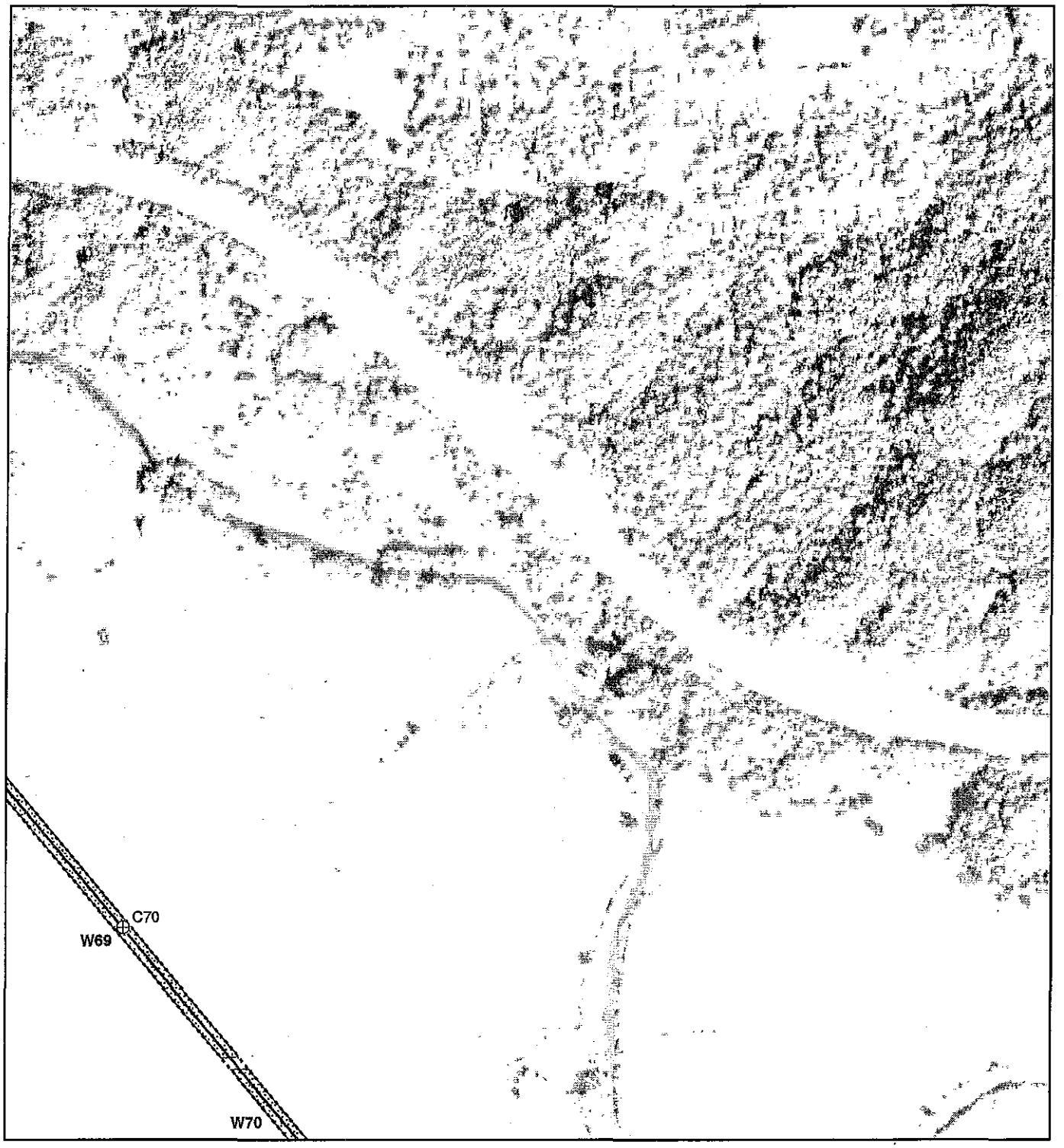


Map 57

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

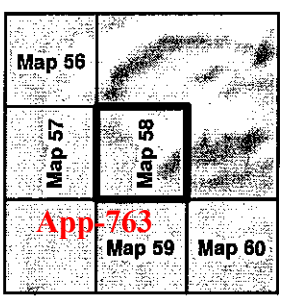


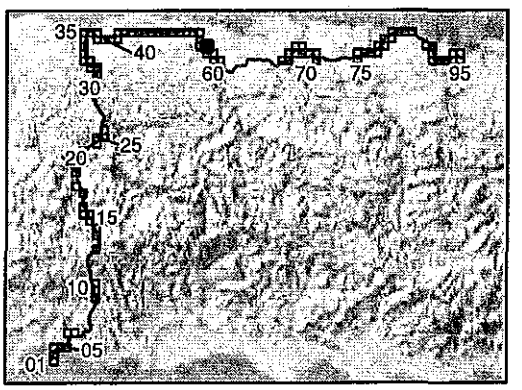


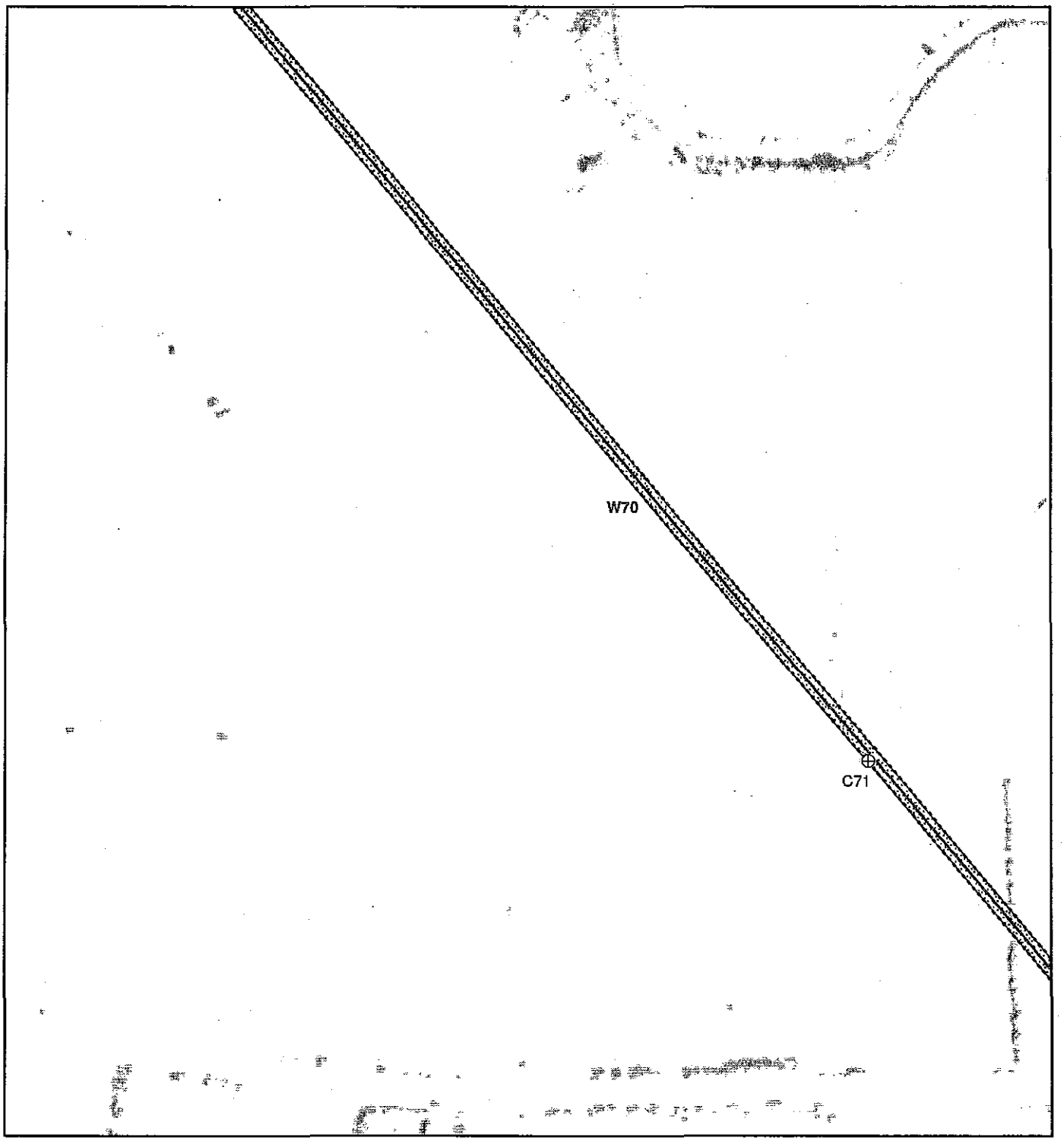


Map 58

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

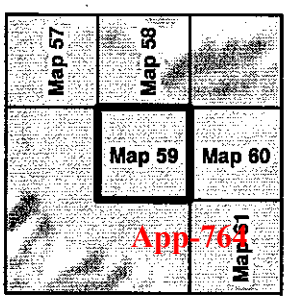


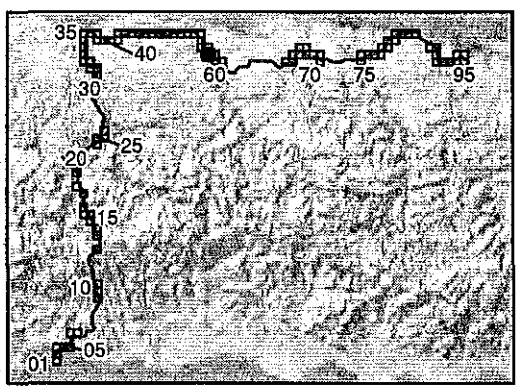


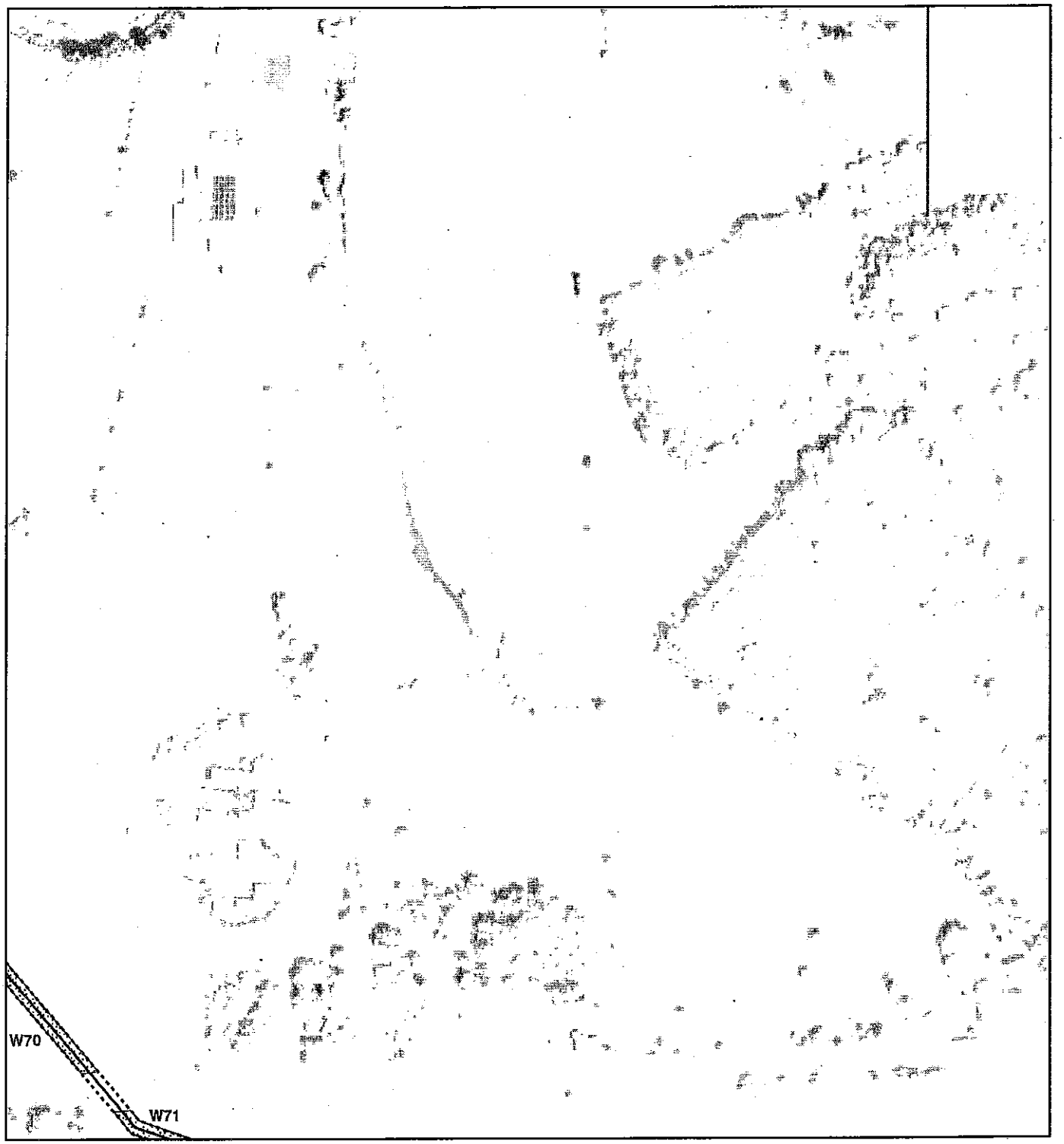


Map 59

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

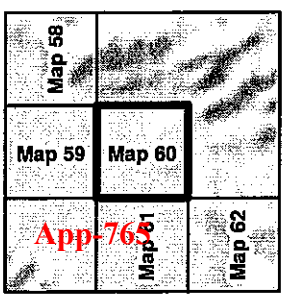


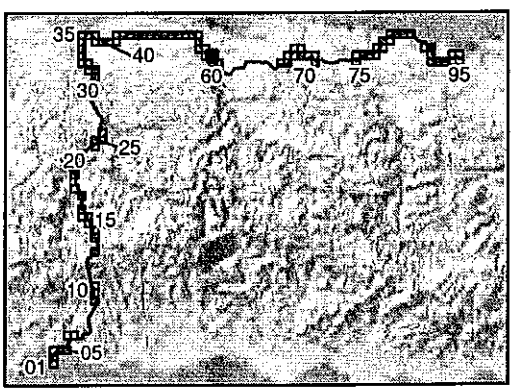


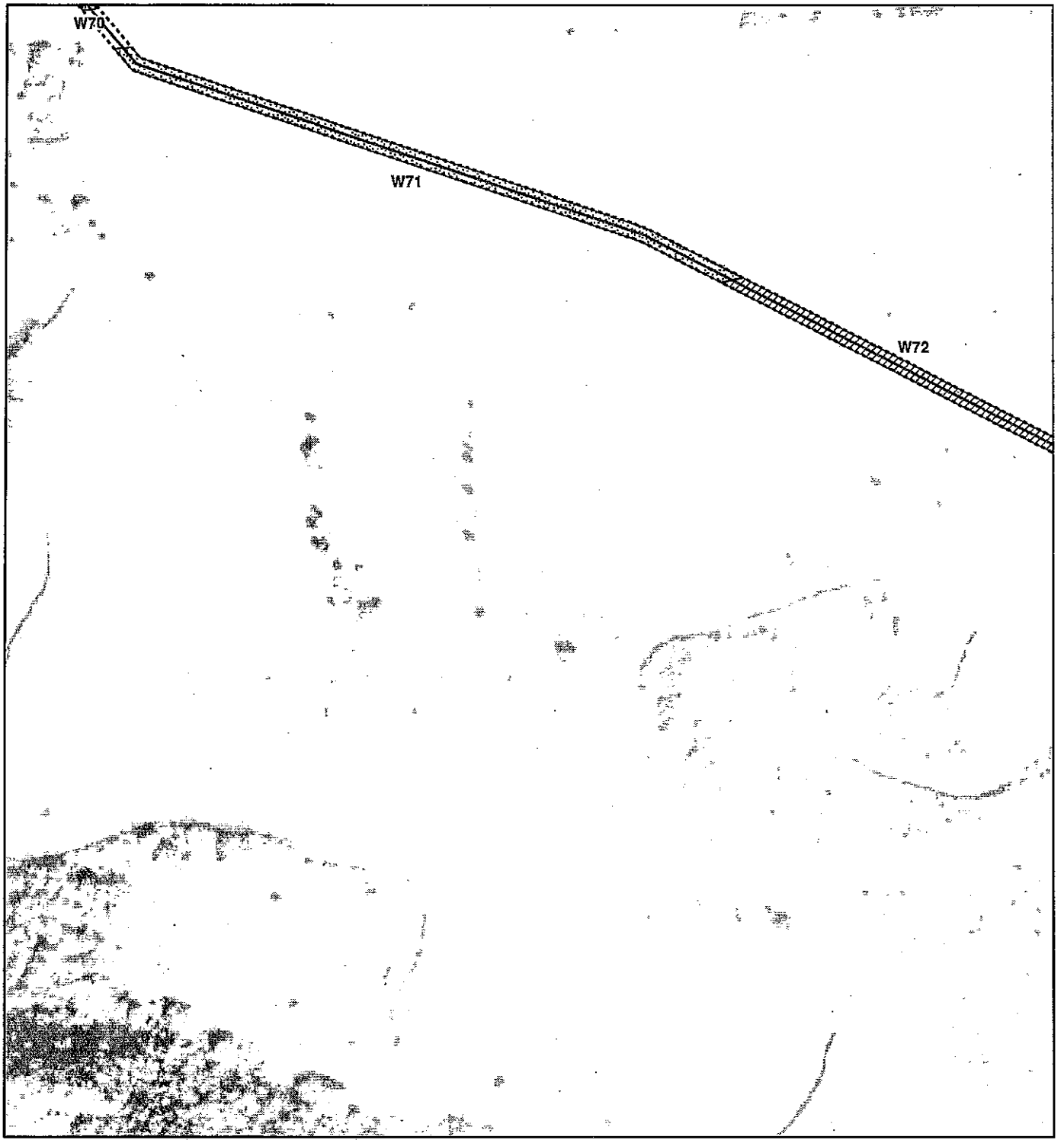


Map 60

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

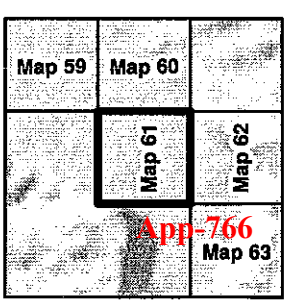


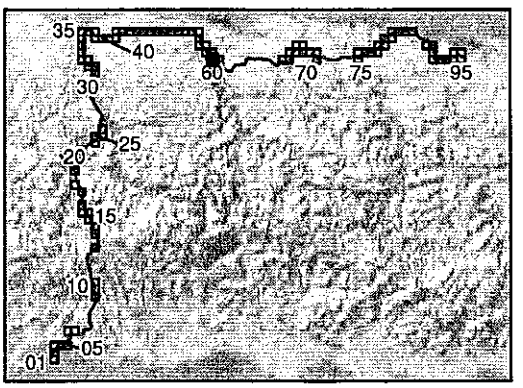


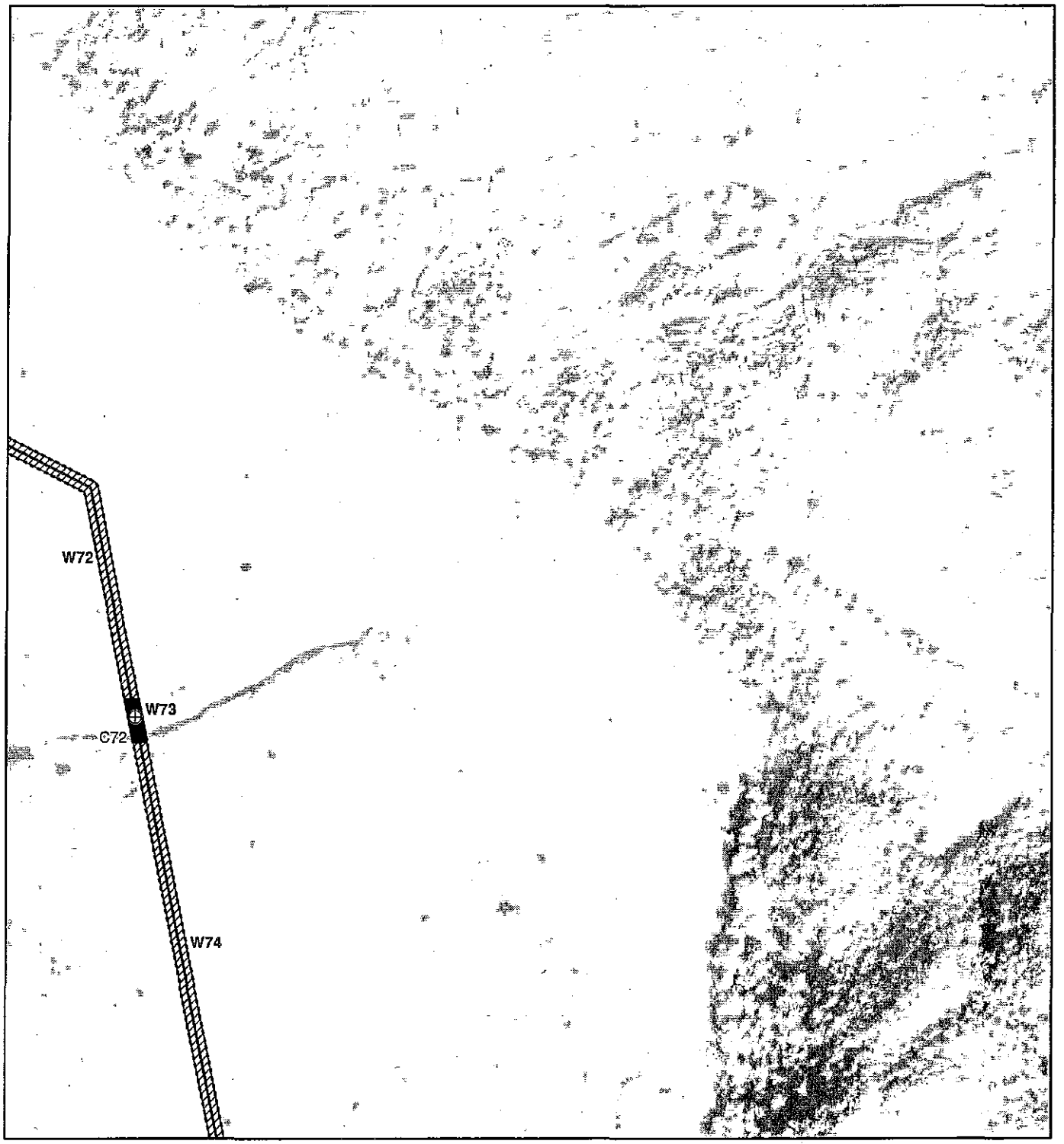


Map 61

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

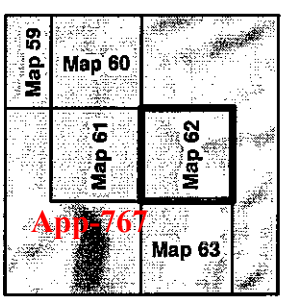


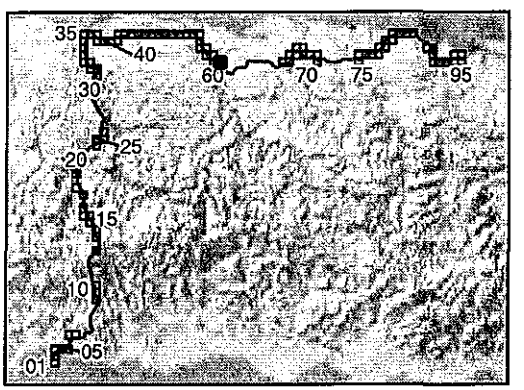


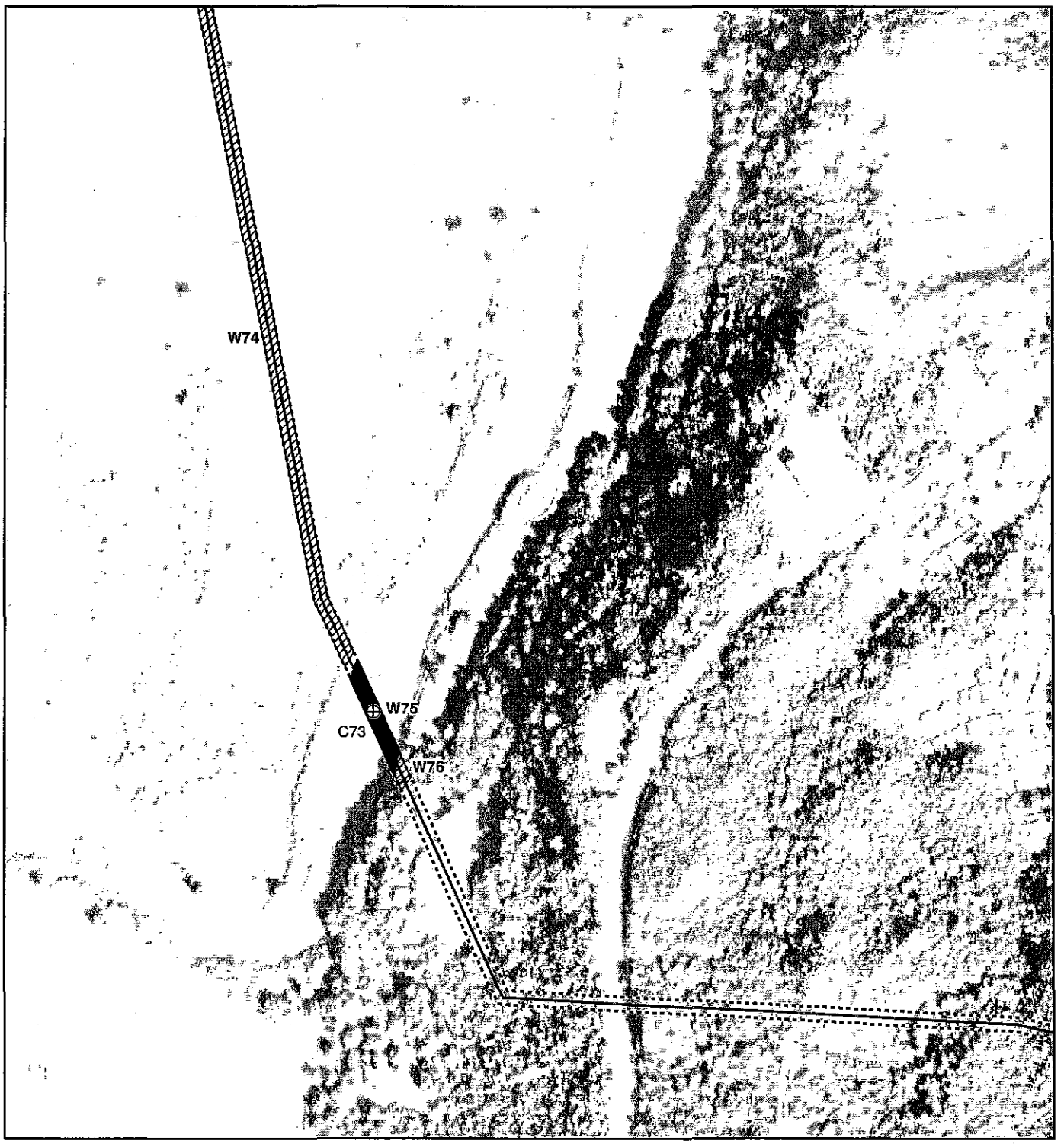


Map 62

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

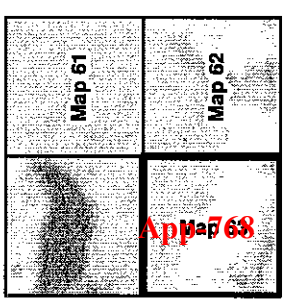


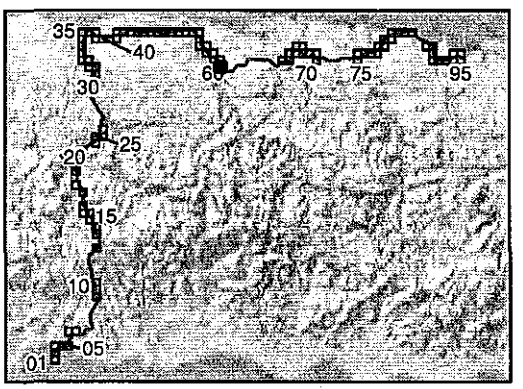


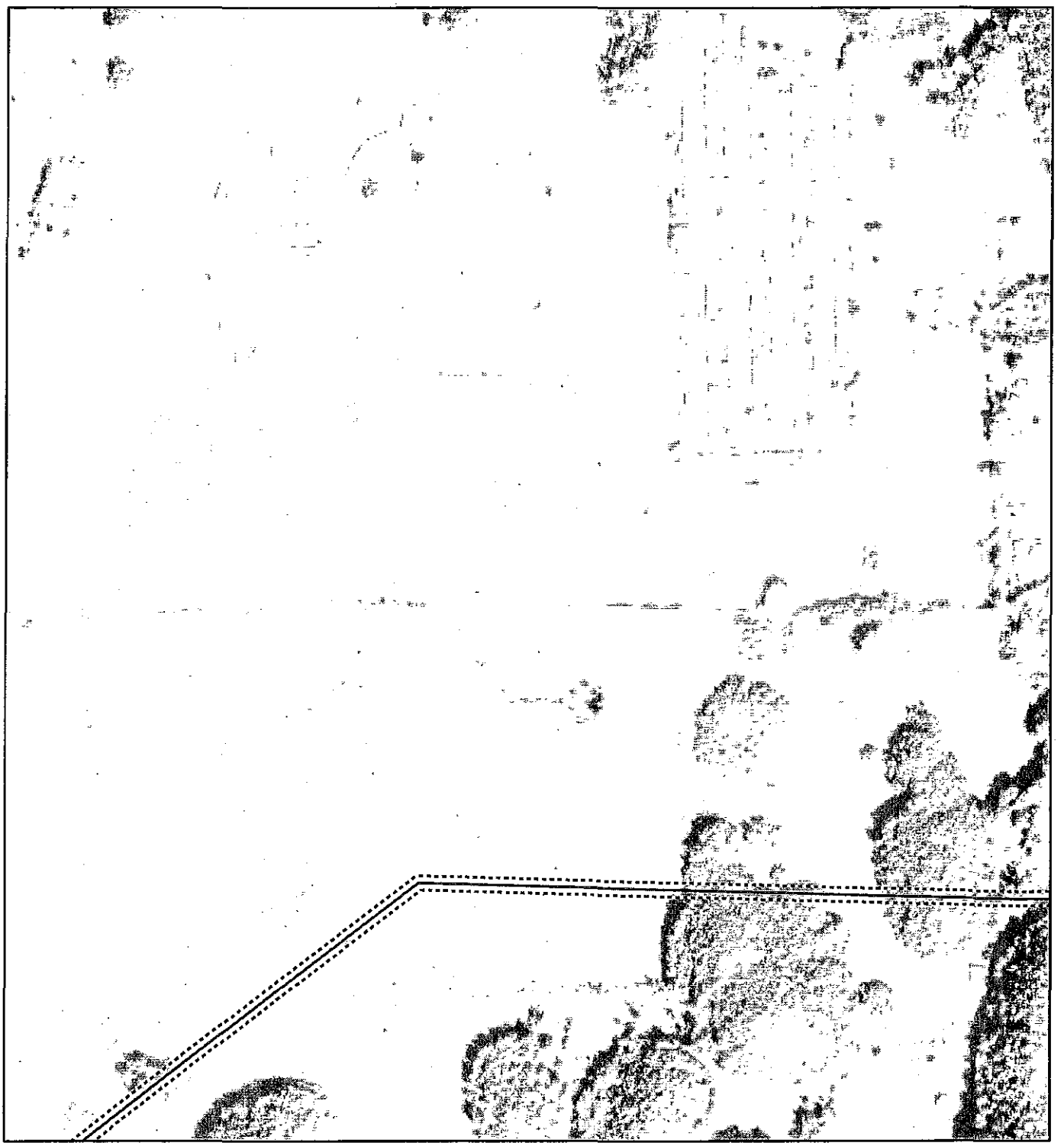


Map 63

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

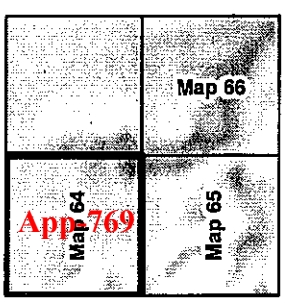


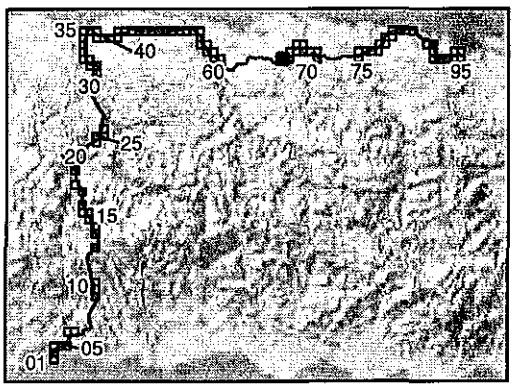


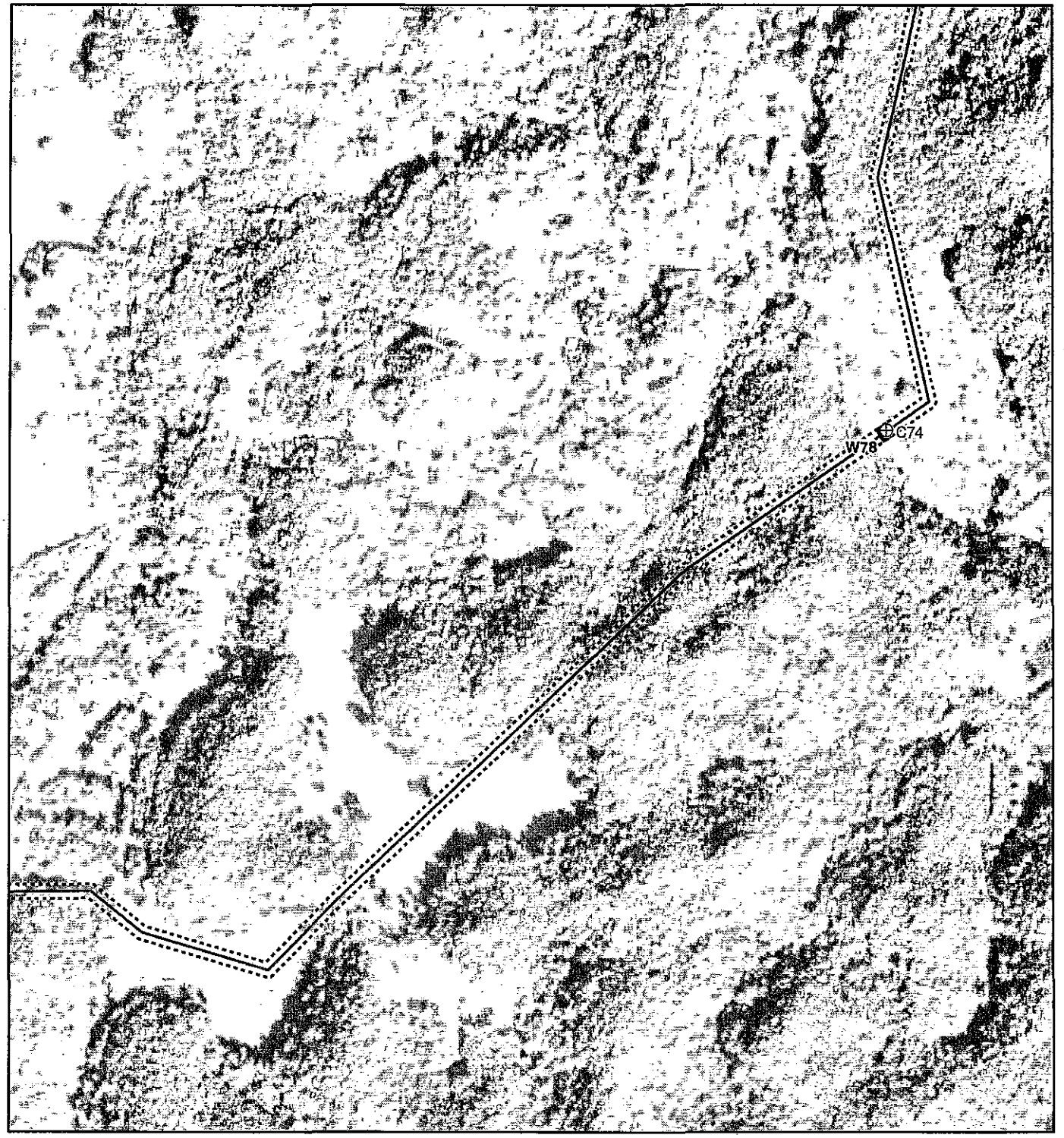


Map 64

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

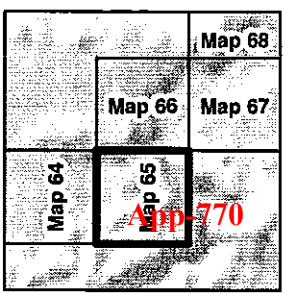


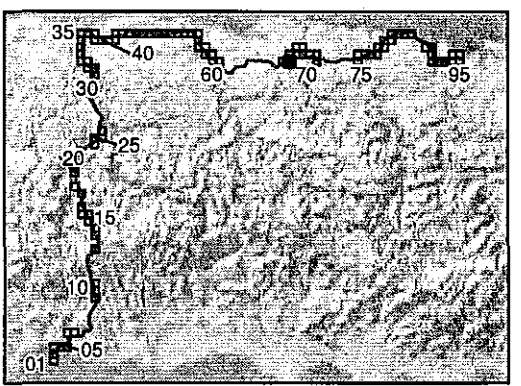


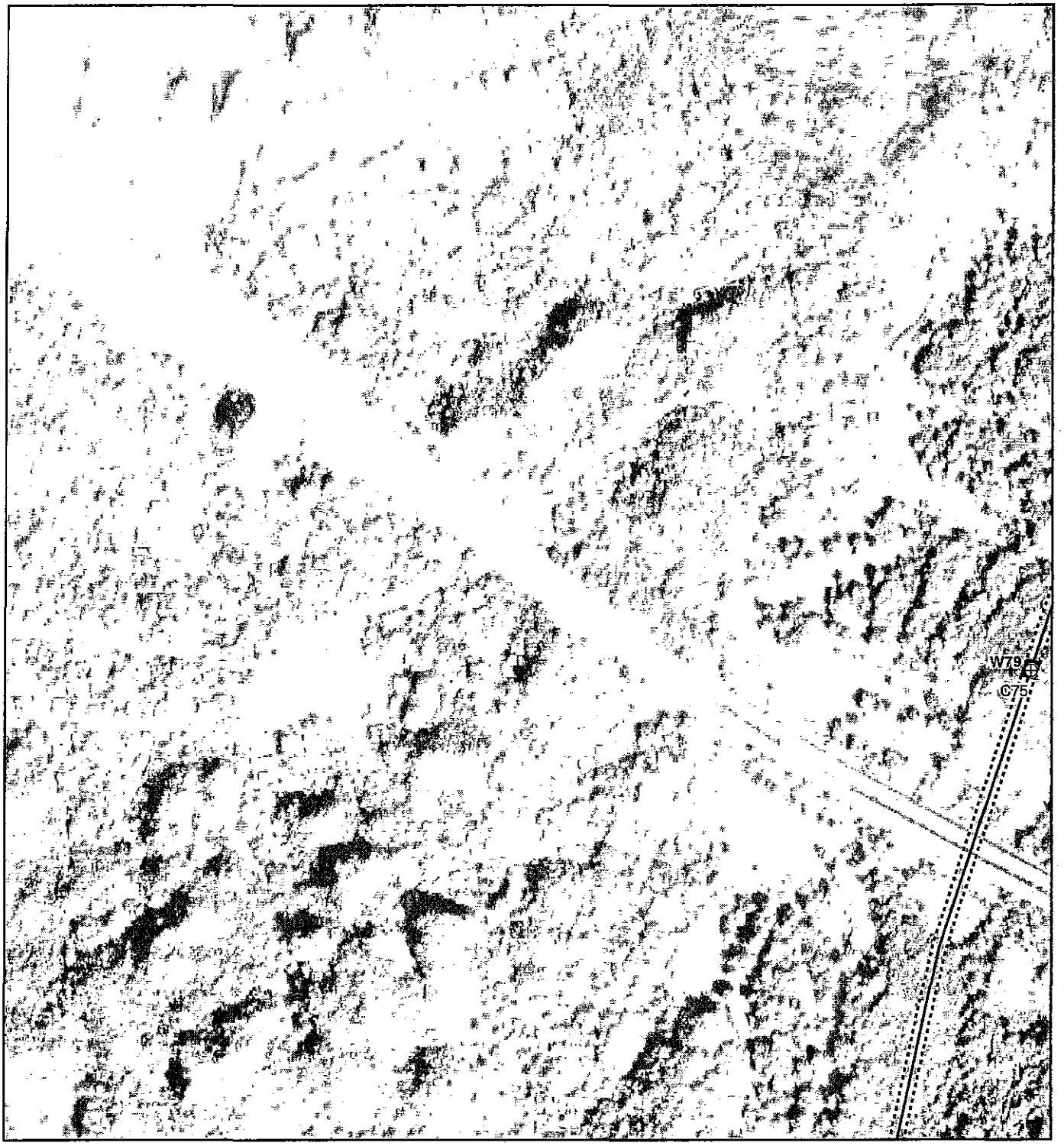


Map 65

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

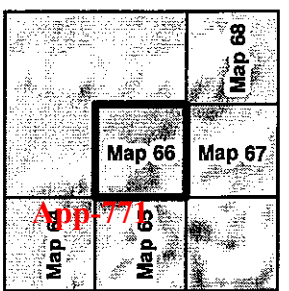


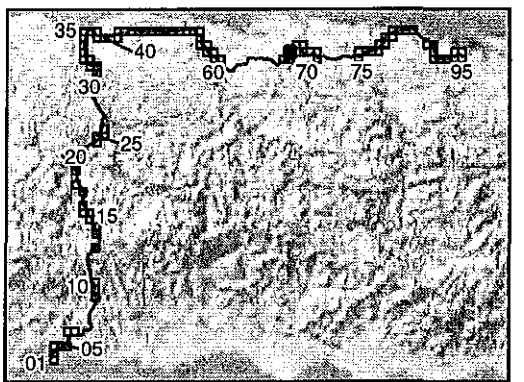




Map 66

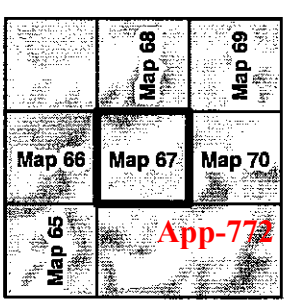
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

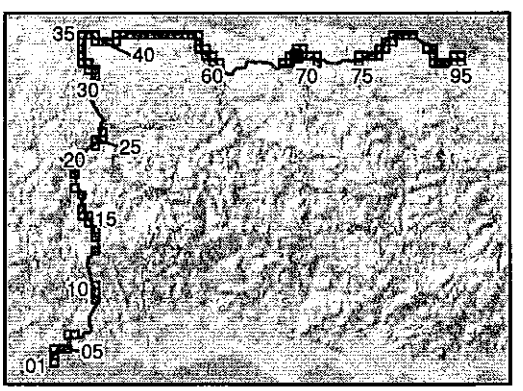




Map 67

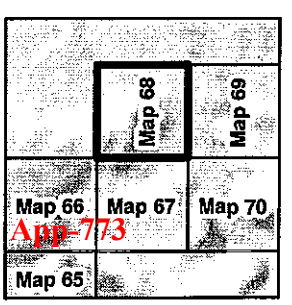
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

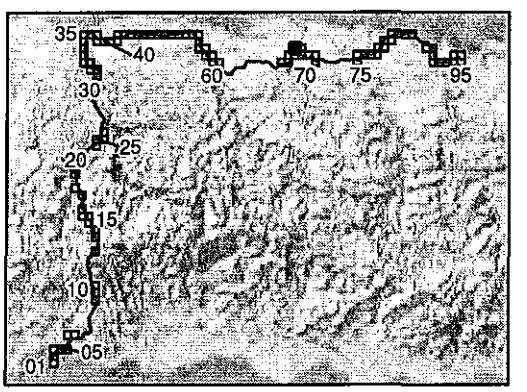




Map 68

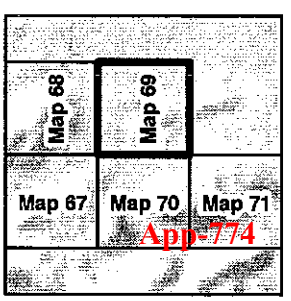
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

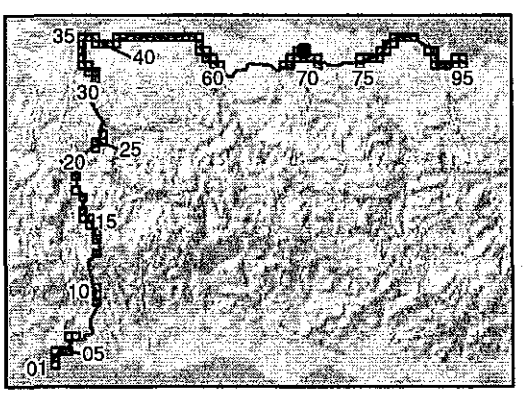


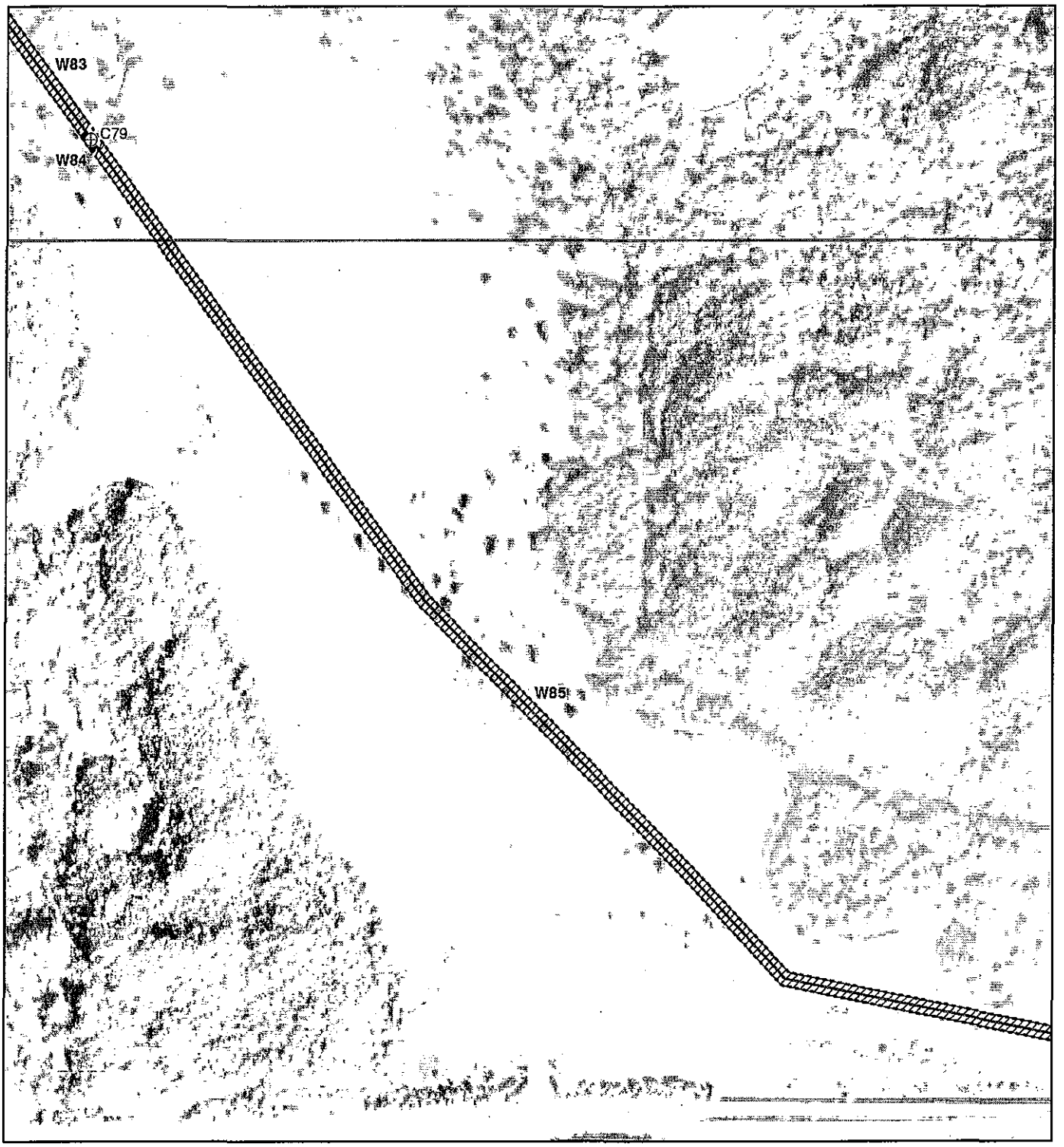


Map 69

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

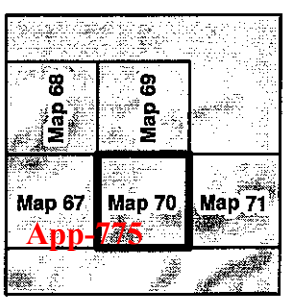


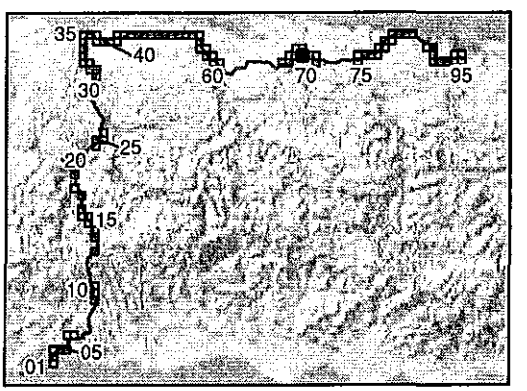


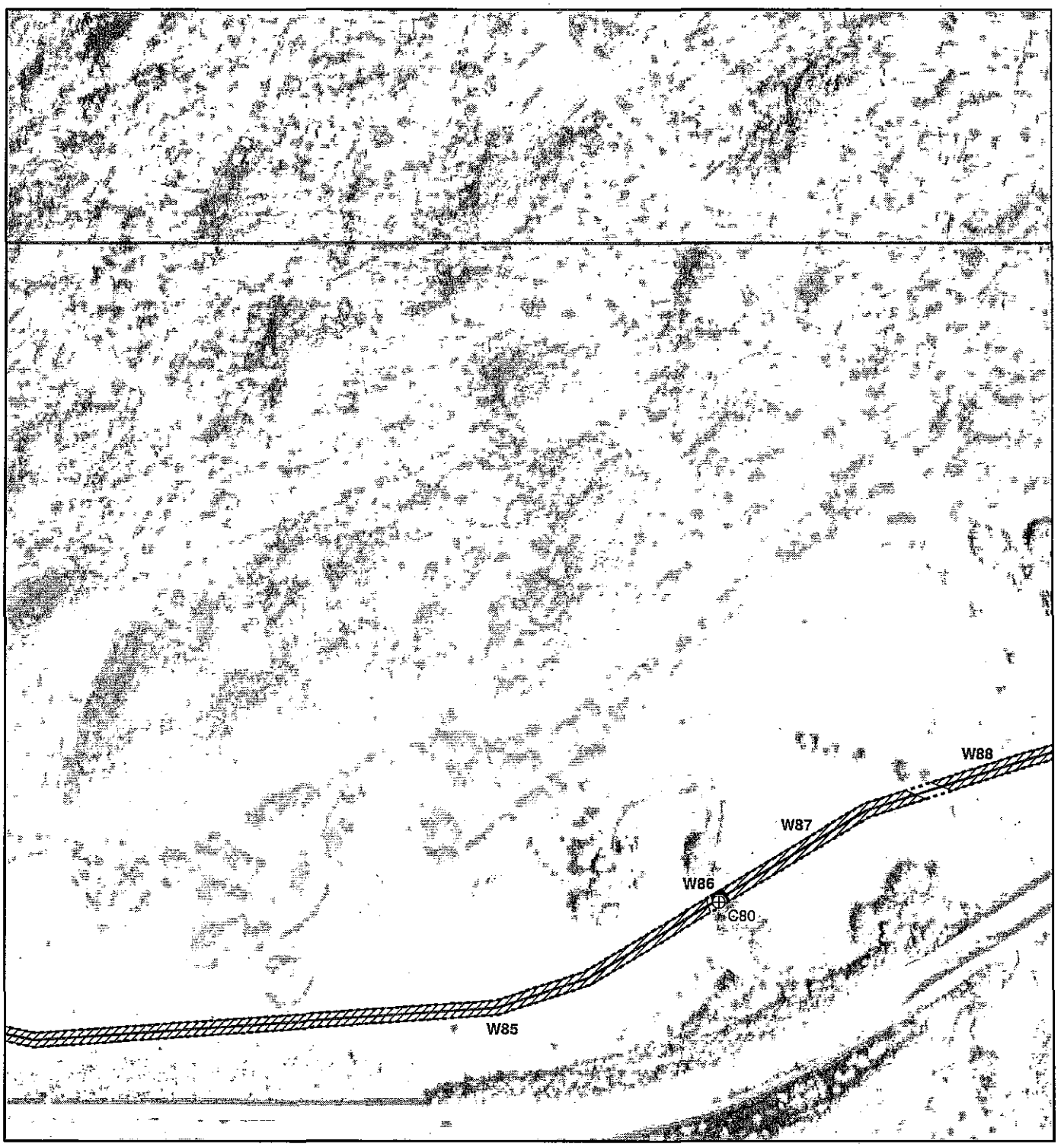


Map 70

Crossing
Meter Station
Canal
Estuarine Forested
Estuarine Saltflat Mangrove
Mangrove Canal
Palustrine Forested
Palustrine Herb
Palustrine Man Herb

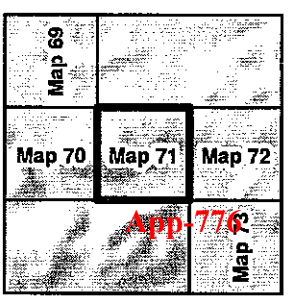


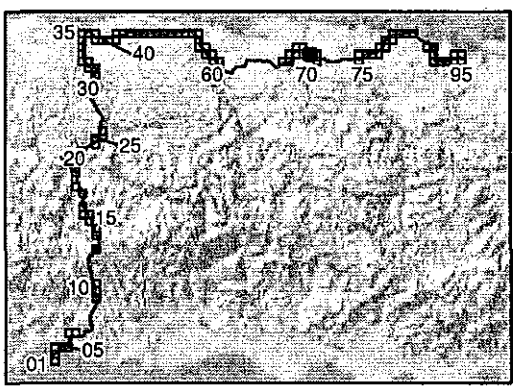


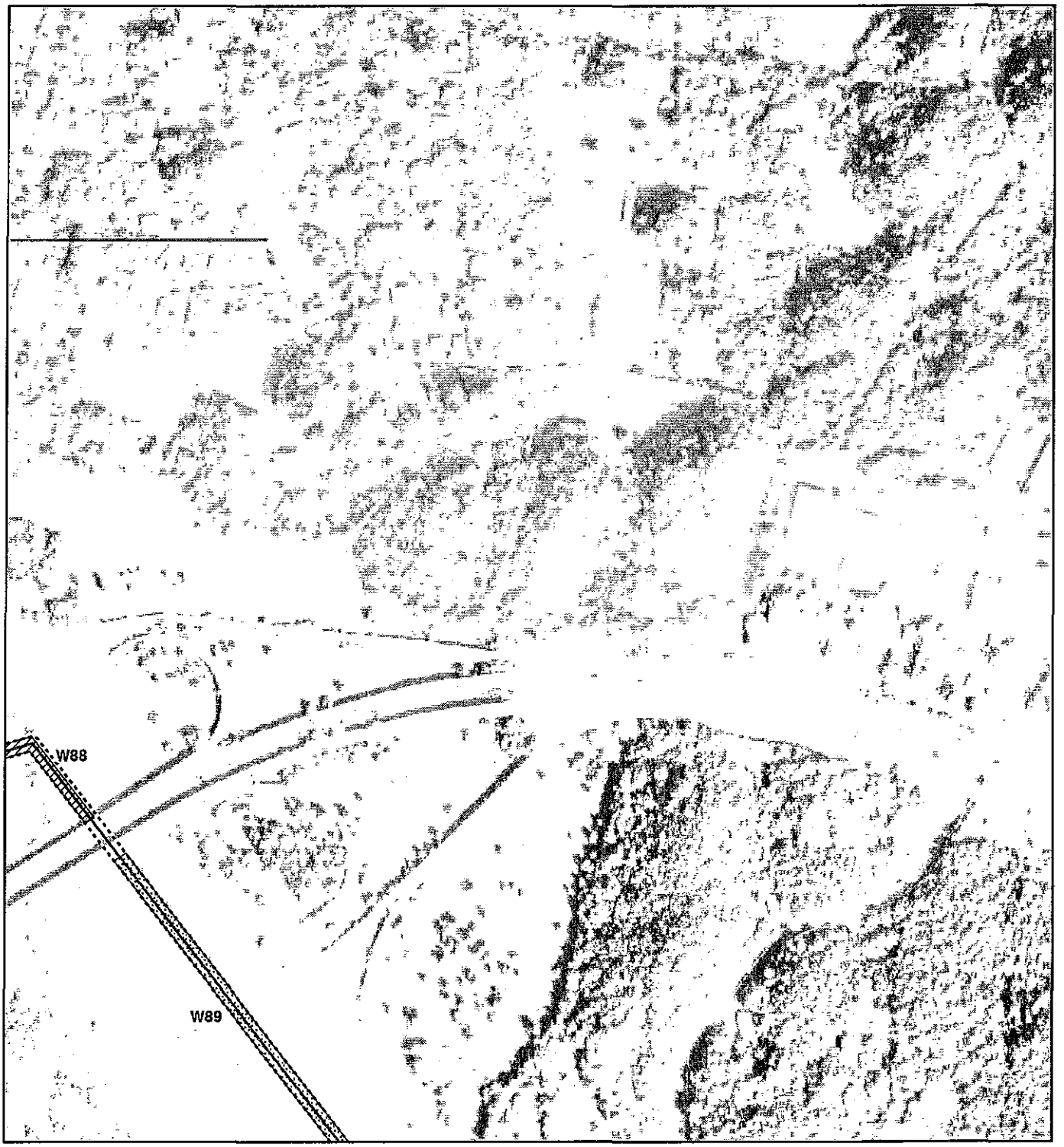


Map 71

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

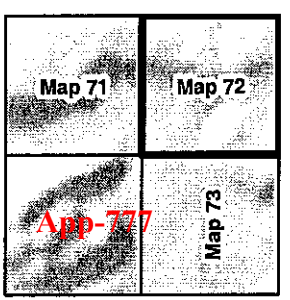


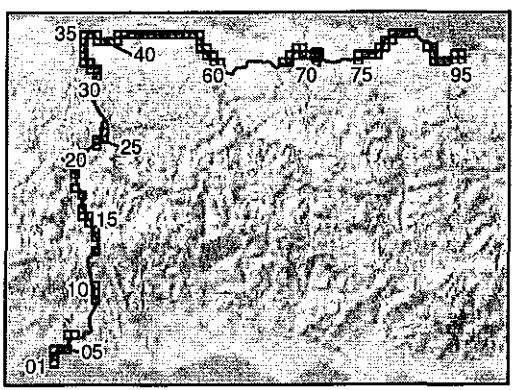




Map 72

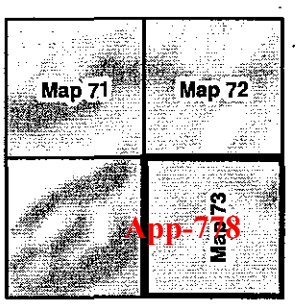
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

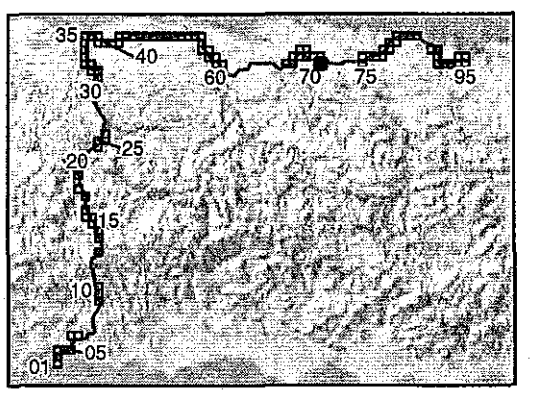


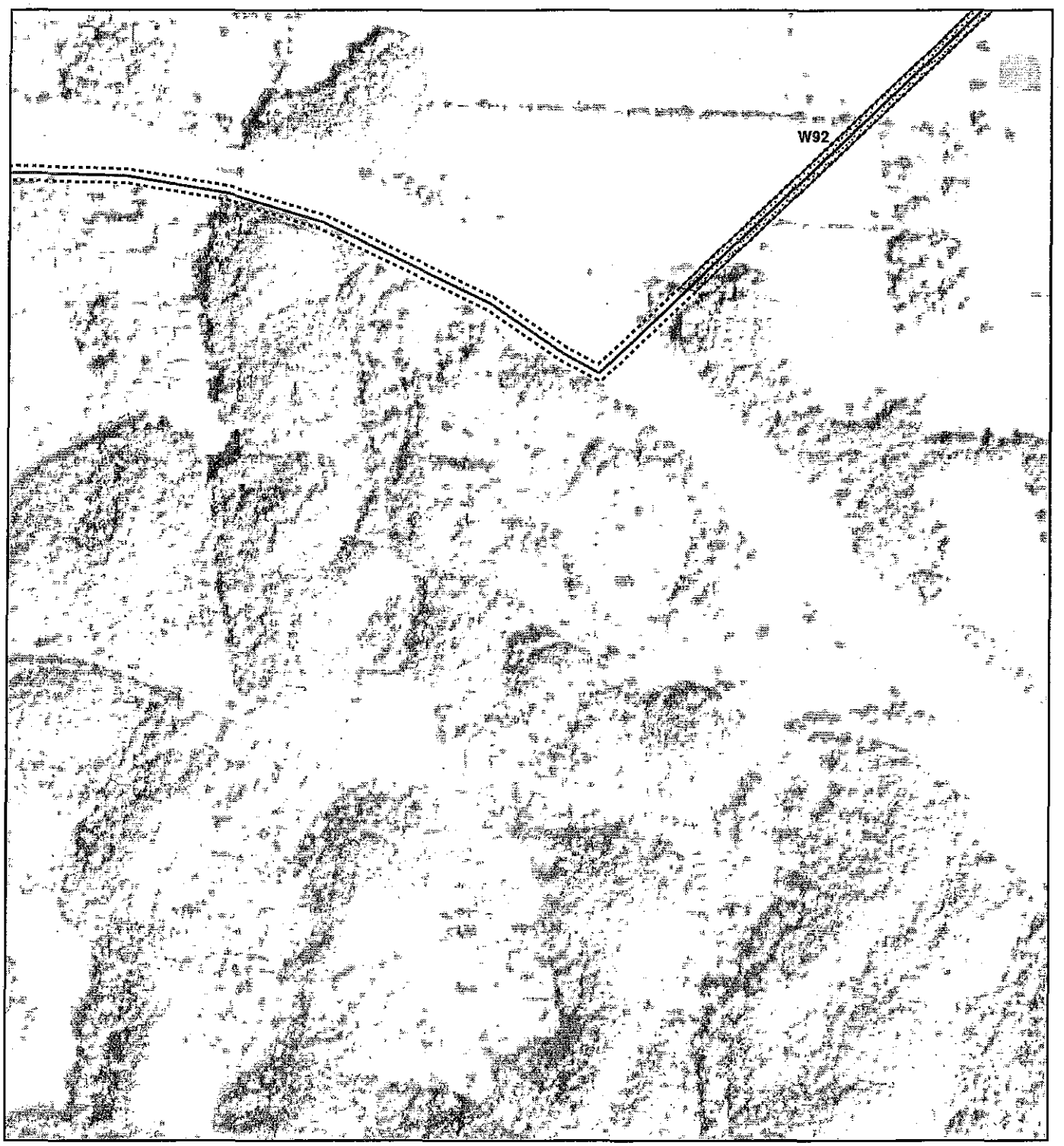


Map 73

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

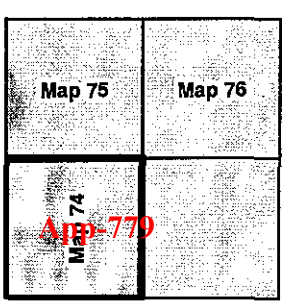


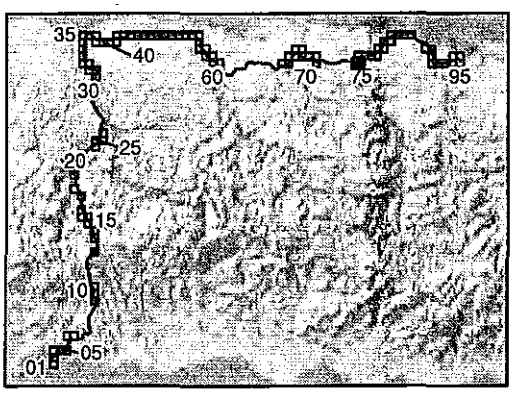




Map 74

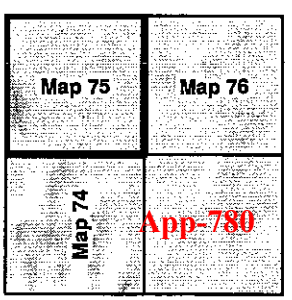
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

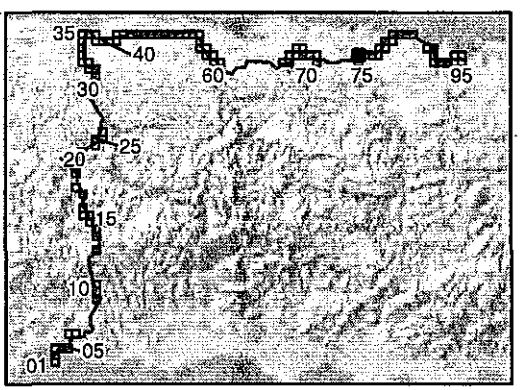




Map 75

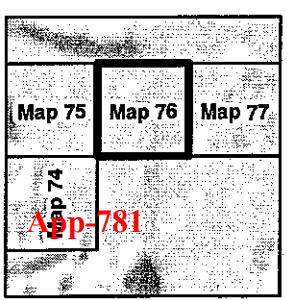
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

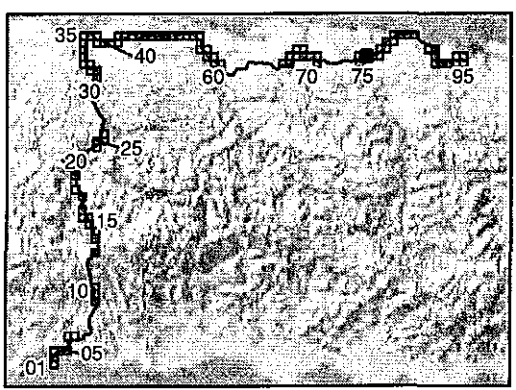


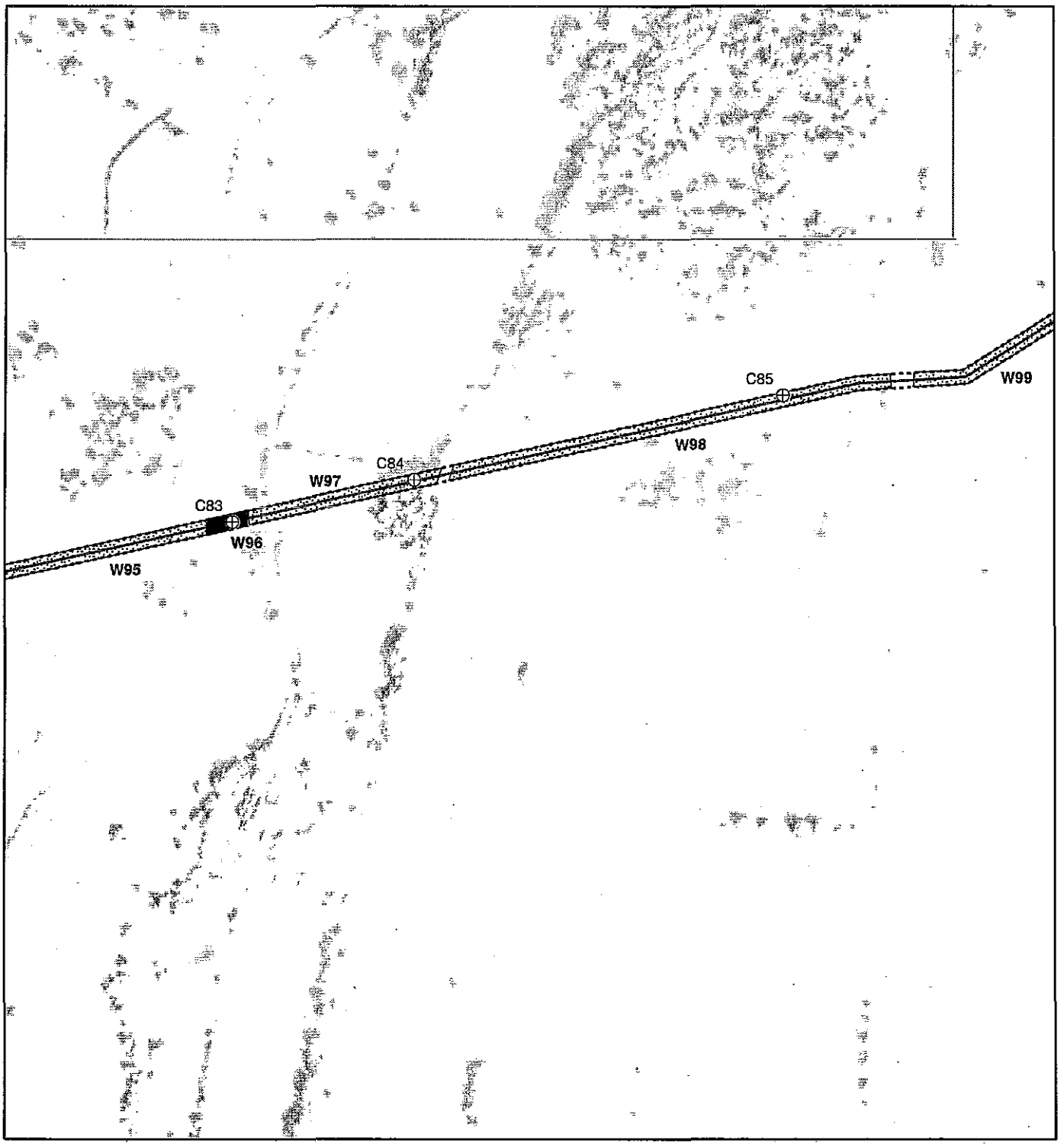


Map 76

- ⊕ Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

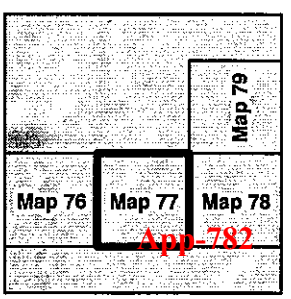


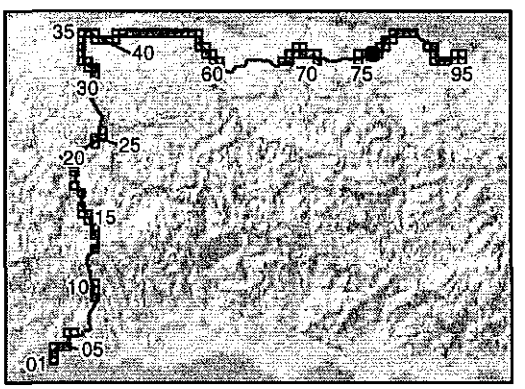




Map 77

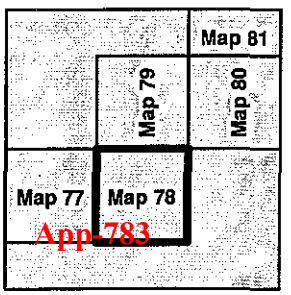
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

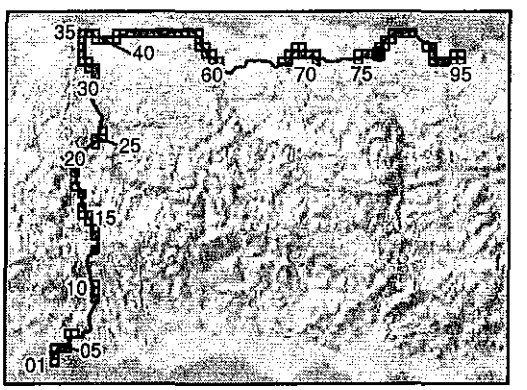


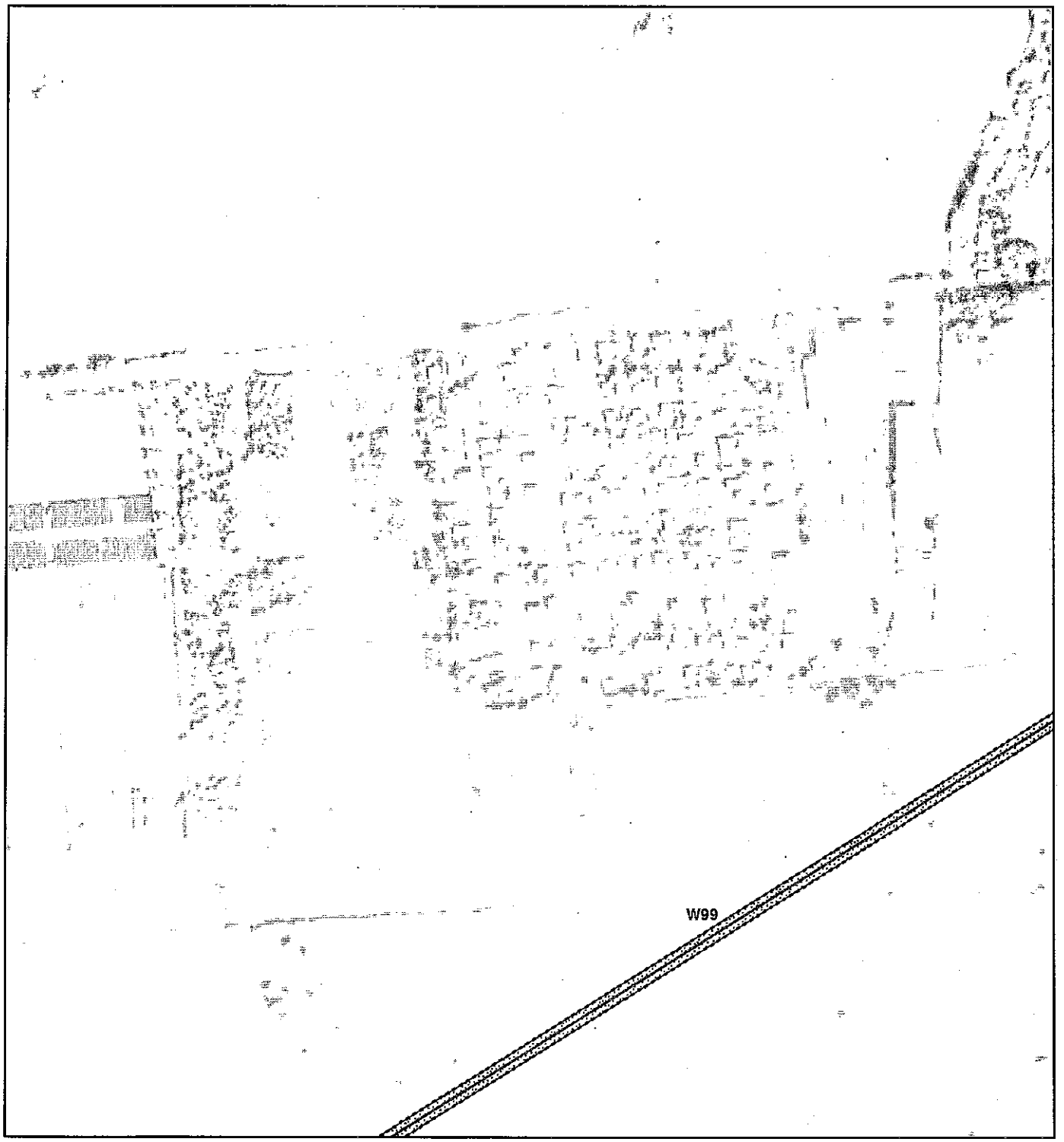


Map 78

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

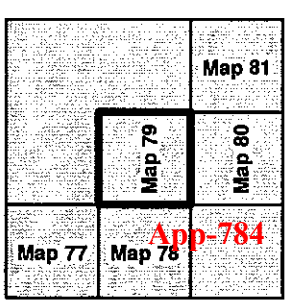


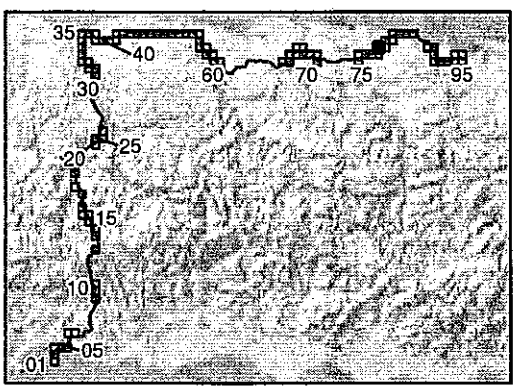




Map 79

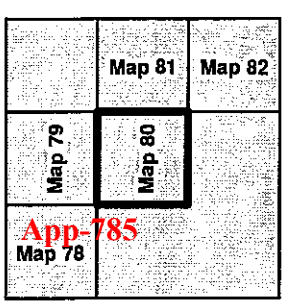
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

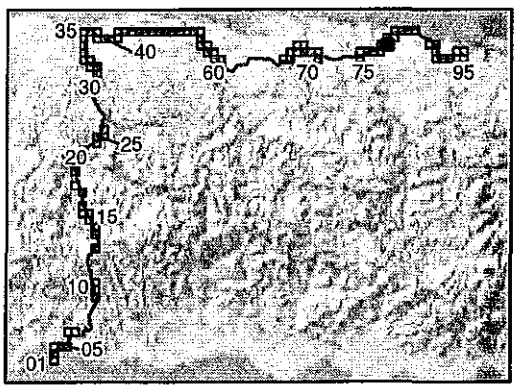




Map 80

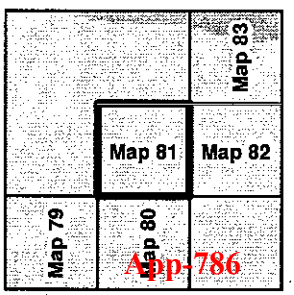
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

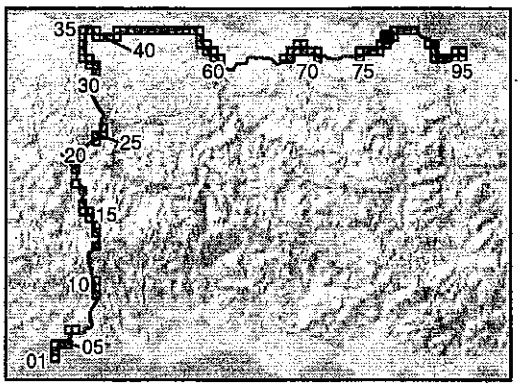


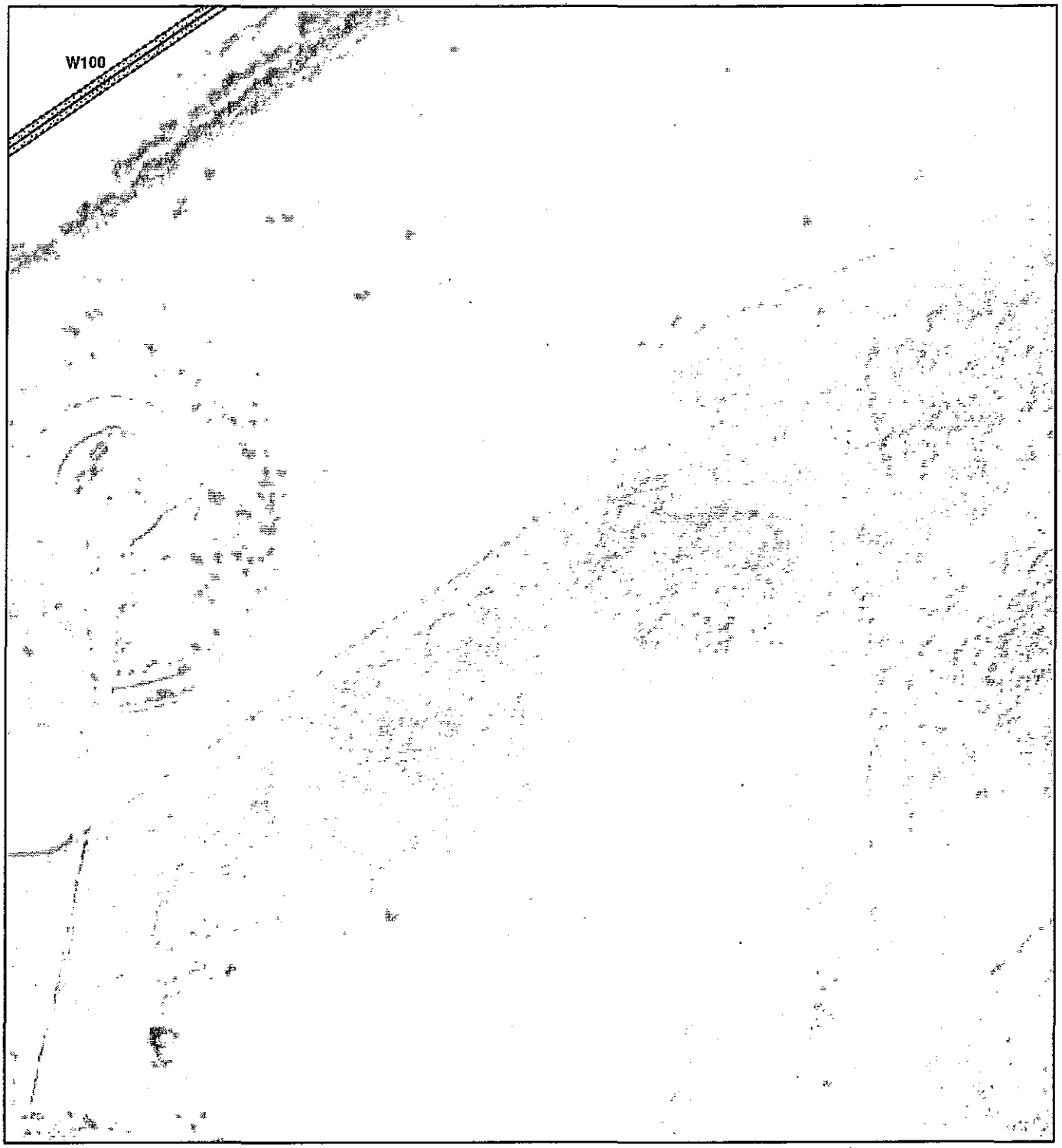


Map 81

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

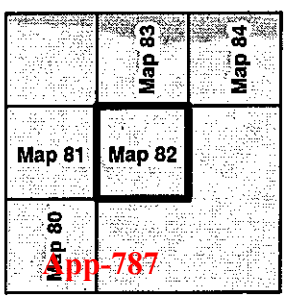


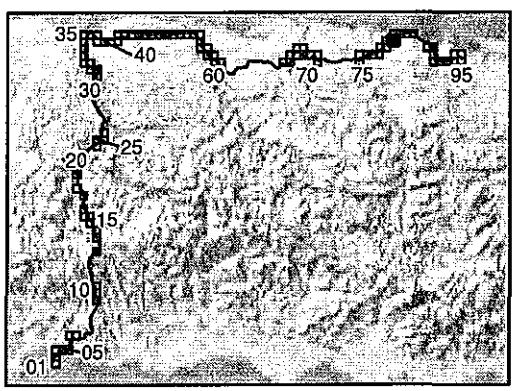


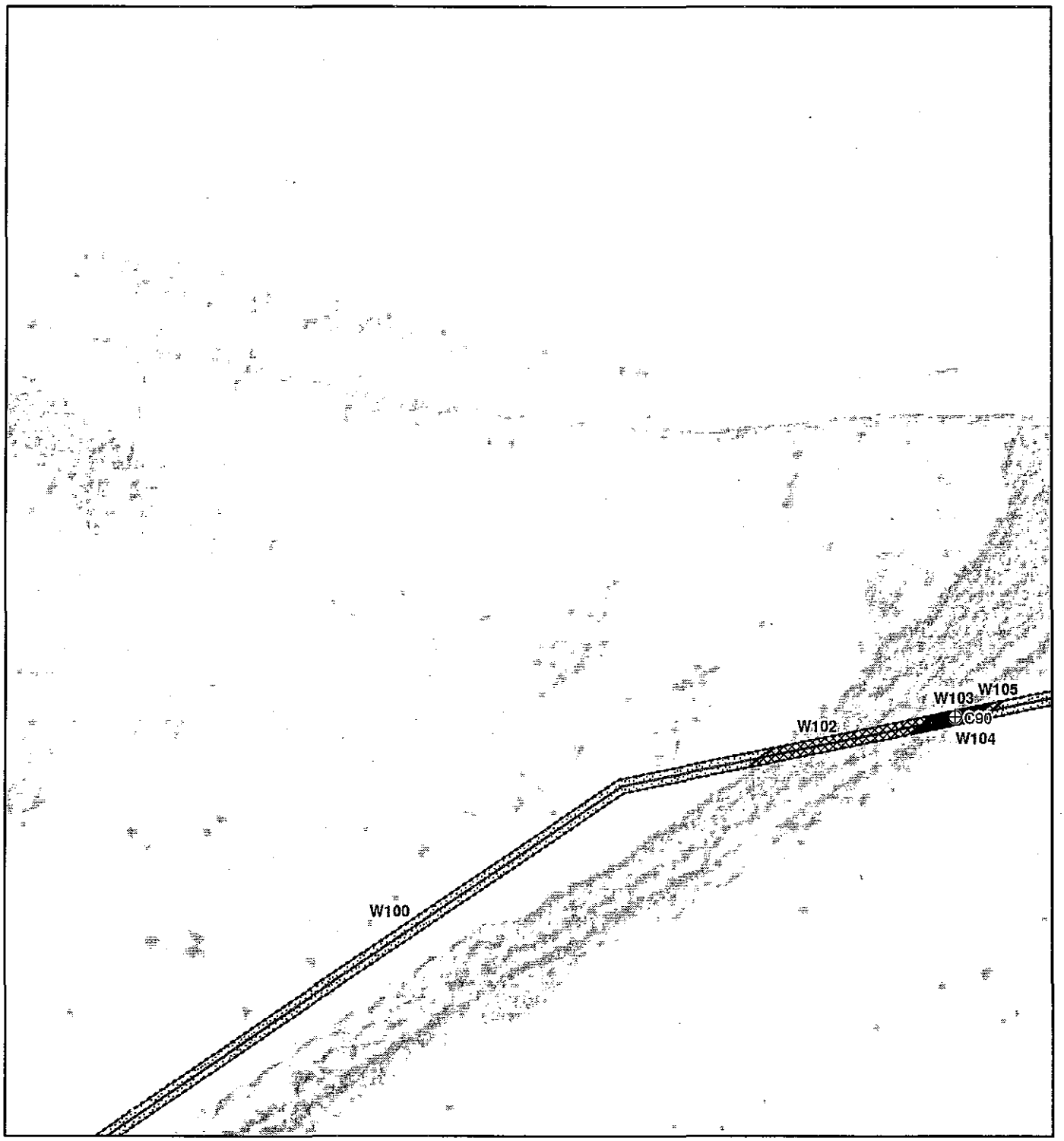


Map 82

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

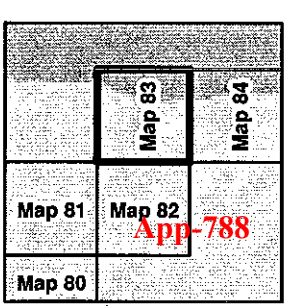


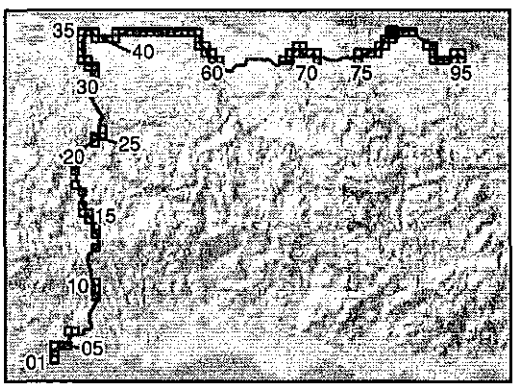


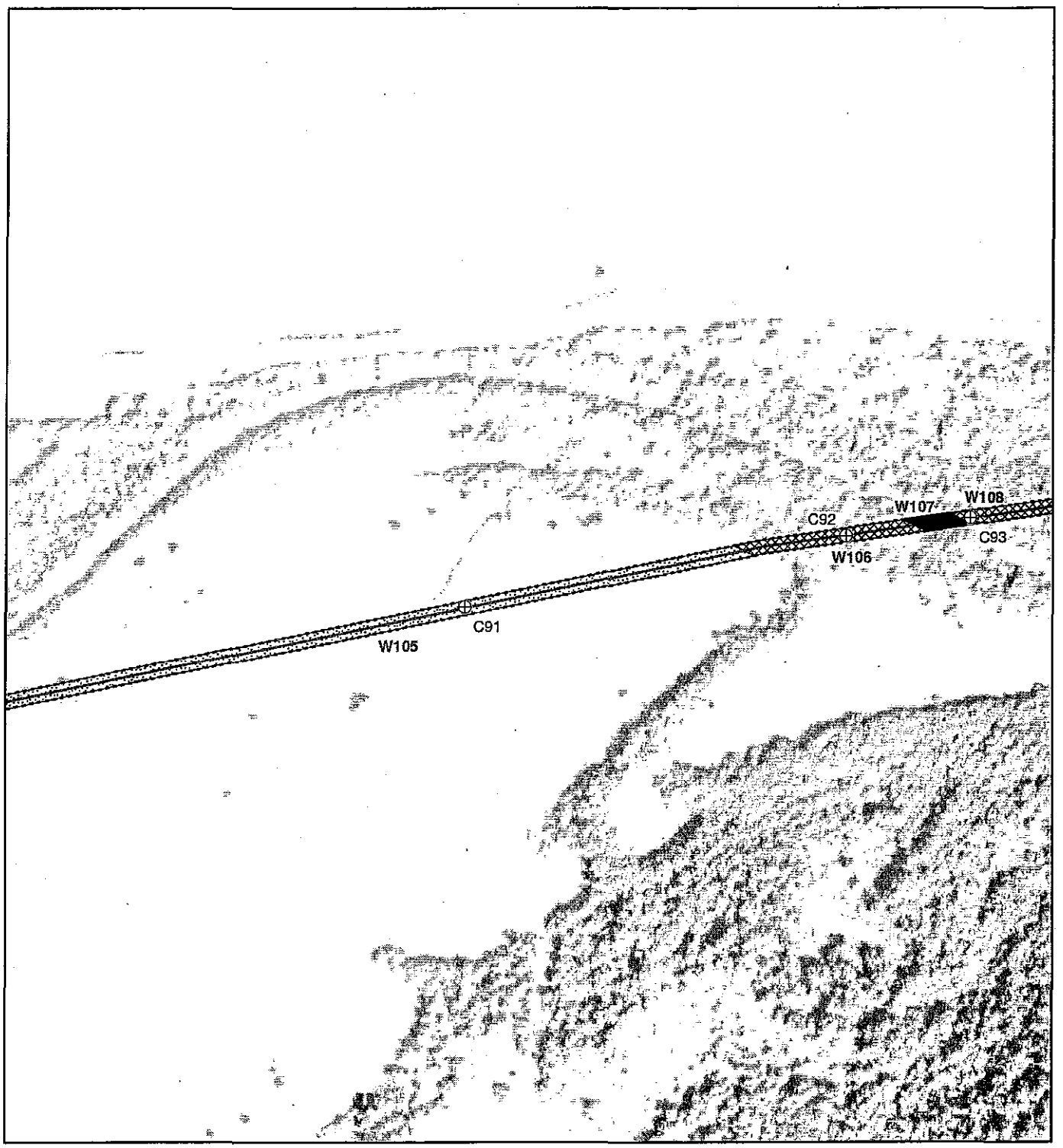


Map 83

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

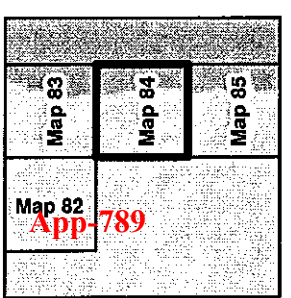


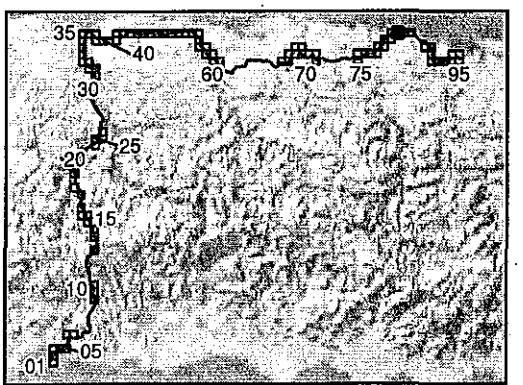


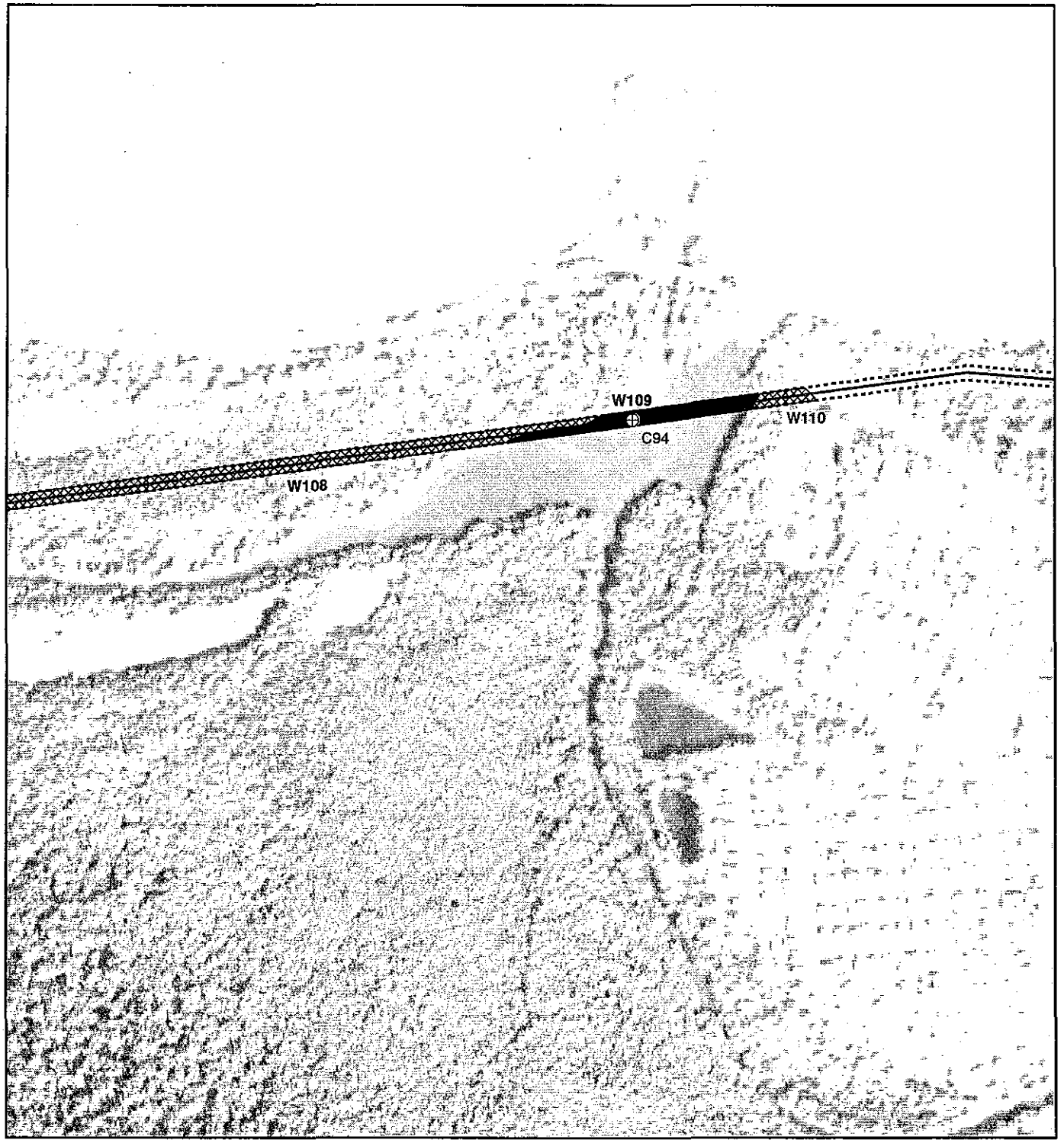


Map 84

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

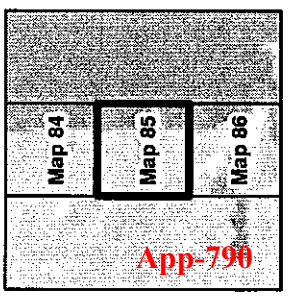


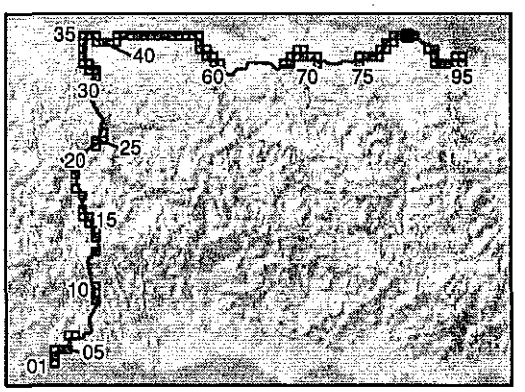


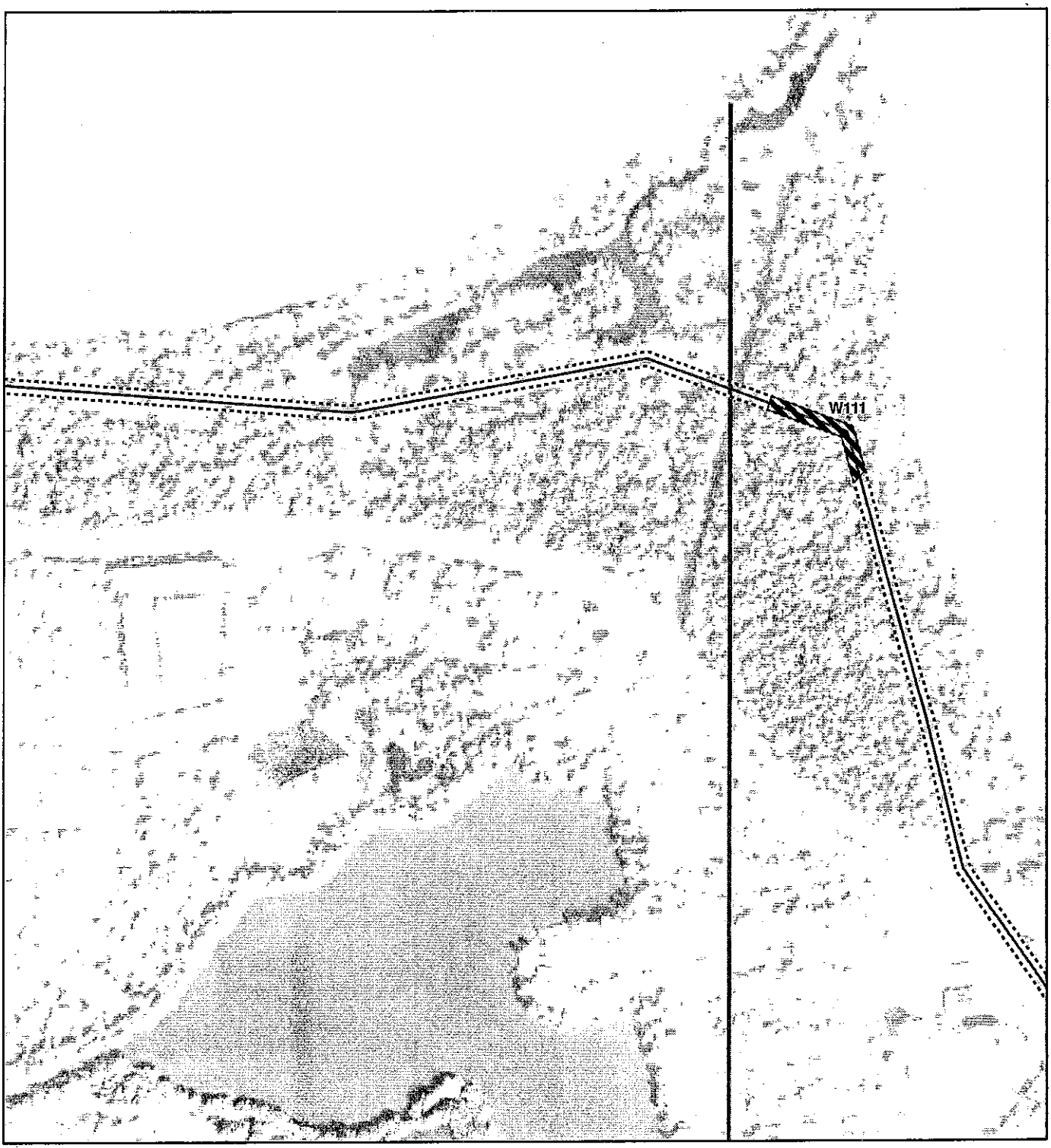


Map 85

- ⊕ Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

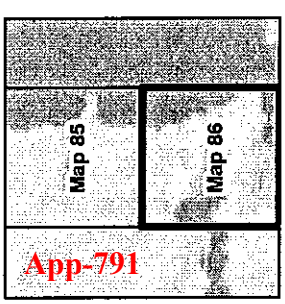


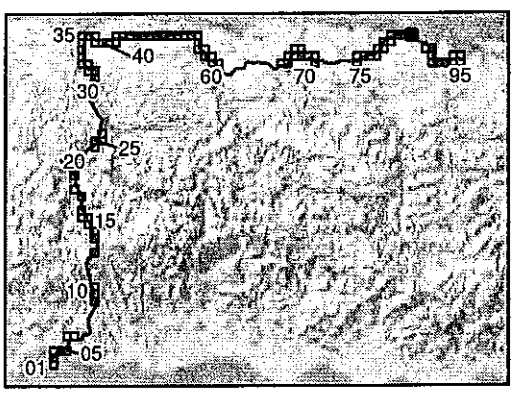




Map 86

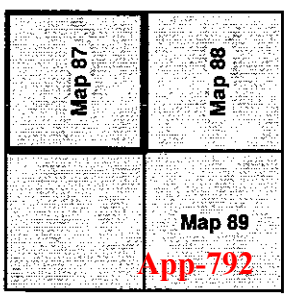
- ⊕ Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

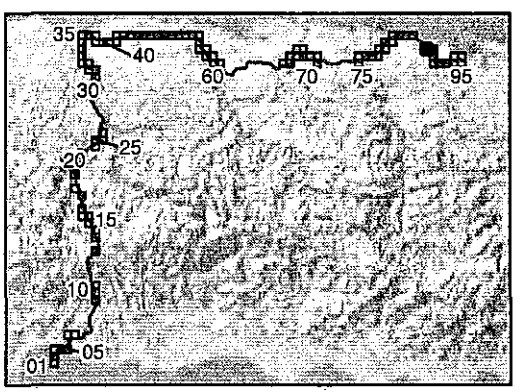




Map 87

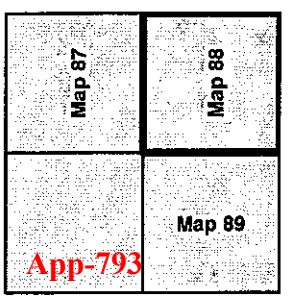
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

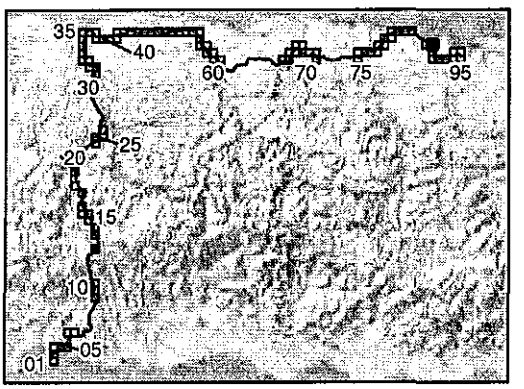




Map 88

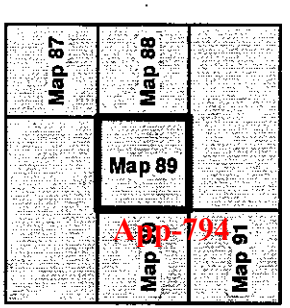
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

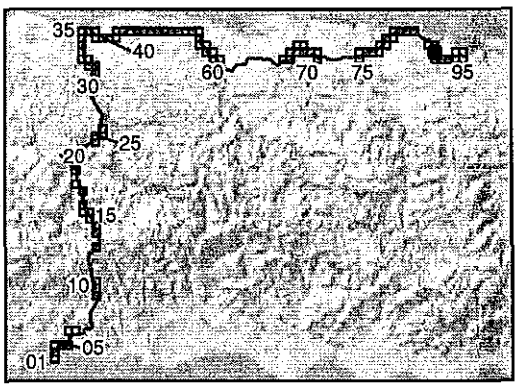




Map 89

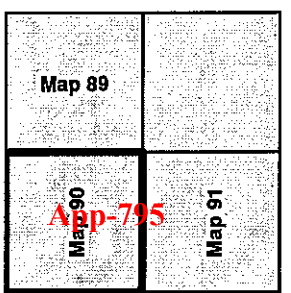
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

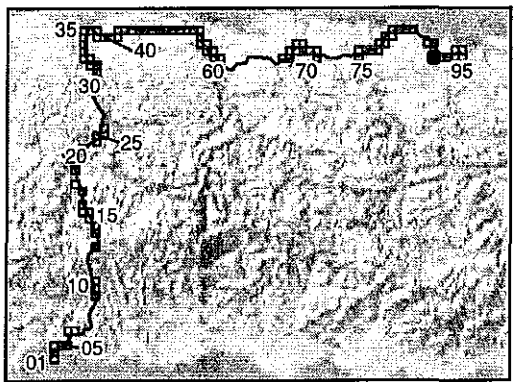


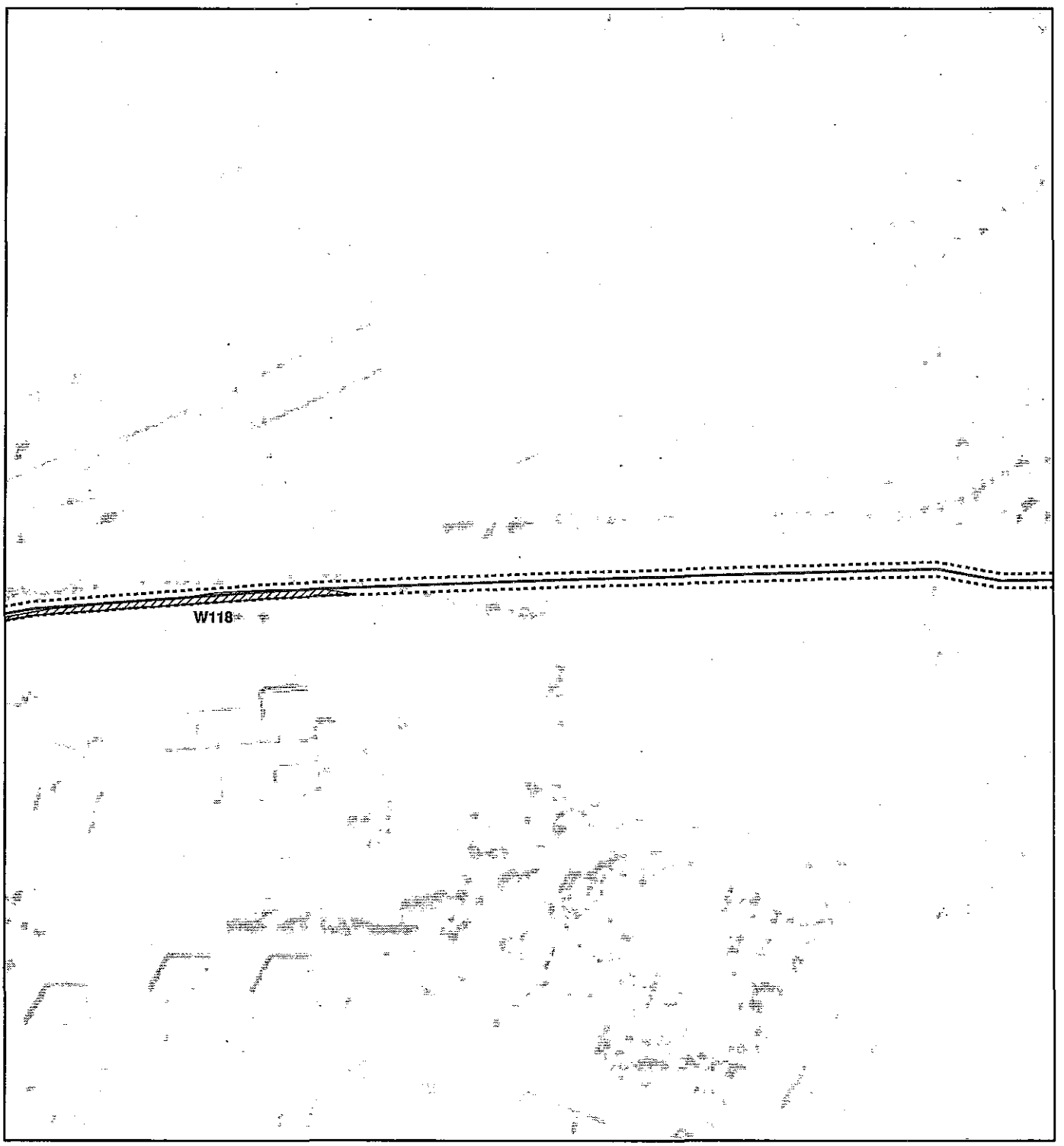


Map 90

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

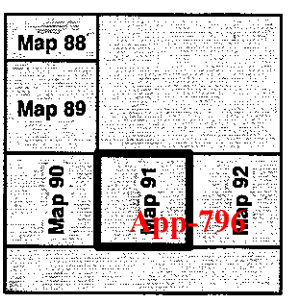


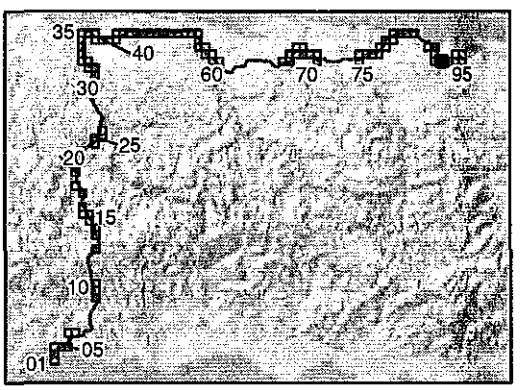




Map 91

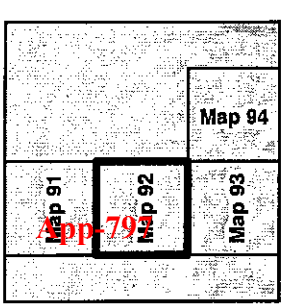
- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

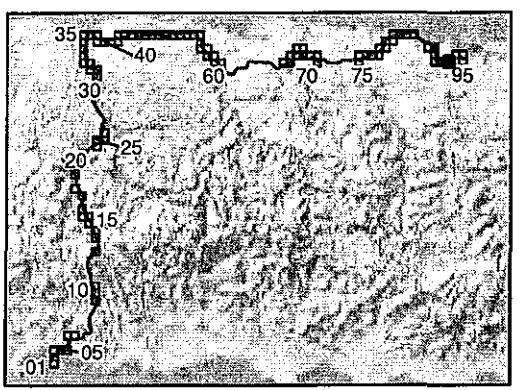


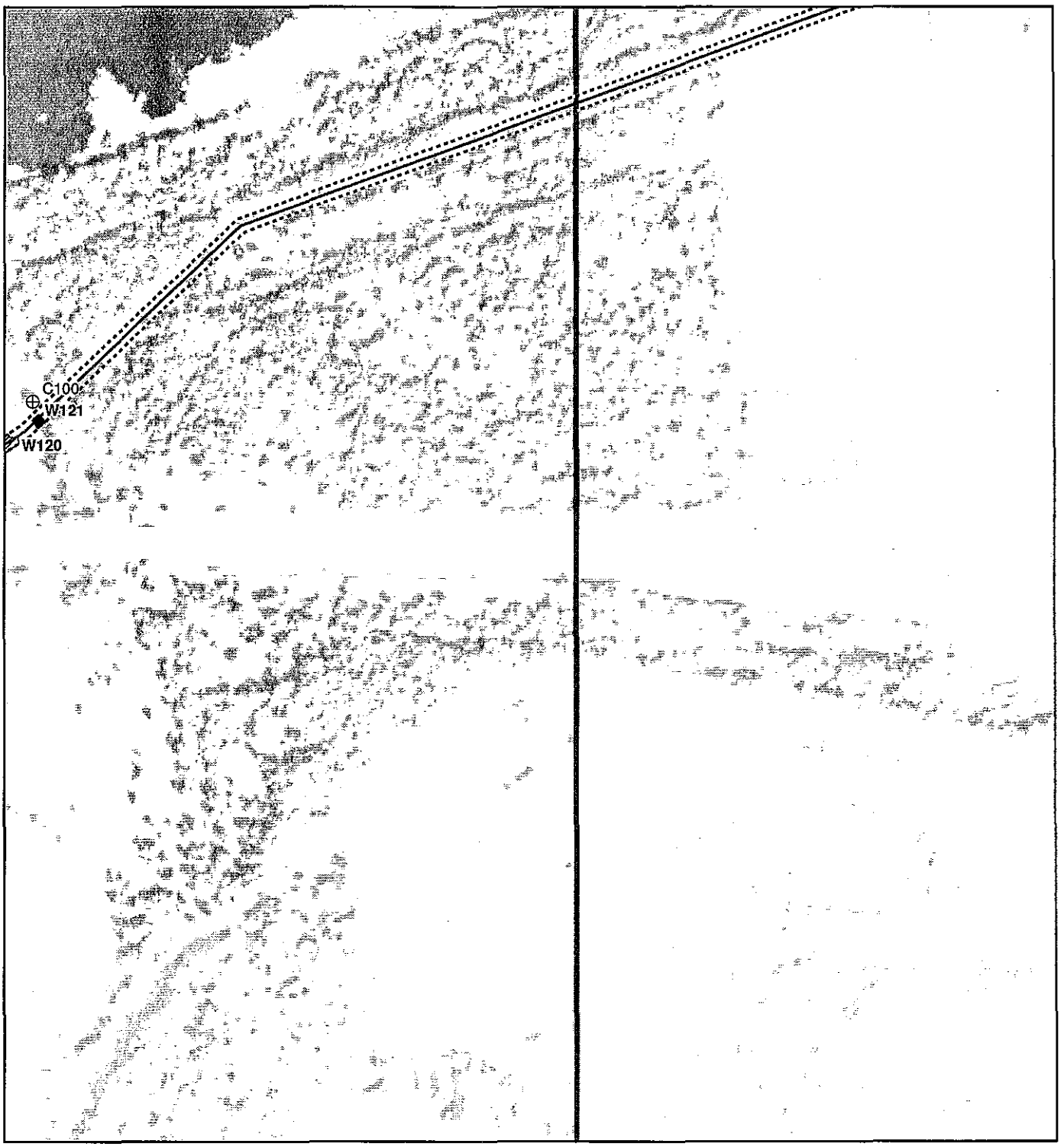


Map 92

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

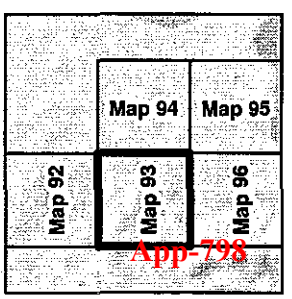


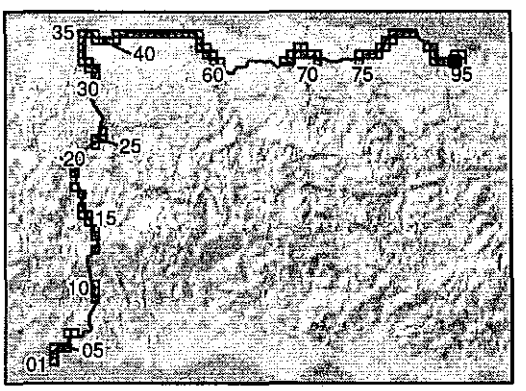


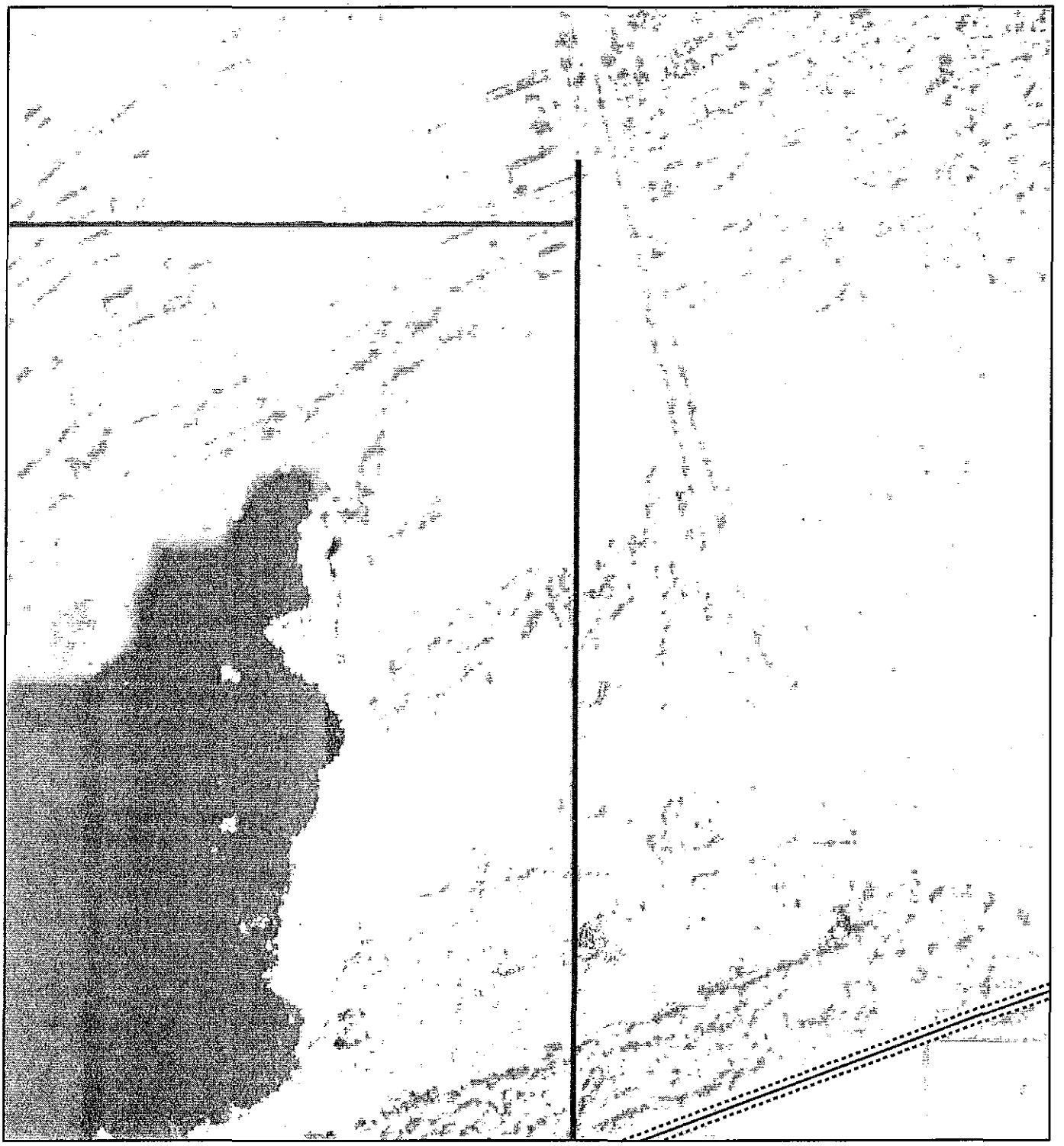


Map 93

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

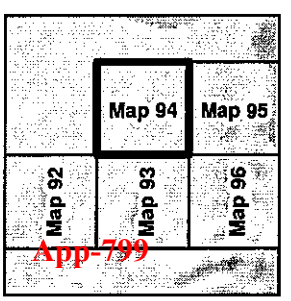


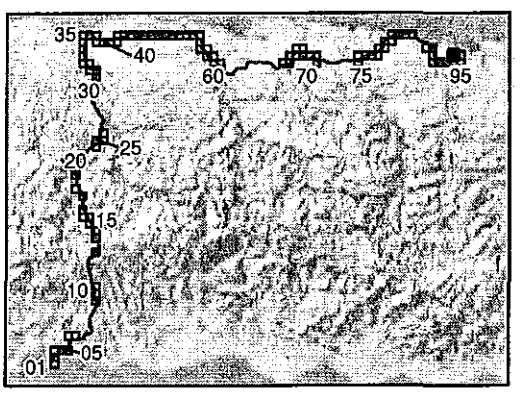


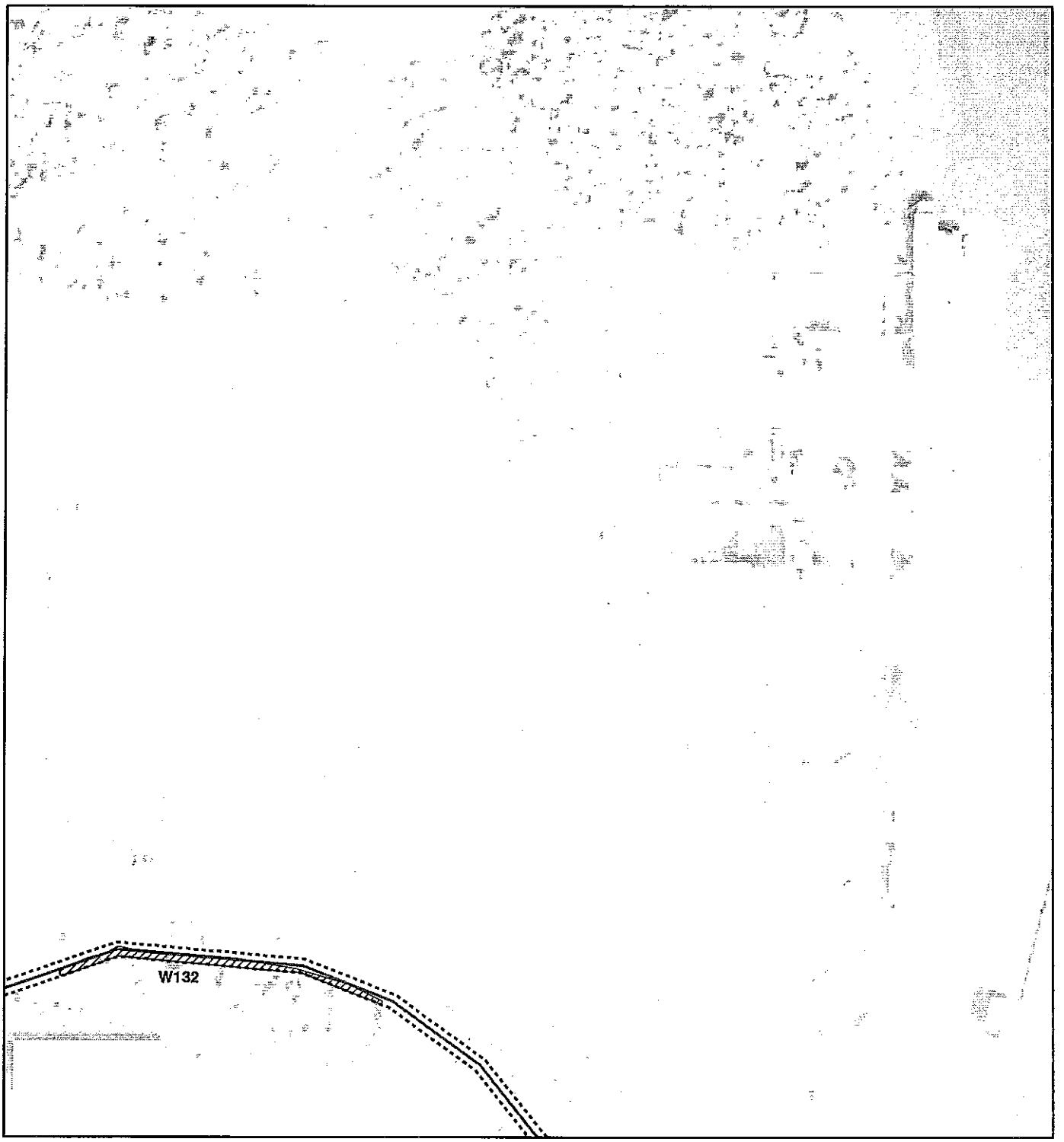


Map 94

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

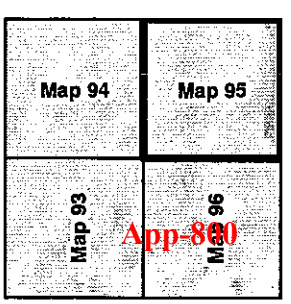


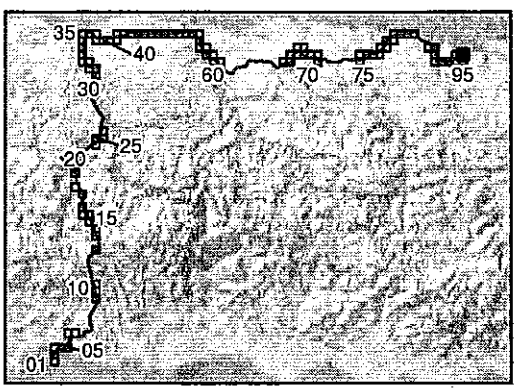


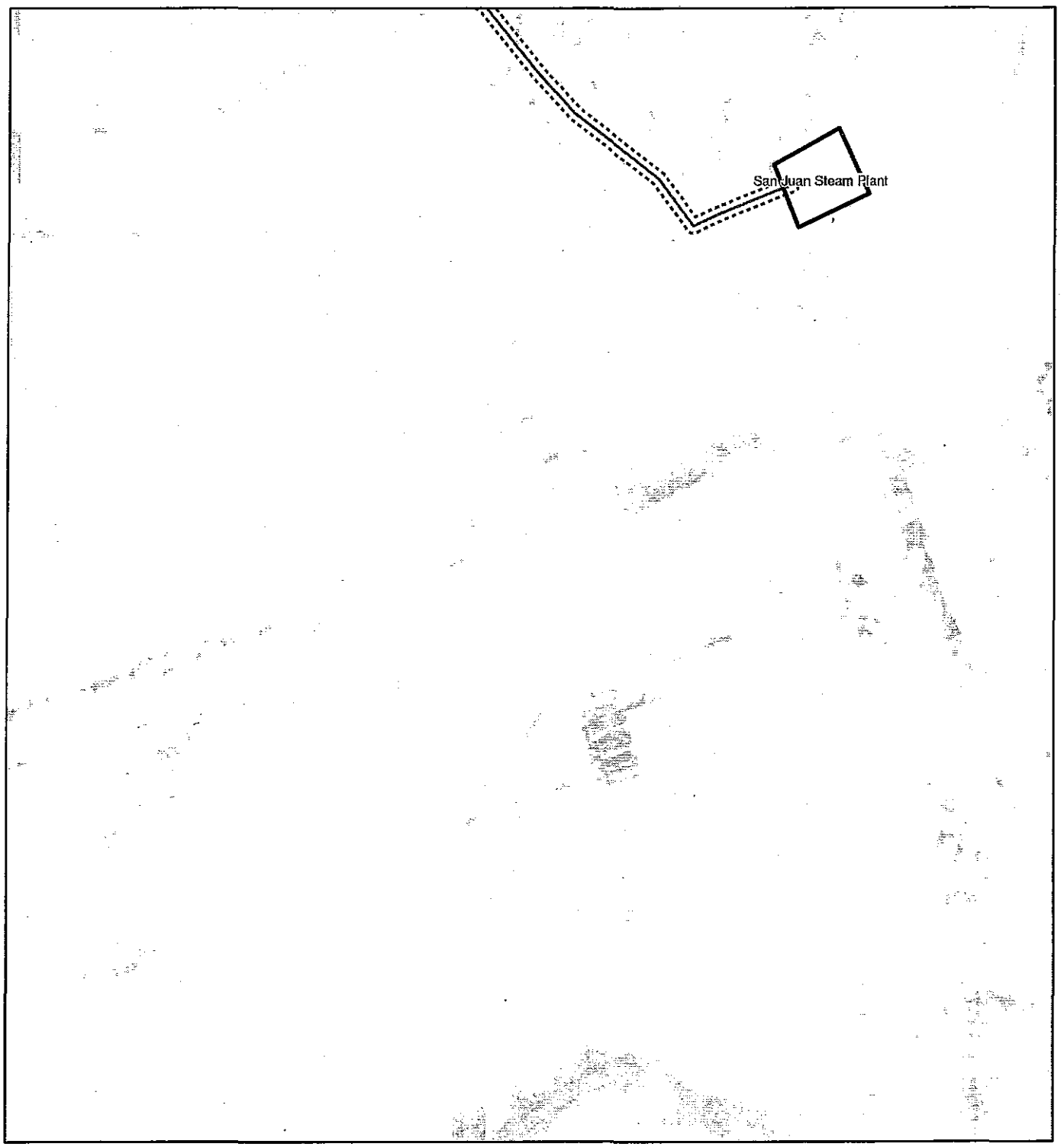


Map 95

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb

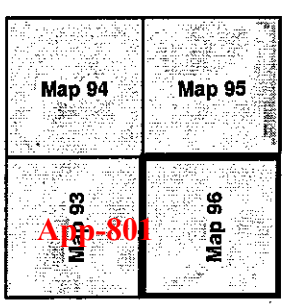


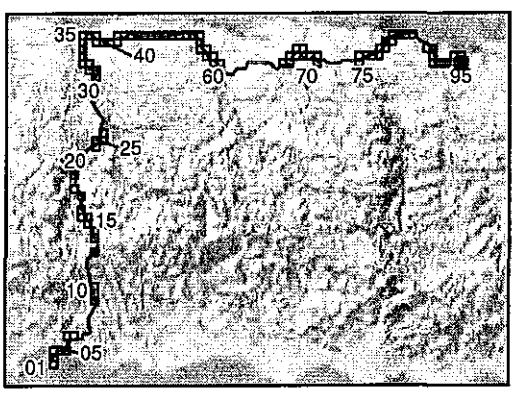




Map 96

- Crossing
- Meter Station
- Canal
- Estuarine Forested
- Estuarine Saltflat Mangrove
- Mangrove Canal
- Palustrine Forested
- Palustrine Herb
- Palustrine Man Herb





Via Verde NG Pipeline Project

Biological Evaluation

Puerto Rico Electric Power Authority

August 2010

Table of Contents

List of Tables

1 Introduction

The purpose of this Biological Evaluation (BE) is to evaluate the effects of the construction of a 24-inch diameter steel natural gas (NG) pipeline proposed to run from the EcoEléctrica LNG Terminal in Peñuelas north to the Cambalache Termoeléctricas Authority Central electric power plant (PES) in Arecibo, then east to the Palo Seco and San Juan power plants. The approximately 92 mile pipeline will be embedded (buried) for its entire length and will pass through the municipalities of Peñuelas Adjuntas, Utuado, Arecibo, Barceloneta, Manati, Vega Alta, Vega Baja, Dorado, Toa Baja, Cataño, Bayamón, and Guaynabo.

Principal resources used to develop this report included:

The 2007 Puerto Rico GAP Final Report
Gould, W., et al. 2007. Puerto Rico Gap Analysis Project – Final Report. USGS, Moscow, ID and the USDA Forest Service International Institute of Tropical Forestry, Río Piedras, PR. 159pp. plus appendices.

U.S. Fish and Wildlife Service. 2000. Endangered Species List (Puerto Rico/Virgin Islands)
U.S. Fish and Wildlife Service. 2000. Endangered Species List (Puerto Rico/Virgin Islands). Division of Endangered Species. U.S. Fish and Wildlife Service. 2007. Caribbean Endangered Species Map. Ecological Services in the Caribbean.

Environmental Sensitivity Index: Puerto Rico
Interactive Map Atlas and Associated Data

Coll Environmental, *Wetlands and U.S. Waters Jurisdictional Determination Study – Via Verde Pipeline Project, Puerto Rico* (Wetland JD report), August 2010. A copy of this report has been included in the PREPA, Via Verde Project, Declaraciòn de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

Coll Environmental, *Estudio Descriptivo de Flora Y Fauna – Via Verde Pipeline Project, Puerto Rico* (Flora and Fauna report), August 2010. A copy of this report has been included in the PREPA, Via Verde Project, Declaraciòn de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

PREPA - Via Verde Project, *Declaraciòn de Impacto Ambientales (DIA)*, August 2010. A copy of this report has been included in Appendix D of the USACE Joint Permit Application.

This BE has been prepared to assist in consultations with the U. S. Fish and Wildlife Service (USFWS) with respect to Section 7 of the Endangered Species Act (ESA) and has been developed to accompany a Department of the Army (DA)/ Puerto Rico USACE Joint Permit Application prepared for the proposed Via Verde Pipeline project. This document has been prepared to:

- clarify whether and what listed, proposed, and candidate species or designated or proposed critical habitats may be in the action area;
- determine what effect the action may have on these species or critical habitats;
- explain the ways the project has been modified to reduce or remove adverse effects to the species or critical habitats;
- determine the need to enter into consultation for listed species or designated critical habitats, or conference for proposed species or proposed critical habitats; and
- explore the design or modification of an action to benefit the species.

A total of 36 federally listed plant and animal species (22 plants and 14 animals) have been identified as potentially occurring within the project limits. Species list presented includes all individual species that are known to exist or have the potential to occur in the pipeline corridor as identified by the USFWS. The lists of protected plants and animals for each municipality were used as a baseline. Subsequent review of the pipeline corridor route by the USFWS in June of 2010 further refined the target species for on-site field reconnaissance. A copy of the letter developed by the USFWS (dated June 30, 2010) has been included as Appendix 3 in this document. Table 15 presents those species considered by this Biological Evaluation. Two of these species have been confirmed within the project area. Under Section 7 of the ESA, a federal action requires consultation with the USFWS to ensure the action does not jeopardize the existence of any federally listed species.

2 Description of Proposed Action

Installation of the approximately 92 mile pipeline will require an initial construction right-of-way (ROW) approximately 100 feet wide and a permanent maintained post-construction ROW of 50 feet post construction. The total project area encompasses 1,113.8 acres (92 miles X 100 foot ROW); 369.3 acres of which are Waters of the United States.

The project will not result in any permanent wetland impacts since all disturbed wetlands will be restored to pre-construction grades, stabilized, and revegetated. The total temporary impact area has been limited 1.71 square miles. The project qualifies for review and verification through the United States Army Corps of Engineers (USACE) Nationwide Permits.

Field studies for the upland flora and fauna of the pipeline corridor were carried out between the months of May to July 2010. The studies were conducted to determine the limits of the ground vegetation, its cover, and habitat potential; and to assess the presence of the species protected by the United States Fish and Wildlife Service and the Commonwealth of Puerto Rico.

This study of flora and fauna was carried out using representative transects and methods adapted to the characteristics and conditions of the study area. A total of 13 project corridor segments were field canvassed and 46 additional Gentry transects were analyzed as part of this field study. Segments varied from 0.76 to 10.5 miles long, for a total of 44.35 miles. Gentry transects varied from 50 to 300 meters (165 to 990 feet), for a total of 2,350 meters (1.41 miles). A copy of the Coll Environmental Flora and Fauna Study – Via Verde Pipeline Project, Puerto Rico, can be found in the PREPA, Via Verde Project, Declaraciòn de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

section of the USACE Joint Permit Application.

In addition to the upland surveys, the extent of wetlands and waters jurisdictional to the United States Army Corps of Engineers (USACE) for the project was determined by Jorge Coll (Coll Environmental). The methodology employed for this study followed the 1987 Corps of Engineers Wetland Delineation Manual, and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region (the Caribbean supplement).

The field work necessary for this JD was performed concurrent with the upland surveys, May to July 2010. The limits of the study area extended 100 feet to each side of the centerline of the preferred pipeline route. A copy of the Coll Environmental Wetlands and U.S. Waters Jurisdictional Determination Study – Via Verde Pipeline Project, Puerto Rico (Wetland JD report) can be found in the PREPA, Via Verde Project, Declaraciòn de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application).

2.1 Existing Conditions

The topography of the project corridor varies from flat to semi-level along the north segment (Mile Marker 40 to Mile Marker 92) to mostly steep in the southern segment (MM 4 to MM 40) that crosses the central range from Arecibo to Peñuelas. The project area includes four of the six life zones identified in Puerto Rico (Ewel and Whitmore, 1973). These life zones include: the subtropical dry forest, subtropical wet forest, lower Montane rain forest, and Subtropical Moist

Forest. Location data and relative coverage of each zone within the project corridor are included in the table below.

Table 1: Project Life Zones

Project Life Zones				
Zone Type	Location, MM	Length, miles	Total Area, acres	% Project Area
Subtropical Dry Forest	0 – 5.25	5.25	63.50	5.80
Subtropical Wet Forest	12.25 – 13.5, 15 - 25	11.25	147.53	13.48
Subtropical Montane Wet Forest	13.5 – 15.0	1.50	10.59	0.97
Subtropical Moist Forest	5.25 – 12.25, 25 – 92	72.30	872.51	79.74

Detailed descriptions of existing conditions have been presented in the:

Coll Environmental *Wetlands and U.S. Waters Jurisdictional Determination Study – Via Verde Pipeline Project* and *Estudio Descriptivo de Flora Y Fauna – Via Verde Pipeline Project* reports and the PREPA - Via Verde Project, *Declaraciòn de Impacto Ambientales* .

Copies of these reports have been included in the PREPA, Via Verde Project, Declaraciòn de Impacto Ambientales. (Appendix D of the USACE Joint Permit Application)

The majority of the species found during this survey are typical of those associated with disturbed communities that have been modified for anthropogenic purposes. The project path includes and exhibits a variety of land uses. Some of the land uses are still active, while other historic uses are recognized by their marks left on the landscape. Examples of current uses include: cattle grazing in varied intensities, sugar cane plantations, shade and sun grown coffee plantations, pineapple plantations, rice fields, and fallow agricultural lands.

While many of the species found during this survey are typical to habitats modified by anthropogenic means, there are species in some areas of the project showing ecological succession towards a more mature state. These trees are typical of secondary forest in Puerto Rico. The greatest diversity of trees was observed in the subtropical moist forest, which is present along both the north segment and part of the south section..

A composite list of protected, listed or endangered, species found within or likely to occur within the pipeline corridor route is found in Table 15. Descriptions and locations, when available, for Commonwealth parks and preserves associated with each municipality are presented and discussed below.

Table 2: Commonwealth Forests and Nature Preserves

PARKS AND RESERVES HABITAT SUMMARY ENTIRE VIA VERDA CORRIDOR ROUTE (MM 0.0 TO MM 90.3)				
Municipality	Mile Marker	Map Number	Park/Reserve Name	Comments
Peneulas, Adjuntas	13.75 to 16.3	1	No habitat identified	2 occurrences, verify species status
Utuado	22.35 to 55	2	No critical habitat identified	See Hengstenberg report for Focal Area 1
Utuado, Arecibo	29.1 to 30.05	3	Bosque Estatal deRio Abjo	corridor route follows transportation ROW of PR 10 for entire length
Arecibo	31.1 to 32.5	4	Bosque Estatal deRio Abjo	Check Hengstenberg data for Focal Area 2
Arecibo	45.4 to 45.7	5	Reserva Cano Tiburones	check Coll data for % cover TE,flora/fauna
Arecibo	47.2 to 48.7	6	Reserva Cano Tiburones	outside of ROW
Arecibo	49.0 to 49.7	7	Reserva Cano Tiburones	check Coll data for % cover TE,flora/fauna
Barceloneta	53.2 to 54.2	8	Reserva Natural Hacienda la Esperanza	corridor route traverses disturbed agricultural lands, temp herbaceous impacts
Vega Baja, Vega Alta	70.6 to 71.5	9	Bosque Estatal de Vega	Check Hengstenberg data for Focal Area 2
Vega Alta	72.4 to 73.6	10	No critical habitat identified	Check Hengstenberg data for Focal Area 2
Dorado, Toa Baja	80.4 to 81.8	11	No critical habitat identified	Horizontal directional drill, no surface impacts
Notes:				
Mile Marker - Via Verde Pipeline, begin Penuelas MM 0.0 to end Guayanabo MM 92				
Map Number - BCPeabody Critical Habitats and Wildlife Elements August 27, 2010				
Critical Habitat Name - Local, Commonwealth, Federal Protection Areas identified				

2.1.1 Peñuelas

Within the municipality of Peñuelas, the proposed Via Verde project corridor will run from mile 0 to approximately mile 14.5. Within this municipality, the proposed project corridor does not pass through any reserves or protected areas. The areas adjacent to the project corridor are a mix of industrial/developed areas and native shrubby vegetation commonly found along the southern coast of Puerto Rico.

Peñuelas is located within the Subtropical Dry Forest and the Subtropical Moist Forest life zones (Ewel and Whitmore, 1973). The USFWS identified the following federally threatened or endangered species as likely to occur in the Subtropical Dry Forest life zone: Palo de rosa (*Ottoschulzia rhodoxylon*), Bariaco (*Trichilia triacantha*), Diablito de tres cuernos (*Buxus vahlii*), *Eugenia woodburyana, Catesbaea melanocarpa, Cordia rupicola, Mitracarpus maxwelliae, Mitracarpus polycladus,* Guabairo (*Caprimulgus noctitherus*). Table 3 (below) lists the federally threatened or endangered species identified on USFWS Caribbean Endangered Species Map within the municipality of Peñuelas.

Table 3: Protected Species- Peñuelas

Federal Protected Species- Caribbean List			
Scientific Name	**Common Name**	**Distribution**	**Species**
Accipiter striatus venator	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
Buxus vahlii	Val's Boxwood	Tallaboa Limestone Hills	Endangered
Caprimulgus noctitherus	Puerto Rican Nightjar	Coastal Forest	Endangered
Chelonia mydas	Green Sea Turtle	Coastal Zones	Threatened
Cyathea dryopteroides	Elfin Tree Fern	Monte Guilarte State Forest	Endangered
Eretmochelys imbricata	Hawksbill Sea Turtle	Coastal Zones	Endangered
Eugenia woodburyana	No Common Name	Encarnacion West of Las Cucharas	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones, No Nesting	Endangered
Polystichum calderonense	No Common Name	Cerrote Peñuelas	Endangered
Stahlia monosperma	No Common Name	Tallaboa	Endangered
Sterna dougallii	Roseate Tern	Coastal Areas and Offshore Cays, Nesting	Threatened
Trichechus manatus manatus	Antillean Manatee	Coastal Zones	Endangered
Trichilia triacantha	No Common Name	Encarnacion, (Urb. El Peñon), Tallaboa Poniente	Endangered

2.1.2 Adjuntas

Within the municipality of Adjuntas, the proposed Via Verde project corridor will run from approximately mile marker 14.5 to mile marker 21.7. Within this municipality, the proposed project corridor does not pass through any reserves or protected areas.

The municipality of Adjuntas is located in three ecological life zones: Subtropical Wet Forest, Subtropical Moist Forest, and Subtropical Lower Montane Wet Forest (Ewel and Whitmore 1973). The USFWS identified the following federally threatened or endangered species as likely to occur in those ecological life zones: *Accipter striatus venator Amazona vittatta vittatta, Auerodendron pauciflorum, Banara vanderbilii, Buteo platypterus brunnescens, Buxus vahlii, Cordia bellonis, Daphnopsis hellerana, Juglans jamaicensis, Myrcia paganii, Ottoschulzia rhodoxylon, Pleodendron macranthum, Polystichum calderoense, Shoepfia arenaria, Tectaria, Thelypteris inabonensis, Thelypteris verecunda,* and *Zanthoxylum thomasianum.* Table 4

(below) lists the federally threatened or endangered species identified on the USFWS Caribbean Endangered Species Map within the municipality of Adjuntas.

Table 4: Protected Species- Adjuntas

Federally Protected Species- Caribbean List			
SCIENTIFIC NAME	**COMMON NAME**	**DISTRIBUTION**	**STATUS**
Accipiter striatus venator	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
Buteo platypterus brunnescens	Puerto Rican Broad-Winged Hawk	Monte Guilarte State Forest	Endangered
Cyathea dryopteroides	Elfin Tree Fern	Monte Guilarte State Forest	Endangered
Eleutherodactylus jasperi	Golden Coqui	Forested Mountains w/ elevations over 700 m.	Threatened
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic and Limestone (Karst) Hills	Endangered
Juglans jamaicensis	West Indian Walnut	Monte Guilarte State Forest (La Silla de Calderon)	Endangered
Polystichum calderonense	No Common Name	Cerrote Peñuelas	Endangered

2.1.3 Utuado

In the municipality of Utuado, in the barrios of Rio Abajo, Rio Arriba, and Hato Viejo, the pipeline corridor will run 400 meters to the south and east of the Río Abajo State Forest Reserve from mile marker 28.4 to mile marker 35.

This forest and its associated wetlands have a great diversity of wildlife and varied vegetation. Within the forest, one hundred and seventy-five tree species were identified in past fauna studies; forty-seven of which are considered threatened or endangered. As a result of past deforestation that occurred in Puerto Rico during the 1930's, the Government of Puerto Rico began, and currently maintains programs for tree planting in Commonwealth forests. Some representative species of the native vegetation found in the forest are: algarrobo, almácigo, hairy camasey, canelilla, white capá, ceboruquillo, male cedar, kapok, cojoba, heart, Cork, rubial Hawthorn, guano, guara, higuerillo, jobo, magician, Palm coyor and tabaiba. Several research projects involving multiple endangered species that inhabit the forest are currently being conducted. Endemic and endangered species included are: erubia (*Solanum drymophilum)*, rosewood (*Ottoschulzia rhodoxylon)*, *Daphosis hellerana*, chigger (*Cornutia obovata)*, and *Cordia bellonis.*

In the Rio Abajo barrio, approximately 1,050 meters from the project corridor (Mile Marker 29.6), the endangered plant species, chupacallos (*Pleodendron macranthum*), was found during other flora studies. The species was not identified in the corridor during the PREPA flora study conducted by Coll Environmental. Other species found in the municipality of Utuado include: *Calyptronoma rivalis* and *Cornutia obovata*. Both have been identified from previous corridor studies: the locations are approximately 3,000 meters from the project.

The proposed project corridor follows, and will be co-located within, an existing transportation right-of way for about 2.3 miles (MM 30.5 - 31 and 25.2 - 27) within the municipality of Utuado. No new impacts to any threatened and endangered species habitat will occur in this municipality and the existing plants identified are well outside of the project construction right-of-way.

Table 5 (below) lists the federally threatened or endangered species identified on the USFWS Caribbean Endangered Species Map within the municipality of Utuado.

Table 5: Protected Species- Utuado

Federally Protected Species- Caribbean List			
SCIENTIFIC NAME	**COMMON NAME**	**DISTRIBUTION**	**STATUS**
Accipiter striatus venator	PR Sharp-Shinned Hawk	Monte Guilarte State Forest	Endangered
Amazona vittata vittata	Puerto Rican Parrot	Rio Abajo State Forest	Endangered
Auerodendron pauciflorum	No Common Name	Rio Abajo State Forest	Endangered
Buteo platypterus brunnescens	Puerto Rican Broad-Winged Hawk	Monte Guilarte State Forest	Endangered
Buxus vahlii	Val's Boxwood	Tallaboa Limestone Hills	Endangered
Calyptronoma rivalis	No Common Name	Rio Abajo State Forest	Threatened
Cordia bellonis	No Common Name	Rio Abajo State Forest	Endangered
Cornutia obovata	No Common Name	Rio Abajo State Forest	Endangered
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic and Limestone (Karst) Hills	Endangered
Juglans jamaicensis	West Indian Walnut	Monte Guilarte State Forest (La Silla de Calderon)	Endangered
Solanum drymophilium	Erubia	Rio Abajo State Forest	Endangered
Patagioenas (Columba) inornata wetmorei	Puerto Rican Plain Pigeon	Lower Montane Forest and Riparian Habitats	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones, Lago Dos Bocas, No Nesting	Endangered
Pleodendron macranthum	No Common Name	Rio Abajo State Forest	Endangered
Schoepfia arenaria	No Common Name	Rio Abajo State Forest (Cuesta de los Perros)	Threatened
Tectaria estremerana	No Common Name	Rio Abajo State Forest	Endangered

2.1.4 Arecibo

The municipality of Arecibo has several protected areas. These include the Río Abajo Forest, Cambalache Forest and the Caño Tiburones Reserve. These protected areas have been designated by the Puerto Rico Department of Natural and Environmental Resources (DRNA), as critical habitat for several flora and fauna species.

At the border with the municipality of Utuado, the pipeline corridor will pass through the eastern boundary of the Río Abajo Forest in two locations for a total distance of approximately 3.5 miles. The project corridor will additionally pass through approximately 1.54 miles of the Caño Tiburones.

Several species of flora that are federally listed as threatened or endangered species have been identified in these two natural systems. Those species identified as potentially occurring in the path of the project are: *Auerodendron pauciflorum*, Palm of Manaca (*Calyptronoma rivalis*), *Cordia bellonis*, chigger stick (*Cornutia obovata*), *Myrcia paganii*, matabuey (*Goetzea elegans*), rosewood (*Ottoschulzia rhodoxylon*), chupacallos (*Pleodendron macranthum*), *Schoepfia arenaria*, erubia (*Solanum drymophilum*), and *Tectaria estremerana*.

Table 6: Protected Species- Arecibo

Federal Protected Species – Caribbean List			
Scientific Name	Common Name	Location	Status
Auerodendron pauciflorum	No Common Name	Rio Abajo State Forest	Endangered
Calyptronoma rivalis	No Common Name	Rio Abajo State Forest	Endangered
Cordia bellonis	No Common Name	Rio Abajo State Forest	Endangered
Cornutia obovata	chigger stick	Rio Abajo State Forest	Endangered
Goetzea elegans	Matabuey	Cambalachee State Forest	Endangered
Ottoschulzia rhodoxylon	Rosewood	Cambalachee State Forest, Sabana Hoyos	Threatened
Pleodendron macranthum	chupacallos	Rio Abajo State Forest	Endangered
Schoepfia arenaria	No Common Name	Rio Abajo State Forest (Cuesta de los Perro)	Threatened
Solanum drymophilum	Erubia	Rio Abajo State Forest	Endangered
Tectaria estremerana	No Common Name	Rio Abajo State Forest	Endangered

Sections 3 and 4 include a brief description of these species.

The results of the Coll Environmental wetland and flora/fauna studies conducted within the project right-of-way corridor for this Municipality did not find any federally listed species.

2.1.5 Barceloneta

A part of the Caño Tiburones natural reserve lies in this municipality, approximately 543 meters north of the project corridor right-of-way, at Mile Marker 51.0 to 51.30. This reserve is the longest herbaceous marsh on the Island, and the second largest in the Caribbean. This coastal wetland plays an important role in quantity and quality of storm water treatment.

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Barceloneta identifies seven species, six of which are characterized as marine or coastal zone species. The only terrestrial species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. A copy of this document has been included as part of this Biological Evaluation. The project will not result in any impacts to marine or coastal zone habitats and all of these open water crossings will be directionally drilled, therefore no impacts to those federally listed threatened and endangered species are anticipated.

Table 7: Protected Species- Barceloneta

Federal Protected Species – Caribbean List			
Scientific Name	Common Name	Location	Status
Chelonia mydas	Green Sea turtle	Marine Coastal	Threatened
Dermochelys coriacea	Leatherback Sea Turtle	Marine Coastal	Endangered
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
Eretmochelys imbricata	Hawksbill Sea Turtle	Marine Coastal	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones	Endangered
Sterna dougallii	Roseate Tern	Coastal Zones	Threatened
Trichechus manatus manatus	Antillean Manatee	Marine Coastal	Endangered

Flora found in the project corridor throughout the municipality varied. The land cover within the project right-of-way corridor ranges from farmlands (pineapple and other minor fruits) and fallow uncultivated areas to herbaceous wetlands and open freshwater wetlands with floating aquatics.

2.1.6 Manati

The project corridor will pass through approximately 1.1 miles of the Hacienda La Esperanza nature reserve in the municipality of Manatí. The importance of this reserve lies mainly in its diversity of terrestrial and marine natural resources. It is classified as an important area for wildlife that use this area for foraging and reproduction. There is a dense, structurally complex natural forest located within the mogotes (haystacks) area in the southeast of the Municipality. This forest consists of a secondary forest composed mostly of invasive species, secondary spiny forest composed mostly of tintillo (*Randia aculeata*), a new growth area of invasive herbaceous vegetation, mostly of exotic origin, bamboo forest, tall herbaceous species (brava cane) and other exotic species that grow on the edge of the Manati River. Portions of this system are brackish water due to past flood control. These areas are populated by tidal marsh species. Salterns, mostly devoid of vegetation due to high salinity (irregularly inundated by extreme high tides) and fringed by red, white, and black mangroves, and buttonwood are also an important vegetative community in this system. The forest along the route in Manati is within the mogotes (haystacks). It is in the southeast of the municipality. The rest of the route crosses basically herbaceous areas associated with the Rio Grande de Manati floodplain.

One species listed as Endangered, the rosewood (*Ottoschulzia rhodoxylon*), is likely to be found within the limits of the construction right of way, although it is not included in the federal list for Manati nor was it identified during the flora and fauna study conducted for the Via Verde Pipeline. One specimen of this species has however been previously documented approximately 2,650 meters north of the project right-of-way.

Table 8: Protected Species- Manati

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Agelaius xanthomus	Yellow-Shouldered Black Bird	Coastal Forest	Endangered
Chamaecrista glandulosa var mirabilis	No Common Name	Tortuguero Lagoon Natural Reserve	Endangered
Chelonia mydas	Green Sea Turtle	Coastal Zones	Threatened
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones, No Nesting	Endangered
Schoepfia arenaria	No Common Name	Tortuguero Lagoon Natural Reserve	Threatened
Sterna dougallii	Roseate Tern	Coastal Areas and Offshore Cays, Nesting	Threatened
Trichechus manatus manatus	Antillean Manatee	Coastal Zones	Endangered

The remainder of this segment of the project corridor (from Mile Marker 54.75 mile to Mile Marker 63.45) includes vegetation consisting of weeds and shrubs commonly found on the northern coast of Puerto Rico. None of the vegetation within the corridor was identified as threatened or endangered.

2.1.7 Vega Baja and Vega Alta

Vega State forest includes six areas that are distributed between the municipalities of Vega Alta and Vega Baja. Vega Alta and Vega Baja have been considered as one region since all parts of the corridor pass through a single preserve area, the Bosque Estatal de Vega. This preserve area is found within the construction right-of-way for both Municipalities.

These areas are classified as moist subtropical forest. Forest flora is represented by seventy-two species of trees. Four federally listed plant species have been identified as possibly occurring within the project right-of-way for these two municipalities. These include the Erubia (*Chamaecrista glandulosa var mirabilis*), *Daphnopsis hellerana*, rosewood (*Ottoschulzia rhodoxylon*), and *Schoepfia arenaria*.

Table 9: Protected Species- Vega Baja and Vega Alta

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Chamaecrista glandulosa var mirabilis	No Common Name	Tortuguero Lagoon Natural Reserve	Endangered
Daphnopsis hellerana	No Common Name	Bloques Carmelo	Endangered
Ottoschulzia rhodoxylon	Stick of roses	Sabana Ward	Endangered
Schoepfia arenaria	No Common Name	Tortuguero Lagoon Natural Reserve	Threatened

2.1.8 Dorado

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Dorado identifies nine species, four of which are characterized as marine or coastal zone species. The only terrestrial faunal species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. A copy of this document has been included as part of this Biological Evaluation. The project will not result in any impacts to marine or coastal zone habitats and all open water crossings will be directionally drilled, therefore no impacts to those federally listed threatened and endangered species identified as marine/coastal are anticipated.

The Ramon stick (*Banara vanderbilitii)*, rosewood (*Ottoschulzia rhodoxylon*), and *Daphnopsis hellerana* are listed as endangered plants. In Dorado, most of the route goes through herbaceous areas, or the PR-22 right of way. Suitable habitat for the above mentioned species (except Chamaecrista) is typically limited to haystacks. Chamaecrista was not found. It prefers silica sands, which were not found in that segment of the route.

Table 10: Protected Species- Dorado

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Banara vanderbiltii	Ramón stick	Near Rio Lajas Limestones	Endangered
Chamaecrista glandulosa var mirabilis	No Common Name	Sardinera	Endangered
Daphnopsis hellerana	No Common Name	Rio Lajas	Endangered
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
Ottoschulzia rhodoxylon	Rosewood	Cerro Higuillar, Espinosa Ward, Maguayo Ward	Endangered

Four Marine / Coastal zone species were not included in table above. The results of the Coll Environmental wetland and flora/fauna studies conducted within the project right-of-way corridor for this Municipality did not find any federally listed species.

2.1.9 Toa Baja

None of the federally listed species known to exist within the Municipality of Toa Baja were found in the project corridor.

Table 11: Protected Species- Toa Baja

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Banara vanderbiltii	Ramón stick	Rio Lajas Hills	Endangered
Daphnopsis hellerana	No Common Name	Nevares Limestone Hills, Near Sabana Seca, Primate Center	Endangered
Ottoschulzia rhodoxylon	Stick of roses	Media Luna Ward, Candelaria Ward	Endangered

2.1.10 Cataño

Cataño has several environmentally sensitive areas of high natural value that must be protected. These areas include: La Esperanza Park, the Laguna Secreta, remnant wetlands from channelizing the Bayamón River, and the historic mouth of the River Bayamón. Remnants of wetlands can also be found along the project construction right-of-way at the Hondo River.

The vegetation associated with these estuarine wetlands include black mangrove (*Avicennia germinans*) and white mangrove (*Laguncularia racemosa*). The Laguna Secreta is located 100 meters north of the project right-of-way. This area is dominated by cattail marsh with several remnants of marshy areas occupied by the black mangrove.

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Catano identifies four species, all of which are characterized as marine or coastal zone species.

Table 12: Protected Species- Catano

Federal Protected Species - Caribbean List			
Scientific name	Common name	Location	Status
Chelonia mydas	Green Sea Turtle	Coastal Zones	Threatened
Eretmochelys imbricata	Hawksbill Sea Turtle	Marine Coastal	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones, No Nesting	Endangered
Trichechus manatus manatus	Antillean Manatee	Coastal Zones	Endangered

The project will not result in any impacts to marine or mangrove forested coastal zone habitats and open water crossings will be directionally drilled, therefore no impacts to those federally listed threatened and endangered species identified as marine/coastal are anticipated. All impacts to herbaceous wetlands will be temporary and all disturbed areas will be restored to natural grade and allowed to naturally revegetate.

2.1.11 Bayamón

The U.S. Fish and Wildlife Service's Caribbean Endangered Species List for the Municipality of Bayamon identifies six species, four of which are endangered plant species. The four endangered plant species include: *Banara vanderbiltii, Buxus vahlii, Daphnopsis hellerana,* and *Ottoschulzia rhodoxylon*. The only terrestrial faunal species identified is the Puerto Rican Boa. Due to the wide range of habitats and overall distribution of the boa, this species will be considered to have the potential to occur throughout the entire project construction corridor right-of-way. A boa monitoring and protection plan will be implemented for this species. A copy of this document has been included as part of this Biological Evaluation.

The remaining species is the Puerto Rican Plain Pigeon.

Table 13: Protected Species- Bayamon

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Banara vanderbiltii	Ramón stick	PR-2	Endangered
Daphnopsis hellerana	No Common Name	Sabana Seca, PR-2	Endangered
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
Ottoschulzia rhodoxylon	Stick of roses	Hata Tejas, Parque de las Ciencias	Endangered
Patagioenas (Columba) *inornata wetmorei*	Puerto Rican Plain Pigeon	Lower Montane Forests and Riparian Habitats	Endangered

Sections 3 and 4 includes a brief description of the federally listed species.
The results of the Coll Environmental wetland and flora/fauna studies conducted within the project right-of-way corridor for this Municipality did not find any federally listed species within the propose pipeline corridor.

2.1.12 Guaynabo

According to the U.S. Fish and Wildlife Service 2007 *Caribbean Endangered Species Map*, six federally listed species, including the Yellow Shouldered Black Bird (*Agelaius xanthomus*) and the rosewood (*Ottoschulzia rhodoxylon)* have been identified from the municipality of Guaynabo.

Table 14: Protected Species- Guaynabo

Federal Protected Species - Caribbean List			
Scientific Name	Common Name	Location	Status
Agelaius xanthomus	Yellow-Shouldered Black Bird	Coastal Forest	Endangered
Patagioenas (Columba) inornata wetmorei	Puerto Rican Plain Pigeon	Lower Montane Forest and Riparian Habitats	Endangered
Ottoschulzia rhodoxylon	Stick of roses	Hata Tejas, Parque de las Ciencias	Threatened
Epicrates inornatus	Puerto Rican Boa	Forested Volcanic / Limestone (Karst) Hills	Endangered
Pelecanus occidentalis	Brown Pelican	Coastal Zones, No Nesting	Endangered
Trichechus manatus manatus	Antillean Manatee	Coastal Zones	Endangered

3 Flora

A total of 28 species of plants on the federal list have the potential to occur within the identified pipeline corridor. No critical habitat rules have been published for these species in Puerto Rico. The Coll Environmental wetland and flora/fauna studies conducted within the project right-of-way corridor for the Via Verde Pipeline did not locate any of the federally listed species.

3.1 *Auerodendron pauciflorum* – (No Common Name)

Federal Status: Endangered

The *Auerodendron pauciflorum* is a shrub or small evergreen tree that can reach 5 meters (16.5 feet) high. The leaves are opposite or sub-opposite, glabrous, and eliptical, 15.6 cm (2.5 to 6

inches) long and 3.5 to 6 centimeters (1.5 to 2.5 inches) wide with tiny black glandular spots. Two or three flowers are found in the axils of the leaves. The fruit are not described and seeds have not been observed in the field. The species is found in limestone elevations in northwest Puerto Rico. Only 19 individual plants are known for the four groups in the Barrio Coto de Isabela area near the intersection of Highway 113 road and Highway 2. *A. pauciflorum* was included in the Federal Endangered species list due to habitat destruction on 2 March 1994.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the Rio Abajo State Forest region, as well as the limestone hills of the northern section of Project route. No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.2 *Banara vanderbiltii* – (Palo de Ramón)

Federal Status: Endangered

Palo de Ramón is an evergreen shrub or small tree that reaches 10 meters (33 feet) high and 12 cm (5 inches) in diameter. Leaves are alternate in a single plane, have a toothed margin and are densely pubescent on both sides. The older leaves become rough textured similar to the role of sandpaper on the upper surface. Flowers are bisexual and pollinate themselves. The fruit was discovered recently and consists of berries with many seeds, deep red to purple, with an enlarged calyx and long tip style. The species is known in the karstic northern regions of Puerto Rico and in the Central Highlands area. Specifically, the Palo de Ramón is found in semi-evergreen forests in two locations that are privately owned in northern Puerto Rico; one from Toa Baja to Bayamón and one in the municipality of Salinas (USFWS 1990). Two populations consist of six plants less than 16 meters square (52 sq ft) in the location of Toa Baja and five individuals in Salinas. It has also been found in Dorado and San Juan, according to the Map of Species Occurrence, USFWS Species Profile. The species was included in the list of federal protection on January 14, 1987.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the limestone hills of the northern section of Project route. No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.3 *Buxus vahlii* – (Diablito de tres cuernos)

Federal Status: Endangered

The Diablito de tres Cuernos is an evergreen shrub that grows 4.5 meters (15 feet) tall with a trunk up to 13 cm (5 inches) in diameter. Branches have two channels below each pair of leaves. Oblong leaves are simple, opposite, green dark shiny, and grow to 3-4 cm (1.2 - 1.6 inches) long and about two centimeters (0.75 inch) wide. Flowers group is small, about 6-7 mm (0.25 inches) long, and is composed of a single female flower at the end of several male flowers just below it. Fruiting occurs December to early April, producing black, shiny seeds from 3-4 cm (1.2-1.6 inches) long in a capsule type horn.

The Diablito de tres cuernos was listed as a Federal Endangered species on August 13, 1985. The species is found in three locations in Puerto Rico: on the nuclear energy property of the Commonwealth of Puerto Rico at Punta Higüero, Rincón; at the plant in Hato Tejas, Bayamón, near of Highway No. 2, 650 meters (2,130 feet) west of the intersection with the road No. 167 (on land owned by Pan American Investment, Inc.) (USFWS 1990); and at Isabela. Potential threats to the Diablito de tres cuernos include the destruction or modification of its habitat, the pollution of air and water, and development. The vulnerability generally increases due to the small size of the population, easy access, low rate of reproduction, and likely loss of genetic variation in species from both locations.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist in the limestone hills of Penuelas, and of the northern section of Project route.

No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.4 *Calyptronoma rivalis* – (Palma de manaca)

Federal Status: Threatened

The Palma de manaca is a palm tree that reaches approximately 8-10 m (26-33 ft) tall. Its trunk is soft and can grow up to 13-25 centimeters (5-10 inches) in diameter. The species has pen-shaped leaves that can reach up to 3-4 meters (10-13 feet) long. The base of the petiole can be measured approximately 61 cm (two feet) long. Its large flowers are stacked, branched and

downward. The flowers are arranged into triads of two males and one female. Fruits, less than 6 mm (0.25 inch) wide, are imperfect and reddish, rounded when ripe and are born in summer.

This species was designated as threatened on February 6, 1990. *Calyptronoma rivalis* was previously known only from three wild populations in Puerto Rico: (1) adjacent to the Quebrada Collazo, a small Creek near San Sebastián; (2) for the Camuy River, and; (3) in the Rio Guajataca (USFWS 1990). The combined total population identified at these three locations is about 265 individuals. Three natural populations are located in the semi-evergreen limestone forests of northwestern Puerto Rico at elevations between 100 to 150 meters (490 to 325 feet). In the southern portion of the Camuy River, some individuals are located at the bottom of deep canyons. Its distribution has been revised to include Arecibo and Utuado (Map of Species Occurrence, Species Profile, USFWS). Deforestation caused by development, flash floods (compounded by the effect of deforestation) and forest fires are the most serious threats to these plants.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist in the Arecibo/Utuado section of Project route.

No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.5 *Catesbaea melanocarpa*- (No Common Name)

Federal Status: Endangered

Catesbaea melanocarpa is extremely rare; and was previously known from only one individual location in Cabo Rojo. The one location is on privately-owned land, which is subject to development pressure for residential and tourism projects. The risk of extinction is high because so few individuals of *Catesbaea melanocarpa* are known to occur in limited areas. Additionally, the species is threatened by catastrophic natural events, such as hurricanes, as well as human induced fires. *Catesbaea melanocarpa* was listed as endangered under the Endangered Species Act of 1973 on March 17, 1999. This endangered plant species is a small spiny shrub of the family Rubiacea. Its present distribution includes: Sabana Grande, Yauco, Guanica, Guayanilla, Peñuelas, and Ponce (Map of Species Occurrence, Species Profile, USFWS).

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. No determination has been made as to the potential occurrence of this species within

the Via Verde Pipeline corridor. Potential suitable habitat may exist in the Peñuelas section of Project route.

3.6 *Chamaecrista glandulosa var mirabilis* – (No Common Name)

Federal Status: Endangered

Chamaecrista glandulosa var. rnirabilis is a small shrub endemic to the white silica sands of the northern coast of Puerto Rico at elevations near sea level. *C. glandulosa var. mirabilis* is a prostrate, ascending, or erect shrub which may reach up to 1 meter in height. The branches are slender, straight, and wire-like. Leaves are alternate, evenly one-pinnate, 1 to 3 centimeters long, 0.5 to 1 centimeter wide, with some scattered whitish hairs. The stipules are persistent, striate, and about 2 millimeters long. The leaflets are usually in 18 pairs, 3 to 6 millimeters long and 0.5 to 1.5 millimeters wide. The petioles have one to two stipitate glands. The flowers are solitary, with a pedicel about as long as the leaves. The corolla is yellow, about 2 centimeters in diameter, with one petal much larger than the others. Mature fruits (legumes) are glabrous, linear, 2.5 to 4 centimeters long, 3 to 4 millimeters wide, flat, elastically dehiscent, and 12 to 15 seeded (Vivaldi and Woodbury 1980).

This species is scattered along the southern shore of the Tortuguero Lagoon and is also found at one location in Dorado and one in Vega Alta. Although the Tortuguero Lagoon area has been designated by the Puerto Rico Planning Board as a Natural Reserve, the majority remains in private ownership or in public ownership by agencies such as the Puerto Rico Land Administration, not an agency that is responsible for the protection of natural resources. These populations have been estimated at 100 individual plants. The Dorado population is located just to the east of the Dorado airport, where 20 to 50 individual plants have been observed on this privately owned land. Its distribution also includes Manati and Vieques (Map of Species Occurrence, Species Profile, USFWS). Urban, industrial, and agricultural expansion, as well as sand extraction, may have eliminated other known populations. Although few areas of silica sands have not been explored, it is possible that other small populations may remain.

This species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist in the silica sands area of the northern section of Project route. However, silica sands were only found in Arecibo (near the sanitary landfill area) and the species was not found. No determination has been made as to the potential for occurrence of this species within the proposed Via Verde Pipeline corridor.

3.7 *Cordia bellonis* – (No Common Name)

Federal Status: Endangered

Historically found in the western part of the Cordillera Central of Puerto Rico in open areas exposed to the sun. Today, *Cordia bellonis* is a shrub known only in three public forest in Puerto Rico: Maricao, Susúa, and Río Abajo. It is an arched to erect shrub 1-2 meters (3-6.5 feet) in height, with light branches with short hairs. The leaves are alternate, oblong to oblong-lanceolate, 2 to 6 cm (0.75-2.5 inches) long and usually 2.5-3 times longer that wide. The corolla is white with four subcylindrical lobes. Fruit, appearing from October to January, is a dotted, drupe 5 mm (0.25 inches) long. This dioecious species produces white, axillary, unisexual flowers which have a thin and reduced Corolla. Plants are dense and shrubby, with shade branches that become divergent at obtuse angles. These branches ensnare the plant to adjacent trees. The species entered federal lists on January 10, 1997.

Found in Maricao and Susúa, along roadsides, on the banks of rivers and on slopes, steep elevation between 230-250 m (750-820 feet) in Susúa, and 441-820 m (1, 450-2, 700 ft, Maricao (USFWS 1990). In the Río Abajo forest area, the species is found in open areas in the understory, growing in the forest litter and also among the open, sun exposed portions of the limestone hills. This species was not discovered at Río Abajo until 1994, when approximately 118 individuals were found in 12 locations (USFWS 1990). *C. bellonis* is threatened by habitat destruction and habitat modification, certain practices in forest management and restricted distribution.

The species was not found during the Coll Environmental field reviews of the proposed project corridor. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.8 *Cordia rupicola* – (Puerto Rico Manjack)

Federal Status: Candidate for listing as Endangered Species

This species was believed to be endemic only to Puerto Rico until it was described from the island of Anegada in 1987. The species was discovered in Los Indios, between Guayanilla and barrio Barinas in Yauco in 1986. A year later it was found in Guánica. Two reports of a single specimen exist from the island of Vieques but no population has been confirmed. In 1995 fifteen plants were found east of the historical locations at El Peñón in Peñuelas. El Peñón is a

privately-owned subtropical dry forest site located in a limestone substrate. The area has a sparse, low brush (2 to 3 m/6.6 to 9.8 ft) with a few taller trees reaching 4 to 5 m (13 to 16 ft). These trees include *Bourreria succulenta* var. *succulenta*, *Bucida buceras*, and *Bursera simaruba*. Two Anegada sites, each with a few dozen individuals, have also been confirmed. Both sites are located in the western part of the island and cover an area of less than 5 km^2 (1,200 acres). In Anegada the species is locally abundant in limestone and sand dunes, showing a slight preference for limestone.

The species was not found during the Coll Environmental field reviews of the proposed project corridor. Potential suitable habitat may exist within the Peñuelas section of Project route. No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.9 *Cornutia obovata* – (Palo de Nigua)

Federal Status: Endangered

The *Cortuntia obovata* is an evergreen tree growing to 10-15 m (33-50 ft) high and 25 cm (10 inches) in diameter. The leaves are opposite, simple, obovate, blunt or rounded in the apex and can measure 5-14 cm (2-5.5 inches) long and 4-8 cm (1.5-3.2 inches) wide. Branches have four sides, fine hair and are brown when young. The flower is terminal, 8-30 centimeters (3-12 inches) long, perfect and zygomorphic. The corolla is bluish or purple with fine outside and inside long hairs. The fruit is a purple drupe containing 3 to 4 seeds. Flowering occurs between the months of May and July, the fruits are present in September and October. The species is found in forests semi-evergreen or evergreen covering hills limestone elevations of 150-350 m (490-1150 ft) and higher. Only Palo de Nigua are known from three areas: five individuals have been identified at five different locations in limestone hillsides of the Río Abajo forest; one on a limestone slope near the Arecibo Observatory; and one in the Monte Torrecilla of Barranquitas (USFWS 1990). However, the map of species occurrence also includes it in Camuy, Hatillo, Florida, Ciales, Utuado, Jayuya, Orocovis, Ponce, Yauco and Sabana Grande as potential habitat areas (Species Profile, USFWS). The species was placed on the Federal Endangered species list on April 7, 1988. The listing was prompted by deforestation, selective cuts for agriculture, production of coffee, grazing, charcoal, and the timber industry.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. No determination has been made as to the potential occurrence of this species within

the Via Verde Pipeline corridor as potential suitable habitat may exist in the Arecibo/Utuado section of Project route.

3.10 *Cyathea dryopteroides* – (Elfin Tree Fern)

Federal Status: Endangered

Cyathea dryopteroides is a tree fern of the order *Cyatheales*. The genus name *Cyathea* is derived from the Greek kyatheion, meaning "little cup", and refers to the cup-shaped sori on the underside of the fronds. Several botanists have previously classified this species in the Alsophila genus. They are mostly terrestrial ferns, usually with a single tall stem. *Cyathea dryopteroides* is a small tree fern about 2 feet tall with a trunk of an inch in diameter. Fronds are 3 feet long. Like all ferns, this species reproduces by spores. Plants in state of reproduction as well as individuals of different sizes and in different stages of development have been observed. These two observations suggest that the species is reproducing and is incorporating more individuals to the population.

This species is unique to Puerto Rico and grows at elevations over 2,700 feet. The species was discovered in Peñuelas in 1915. Later it was discovered in Monte Jayuya, Cerro Rosa in Ciales, and Mount Guilarte. It has not been seen recently in the town of Peñuelas and it is believed the species disappeared there. This fern grows only in the type of forest known as Delfin Forest, in the peaks of the highest mountains of the Cordillera Central Mountain Range in Puerto Rico. In this type of forest, trees are short in height, grow slowly, and have twisted branches and thick leaves. Many of these characteristics are related to environmental factors, such as wind exposure, precipitation and soil characteristics, among others. Some areas in this type of forest are made up almost exclusively of Sierra Palm, *Prestoea montana*. *Cyathea* grows in regions of Sierra Palms in the lower part of the forest, in the understory, which is less exposed to sun and wind.

Cyathea dryopteroides is seriously threatened by the destruction of its habitat. Part of its habitat has been modified by the construction of antennas and other communication installations in the highest peaks of our island. In previous years, several of the public forests have also been used as military training areas, human activity that seriously disturbs vegetation. This plant was included in the federal list of endangered species in 1987.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. The Map of Species Occurrence also includes this species in Adjuntas, Orocovis,

Ponce and Juana Diaz (Species Profile, USFWS). No determination has been made as to the potential occurrence of this species within the Via Verde Pipeline corridor.

3.11 *Daphnopsis hellerana* – (No Common Name)

Federal Status: Endangered

The *Daphnosis hellerana* is a small tree or shrub that grows six meters in height and five centimeters (2 inches) in diameter. Leaves (3.13 cm long and 1.5-6 cm of width) (1.2-5 inches long and 0.5-2.4 inches wide) are simple, alternate, elliptic obovate and without edge or rounded. Lateral veins are prominent and curved. The leaves and branches have golden hairs when the plant is young. The species is dioecious (male and female flowers are located on different individuals) and groups of flowers are found between February and April. While both flowers are small, male flowers are tubular with fine hairs outside and female flowers are bell-shaped and also have hairs inside and outside. The fruit is an elliptical, white berry, which is less than 2 centimeters (0.75 inch) long. The species is found in semi-evergreen or evergreen forests of the subtropical rainforest in limestone slopes at elevations from 150 to 350 meters (490 to 1,150 feet). It is restricted to the slopes of limestone on the northwest coast of the island.

Only four populations are in existence consisting of approximately 61 individuals in the area of Isabela / Quebradilla; seven individuals in the Lajas River, Dorado; about 50 in the bottom of the limestone hills in Nevárez; and seven trees on grounds of the National Health Institute near Sabana Seca, Toa Baja (USFWS 1990). Three of the seven locations are located on private land. The species was included in the Federal lists on June 23, 1988. It has possibly always been a rare species, since it is dioecious, thereby reducing the likelihood of successful reproduction. Individuals in well-known places at present are threatened by urban, tourist and industrial expansion (limestone and fill dirt) and clearing of forests for agriculture. The cutting of trees for charcoal and raw materials for construction were the historical threat to this species. The limestone area in the north of the island is under particular threat since the entire areas are destroyed for construction material. These activities can eliminate an entire population of this and other species of plants by destroying the geological formations that define the physical characteristics of this species habitat.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the limestone hills of the northern section of

Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.12 *Eugenia woodburyana* – (No Common Name)

Federal Status: Endangered

Eugenia woodburyana is an evergreen tree than can reach a height of about 18 feet tree. Its leaves are opposite and obovate, with almost no petiole. The berries are globose, 5-6 mm (0.2 inch) in diameter, and turn from green to red. *Eugenia woodburyana* is endemic to subtropical dry forest in the southwest of Puerto Rico. Currently, *Eugenia* is found only in the State forest of Guánica, Cabo Rojo Wildlife Refuge and the Laguna Cartagena Wildlife Refuge. The total population consists of approximately about 150 individuals in various locations in the Sierra Bermeja in Cabo Rojo and Lajas municipalities. The most recent map for species occurrence also includes this species as potentially occurring in Sabana Grande, Yauco and Peñuelas (Species Profile, USFWS). Destruction of habitat for urban development and livestock, and fires are the principal factors that threaten *Eugenia woodburyana.* *Eugenia* was included in the federal list of endangered species on September 9, 1994.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist within the Peñuelas section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.13 *Goetzea elegans* – (Mata buey)

Federal Status: Endangered

The mata buey is a shrub or small evergreen tree that measures approximately 9 meters (30 feet) in height, and 13 cm (5 inches) thick trunk. Leaves are simple, alternate, and can grow to 10 centimeters (4 inches) long and 5 centimeters (2 inches) wide. The upper surface of leaves is dark green bright and the bottom is pale green. The flowers are small, orange, funnel-shaped and are in the axils of the leaves, usually alone. The orange fruit is about 2 cm round (0.75 inch) and occurs usually between May and August, during the same period in which the plant flowers. The species was listed as endangered son April 19, 1985. The species habitat is on the edge of the forested semi-evergreen limestone hills below 200 meters (656 feet) and is present in multiple locations crammed in the northwest part of Puerto Rico in the area of Quebradillas and

Isabela (USFWS 1990). Approximately 40 to 50 individual plants are known in these places. All locations except one are found on private land. The publicly owned lands belong to the Department of Transportation and Public Works of the Commonwealth. Private locations can be impacted by mining, grazing, looting of plants for landscape uses, and the proposed construction of a hotel development. The map for species occurrence also includes it in Mayaguez, Cabo Rojo, Mona Island, Vieques, Arecibo, San Juan, Rio Grande, Canovanas and Fajardo.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. The map for species occurrence also includes this species as potentially occurring in Mayaguez, Cabo Rojo, Arecibo, and San Juan. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.14 *Juglans jamaicensis* – (Nogal or West Indian Walnut)

Federal Status: Endangered

Juglans jamaicensis is a large distinctive tree with fissured bark that can reach heights of up to 25 meters (USFWS 1999). This species is found in Puerto Rico as well as Cuba and Hispaniola. In Puerto Rico, this species is known only from 14 individuals at one locality in the municipality of Adjuntas. The recovery plan includes past specimens in Peñuelas and Yauco that probably do not exist in the present. However, the map for species occurrence includes the tree in Utuado and Guayanila. The habitat for this species is found in the subtropical lower montane wet forest life zone (Ewel and Whitmore 1973). This large-sized tree produces small, green flowers, an edible nut, and wood similar to that of the black walnut tree.

The existing known population of *Juglans jamaicensis* is near the Monte Guilarte Commonwealth Forest, located west of the pipeline corridor and no suitable subtropical lower montane wet forest was identified within the pipeline corridor. Suitable habitat may exist between Adjuntas and Peñuelas, where a segment of the route crosses the subtropical lower montane wet forest. Associated forest community species (Prestoea montana, among others) were found close to that segment during the Coll Environmental flora study. No determination has been made for this species.

3.15 *Mitracarpus polycladus* - (Cana Gorda Girdlepod) *Mitracarpus polycladus*

Federal Status: Endangered

Mitracarpus polycladus is a small shrub that is endemic to a sub-tropical dry forest in southwestern Puerto Rico (USFWS 1994, USFWS 1998), but is also known from the island of Saba of the Lesser Antilles. In Puerto Rico, *M. maxwelliae* and *M. polycladus* are known from only one locality each, both in the Guanica Commonwealth Forest. All areas where this species are located are found within the subtropical dry forest life zone (Ewel and Whitmore 1973), the driest life zone in Puerto Rico.

Existing populations of *Mitracarpus spp.* exist 11.25 miles west-southwest of the pipeline corridor in the Guanica Commonwealth Forest. Both populations are known from only one locality each. The coastal stretch of the Via Verde Pipeline corridor from Mile Marker 0 to Mile Marker 3.7 at PR Interstate 2 was extensively canvassed and no individuals were located within the project right of way. The principal habitat that may be suitable for this species exists to the south of the starting point for the project. In addition, the project will not affect any lands suitable for propagation and/or suitable for establishing new populations on protected lands. A determination of "No Affect" is therefore recommended for this species.

3.16 *Myrcia paganii* – (No Common Name)

Federal Status: Endangered

The *Myrcia paganii* is an evergreeen tree that can grow up to 9 meters (30 feet) high and 13 cm (5 inches) in diameter. The bark is iridescent and flaky with an orange-brown inner bark. Young branches are flat and have numerous soft, brown hairs. The leaves are opposite, simple, leathery, aromatic and glandular below. The leaf is elliptical-oblong reaching 10-16 cm (4-6.5 inches) long and 4-9 cm (1.5-3.5 inches) wide. The fruit and flowers are not described. *M. pagani* was added to the Federal Endangered Species lists as "endangered" on 18 February 1994. It is found in semi-evergreen and evergreen forests in limestone slopes at elevations of 150-350 meters (490-1,150 feet).

All known locations of the species are in private ownership in the limestone hills of northwest of Puerto Rico. Eight individuals of *M. pagani* were reported in three locations in the area south of Arecibo Biáfra-Vietnam and Quebradilals (USFWS 1990).

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the limestone hills of the northern section of the Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.17 *Ottoschulzia rhodoxylon* – (Palo de rosa)

Federal Status: Endangered

Ottoschulzia rhodoxylon is an evergreen tree growing to 4-5 meters (13-16.5 feet). Its smooth, alternate leaves are elliptical to ovate with rounded apex and thick and leathery bases. The species flowers are bisexual and can be found at the base in single layers or in groups. The fruit is a drupe with a thin shell and that occurs irregularly throughout the year, as well as flowers. The species was placed on the Federal Endangered Species List species April 10, 1990. Presently, approximately 200 individuals are known from 17 populations in the following areas of Puerto Rico: Guaynabo; Quebradillas / Isabela; Cambalache forest; Guánica forest; Cabo Rojo; and close to the Río Abajo forest. The map for species occurrence also includes this species as potentially present in the Municipalities of Barceloneta, Vega Baja, Vega Alta, Toa Baja, and Dorado (Species Profile, USFWS), all of which fall within the project corridor route. Types of habitats are semi-evergreen forest about 100 meters (328 ft) in Bayamón, located at low elevations, dry forests in limestone, semi - deciduous, on the southwest coast in Guánica forest. A tree in the Maricao forest only survives in a montane, semi-evergreen green forest in outcrops 600 meters (1970 ft) elevation (USFWS 1990).

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the limestone hills of Peñuelas, and northern limestone hills of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.18 *Pleodendron macranthum* – (Chupacallos)

Federal Status: Endangered

The chupacallos is an evergreen tree growing to 10 meters (33 feet) in height. The leaves are alternate, simple, leathery about 8.5-12.5 cm (3-5 inches) long and 4.5-5 cm (1.5-2 inches) wide. The leaves are elliptical with a dark glossy green upper surface and sunken central veins. The underside is pale green with fine, and prominent central veins with parallel lateral veins.

The leaf stalks are approximately 7 mm (0.25 inch) long. Bisexual whitish flowers are solitary, 2 cm (0.75 inch) wide with stem flower 2.5 cm (1 inch). The black-purple aromatic fruit is 2 cm (0.75 inch) in diameter and contains many seeds. The chupacallos was placed on the Federal Endangered species lists as "Endangered" on September 9, 1994. There are less than 50 individuals of the species currently at seven locations in the wet tropical montane forests to the North and East of Puerto Rico (USFWS 1990). These locations are within the Caribbean National Forest and four are within the Río Abajo forest. This evergreen species is found in semi-open areas of the subtropical rainforest in the limestone slopes at elevations of 150-350 meters (490-1,150 feet).

The proposed corridor route may contain limited habitat suitable for the species, but none were identified during the Coll Environmental flora studies for the pipeline alignment. Potential suitable habitat may exist along the Utuado/Arecibo section of the Project route. The species is considered to have low potential occurrence within the pipeline corridors. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.19 *Polystichum calderoense* (Monte Guilarte hollyfern)

Federal Status: Endangered

Polystichum species are terrestrial or rock-dwelling ferns of warm-temperate and montane-tropical regions. Adult specimens are medium in size and reach 1 to 2 meters high. Ferns of this genus have stout, slowly-creeping rootstocks that form a crown, with a vase-like ring of evergreen fronds 30-200 cm long. The sori are round, with a circular indusium. The stipes have prominent scales. The genus differs from *Dryopteris* in the indusium being circular, not reniform, and in having stronger, more persistent fronds with a harder, somewhat rough, texture. Hybridization is frequent in the genus.

The species was identified by USFWS (June 30, 2010 Technical Assistance Letter) as having the potential to occur in the Central Mountain Range (Volcanic) of the project corridor route and the species was Listed as Federally Endangered on June 9, 1993. *P. calderonense* is only known from two localities. Forty-five individual plants (including juveniles) are known from the summit of "La Silla de Calderón" in the Monte Guilarte Commonwealth Forest (Proctor 1989). Additionally, 12 individuals found by Proctor (1991) in Cerrote Peñuelas in the municipality of

Peñuelas. The species present in the Guilarte Commonwealth Forest may be affected by forested management practices.

Potential habitat may exist for the species along the mountainous segments of the pipeline corridor but none were observed during Coll Environmental field reviews for this biological evaluation. Sections of pipeline running just south of Rio Abajo through the volcanic region to just north of Ponce may require further survey. Potential suitable habitat may also exist on the limestone hills of the Arecibo section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.20 *Schoepfia arenaria* – (No Common Name)

Federal Status: Threatened

The *Schoepfia arenaria* is an evergreen small tree or a shrub growing to 6 meters (19.7 ft) high. The species often has several trunks arising from the base, reaching 10 centimeters (4 inches) in diameter. Leaves are simple, alternate, and green on the upper surface and slightly green on the underside. The bark is grey, or thick, deeply furrowed, dead external crust color chocolate inside. The inner bark is dark pink. It has two or three tubular flowers at the base of the leaf. The species mainly flowers in spring and autumn, usually with two or three slightly yellow flowers and tubular at the end of the stems. The fruit, which appears during the summer and winter, is elliptical, seed, red shiny and 12 mm (0.5 inch) in diameter. The species was listed as "Threatened" on on April 19, 1991. *S. arenaria* is known to exist in four locations: Isabela, pine nuts, Fajardo and the Río Abajo Forest (USFWS 1990), however, the map for species occurrences also includes it in Quebradillas, San Juan, Loiza and Vega Baja (Species Profile, USFWS).

In the Isabella area about 100 individuals of all sizes are known, from woody upper slopes of the mountains to the West of the mouth of the River Guajataca (USFWS 1990). The species is found in evergreen or semi-evergreen forests in the lower elevations in densely wooded portions of the limestone hills in northern Puerto Rico; typically occurring at elevations of 150 to 350 meters (490 to 1,150 feet). Items that have historically restricted dissemination of this plant species are deforestation and the destruction of the limestone hills for materials, construction, agriculture, grazing and development such as urban, industrial or tourist development.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat for this species may exist on the limestone hills of the northern section of the Project route.

No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.21 *Solanum drymophilum* – (Erubia)

Federal Status: Endangered

The Erubia is an evergreen shrub that can grow up to 5.5 m (18 ft) tall, branching from the base, although it may grow from a single stem. The leaves and petioles of this species have sharp yellow spines, mainly on the midrib of the leaves. The spines are almost 13 mm (0.5 inch) long and are located in the middle of leaf vein. The mature shrubs have tiny whitish hairs on the star shaped leaves and petioles. These hairs are longer and appear in the branches and flowers of the younger Bush. The lanceolate to oblongate leaves are alternate, and the bisexual, white flower has five lobes and fan. The Erubia appears to flower and produce round, bright black berries, throughout the year. The Erubia was placed on the federal lists as "Endangered" on August 26, 1988. Historically, the erubia could be found in the Sierra de Cayey, Sierra de Naguabo and the town of Lares. The single location where the Erubia still is known is in the town Sierra of Cayey in the center of Puerto Rico. Approximately 100 to 150 plants exist in this private field, 840 meters (2,760 feet) in elevation and marked with volcanic outcroppings.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist on the volcanic hills of Peñuelas, Adjuntas and Utuado. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.22 *Stahlia monosperma* – (Cobana negra)

Federal Status: Threatened

Stahlia monosperma is a medium-sized evergreen tree endemic to Puerto Rico and Hispaniola (USFWS 1996). This tree can grow up to 50 feet in height and can be found in seasonally flooded wetlands in association with mangrove communities (USFWS 1996). Cobana negra produces an abundance of clustered-yellow flowers that give way to fleshy red fruits that smell

like ripe apples (USFWS 1996). Possible native seed dispersers include fruit-eating bats and land crabs that may take fruit into their burrows (USFWS 1996).

S. monosperma grows in brackish, seasonally flooded wetlands in association with mangrove communities (USFWS 1996). They are usually found close to black mangrove but are restricted to drier, elevated microclimates that are absent of mangrove species (USFWS 1996). Scattered populations can be found in Puerto Rico, Vieques and the eastern portion of the Dominican Republic (USFWS 1996). The largest population is known from southwestern Puerto Rico. The current status of these populations is unknown. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

This species is not included in the USFWS List of Caribbean Species in Danger of Extinction for Bayamon, and no suitable habitat was identified within the project corridor. Reference Coll Environmental Flora and Fauna report), August 2010. The Project was recommended to have "No Affect" on this species or its critical habitat.

3.23 *Tectaria estremerana* – (Helecho alabarda de Puerto Rico)

Federal Status: Endangered

The Helecho alabarda de Puerto Rico is a terrestrial fern with woody rhizomes averaging 10 - 15 mm (0.5-0.7 inch) in length. It has several loosely cluttered fronds 65-80 cm (25-32 inches) long. Significant items that affect this rare and restricted fern are destruction of habitat, and illegal specimen harvesting by collectors. The Helecho alabarda was listed as an "Endangered species" on June 9, 1993. The species is found in the karstic northwest region of Puerto Rico region and portions of the United States Virgin Islands. In Puerto Rico, this species has been found in two locations: the first is wet, shaded regions in or around limestone in wooded rocky slopes at elevations of 250-300 meters (820-985 ft) in the municipality of Arecibo. This location is inside the property of the Arecibo Radio telescope and had 23 individual plants when the registration was made. The second location is in the down river area in the municipality of Florida, where it was observed in 1994 (USFWS 1990). The species and the maiden hair of Puerto Rico (Adiantum vivesii) share local habitats and characteristics.

The Via Verde project corridor includes habitat suitable for the species, but the species was not found in the field studies of the proposed construction corridor. Potential suitable habitat may exist on the limestone hills of the northern section of Project route. The species is considered to

have a low potential of occurrence in the project ROW and a determination of may affect but not likely to adversely affect (MANLAA) this recommended for this species or its critical habitat.

3.24 *Thelypteris inabonensis* (Cordillera Maiden Fern)

Federal Status: Endangered

Thelypteris inabonensis is currently know from only two localities, one protected population in the municipality of Ponce and the other in the municipality of Quberadillas. The Ponce population is made up of 34 individuals, whereas that in Quebradillas is composed of only 12 individuals. These low numbers combined with such a small number of populations spells trouble for this rare fern which favors high elevations (3,680-4,100 feet) in wet montane forests . The fern may also be found on high limerock outcrops in the understory of sub-tropical moist forests. This species was placed on the Federal Endangered Species List on January 17, 1995.

Potential habitat may exist for the species along the mountainous segments of the pipeline corridor but none were observed during Coll Environmental field reviews for this biological evaluation. Sections of pipeline running just south of Rio Abajo through the volcanic region to just north of Ponce may require further survey. Potential suitable habitat may exist on the limestone hills of the Arecibo section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.25 *Thelypteris verecunda* – (Helecho doncella del Barrio Charcas)

Federal Status: Endangered

The Helecho doncella del Barrio Charcas is a terrestrial fern with 2-3 mm (0.75-1.2 inch) thick climbing rhizomes. Its dimorphic frond is covered with star-shaped hairs and many simple and long hairs. Sterile sheets are oblong, 2.5-4 centimeters (1-1.6 inches) long and 1.5-2 centimeters (0.6-0.8 inch) wide, truncated at the base, and round in the widely lobed apex, which also has brown scales. The fertile leaves are linear to attenuated, 13-15 cm (5-6 inches) long, 1.2-1.8 cm (0.5-0.7 inch) in width, truncated at the base and the spine has a tiny and mainly button below the apex. The small and erect sori has a tuft of hair which is long, white, and simple.

This species was placed on the Federal Endangered Species List on July 2, 1993. Due to its rarity, the species is extremely vulnerable to the loss of any individual. Elements that have

negatively affected the species survival are land clearing and the subsequent development of its habitat. The species has been found from the Charcas Barrio in the Municipality of Quebradillas (USFWS 1990). Other locations with known specimens include: Barrio Bayaney, Hatillo and Barrio Cidral in the Municipality of San Sebastian (USFWS 1990). Each of the three known locations for this fern are in private ownership. In Quebradillas and San Sebastian, only an individual has been collected from every location (USFWS 1990). At Barrio Bayaney, around 20 plants are known (USFWS 1990). Specimens are found in wet, shaded limestone areas at elevations of approximately 200 meters (656 ft).

Potential habitat may exist for the species along the mountainous segments of the pipeline corridor but none were observed during Coll Environmental field reviews for this biological evaluation. Sections of pipeline running just south of Rio Abajo through the volcanic region to just north of Ponce may require further survey. Potential suitable habitat may exist on the limestone hills of the Arecibo section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.26 *Thelypteris yaucoensis*

Federal Status: Endangered

Thelypteris yauconensis is perhaps one of Puerto Rico's least known ferns. Very little information is currently available on any aspect of its biology. The species is known only from three populations in the Municpalities of Yauco and Ciales. The total number of plants from all populations is estimated to be fewer than 65 individuals, and all occur on privately owned land, where no protection laws are in place. This fern prefers steep, shady, rocky banks at high elevations of 2780-3940 feet. Given the small population sizes of all three *Thelypteris* ferns, removal of even a single individual could be harmful. This species was placed on the Federal Endangered Species List on January 17, 1995.

Potential habitat may exist for the species along the mountainous segments of the pipeline corridor in the volcanic Central Mountain Range but none were observed during Coll Environmental field reviews for this biological evaluation. Sections of pipeline running just south of Rio Abajo through the volcanic region to just north of Ponce may require further survey. Potential suitable habitat may also exist on the limestone hills of the Arecibo section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.27 *Trichilia triacantha-* (Bariaco)

Federal Status: Endangered

The Bariaco is a small evergreen endemic tree. Easily recognized by its three to seven small wedge shaped palmate leaves (i.e. in the form of the Palm of the hand); each with three sharp spiny tooth lobes. This species can reach about 30 feet tall with a trunk diameter of 3 inches. Floral clusters are short and are located out on the ends of the twig. The flowers are white and about 1/8 inch in size. The fruits are in the form of capsules. The Bariaco produces flowers between January and March, their fruits ripen in the summer months. Preliminary studies indicate that this species produces very little fruit and that there have been very few seedlings or young trees.

The Bariaco tree is currently known only in Guánica, Yauco and Guaniquilla in the Cabo Rojo area. It is estimated there are approximately seventy individuals. The map for species occurrence also includes the tree in Peñuelas, Sabana Grande, and Guanica (Species Profile, USFWS). The species is found in the deciduous forests and semi-evergreen forests on soils comprised of limestone in the driest area of Puerto Rico. The Bariaco was included in the list of endangered species in 1988.

The most important factors affecting the continued survival of this tree include deforestation for urban and industrial development, agriculture, and its use for entresaque wooden poles and charcoal. In Guánica some individuals are located in the State forest. Expanding and/or improving this habitat area will allow for expansion of existing populations. Key factors to preserving this species should include: protection of known individuals, studying the biology of the species, recognition that this attractive tree has an ornamental potential, and development of a method to production of new plants for planting in protected areas; attempts to propagate the Bariaco have not been successful so far.

The species was not found during the Coll Environmental field reviews of the project's proposed corridor. Potential suitable habitat may exist within the Subtropical Dry Forest in the Peñuelas section of Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

3.28 *Zanthoxylum thomasianum* (St.Thomas Prickly Ash)

Federal Status: Endangered

Zanthoxylum thomasianum is a small evergreen tree/shrub up to 6 meters in height, growing as a component of dry forest. Male and female flowers are borne on different plants and this may be an important detrimental factor for its survival given its low population size and the fragmented nature of its distribution. No seedlings have been reported from the PR or USVI populations and only a single seedling has been observed in Virgin Gorda. A total population was estimated to be around 300–350 mature individuals in 1985 when it was listed as an Endangered Species under the US Federal Endangered Species Act. The US Fish and Wildlife Service drew up a recovery plan for this species in 1988. It was also listed as Endangered in the 1997 IUCN Red List of Threatened Plants (Walter and Gillett 1998). All these listings were based on the known scattered subpopulations on Puerto Rico, St Thomas and St John (US Virgin islands). Since 1988 the habitat for this species in St Thomas, St John and Puerto Rico has come under increasing pressure from residential development, habitat has been lost and we can infer that mature individuals have been lost. Some of the known Puerto Rico individuals are on private land that is undergoing changing land use. Mining for limestone is also a threat in part of its range.

The proposed corridor route may contain limited habitat suitable for the species, but none were identified during the Coll Environmental flora studies for the pipeline alignment. Potential suitable habitat may exist along the northern limestone hills in the Arecibo section of the Project route. No determination has been made as to the potential occurrence of this species within the proposed Via Verde Pipeline corridor.

4 Fauna

Three species of sea turtles and the Antillean manatee have been identified as occurring in various coastal municipalities (Peñuelas, Bayamon, etc.) within the proposed pipeline corridor route. The pipeline corridor has been designed so as not to impact any marine environments and therefore these species have not been addressed in this biological evaluation. All construction activities will occur well above the mean higher high water line and will not impact any suitable foraging and nesting habitats.

The following species of animals, eight federally listed and ten state listed (Commonwealth of Puerto Rico) have the potential to be found within the pipeline corridor route.

4.1 Amphibians

4.1.1 *Peltophryne lemur* – (Sapo concho de Puerto Rico)

Federal Status: Threatened

The Puerto Rican crested toad, or Sapo concho, is a mid-size toad, 64-120 mm (2.5-5 inches), with olive-yellow to blackish brown supraorbital ridges and a distinctive turned up snout. Males are considerably smaller than females and have a prominent crest. In spite of not being documented, it is believed these toads are opportunists who primarily consume insects and other invertebrates. Mating appears to be sporadic and highly dependent on occasional heavy rain. When rain and surface waters are suitable, a mating season may occur. The mating period is short and after a few weeks the metamorphosis is complete and their young disperse rapidly. The adult toads are semi-fossorial and widely dispersed when not mating.

Due to this species' cryptic behavior, location or even the presence of adults when they are not mating frogs is difficult to detect. At present, concho toads are known to exist only on the island of Puerto Rico at low elevations, below 200 meters (656 feet). A single large population, located on the southwest coast in Guánica forest has been documented, and a small population is believed to exist on the North Coast. This species has also been infrequently collected in the plains of the South coast, near Coamo (USFWS 1990). While the population of the Guánica forest is relatively stable and consists of approximately 1,500 to 2,000 individuals, the Northern population is only 25 individuals.

The Puerto Rican concho toad was added to the Federal lists as "threatened" on August 4, 1987. The main factors contributing listing includes loss of habitat due to fill and drain for construction, farming, and control of mosquito breeding sites.

The Department of Natural and Environmental Resources reported a significant increase in the Concho toad population in the Bosque Seco de Guánica (Guánica Dry Woodlands) during the first half of this year. The current estimate for the toad population in Puerto Rico is 3,000. Three significant reproductive events have already taken place in Guánica and there is still the possibility that the population will keep on growing because of the above normal rainy season.

DNER biologists have monitored and counted 1339 males, 389 females, 201 amplexus, and 39 rows of hatched eggs.

Funding for recent studies has been provided by USFWS along with the consulting and labor from the Texas Fort Worth Zoo. DNER's efforts to construct artificial ponds for toad reproduction in Manglillo Pequeño continue to provide positive results. Initial monitoring of the artificial pond site indicated that the pond was used by two pairs of Concho toads for reproduction. Additional efforts in the Finca Gabia in Coamo and El Tallonal, have demonstrated that observed adult toads who grew up in other artificial ponds have also demonstrated reproductive success.

The Puerto Rican Concho toad is the only toad endemic to the island. In the past, populations could be found along the northern coast from Arecibo to Isabela and the southern coast between Coamo and Guánica. The northern population was observed for the last time in 1992. The only known reproductive populations are currently found in the Guánica State Forest. Appropriate collaborative management between state, federal and private agencies have resulted in positive population increases of this endangered species.

Conservation measures for the Puerto Rican crested toad have been adopted to reduce any potential impacts associated with clearing and construction of the proposed pipeline. With these conservation measures in place, a "May Affect, but Not Likely to Adversely Affect" (MANLAA) determination is recommended.

4.2 Reptiles

4.2.1 *Epicrates inornatus* – (Puerto Rican Boa)

Federal Status: Endangered

The color of the Puerto Rican boa is variable, but generally is colored from pale to dark brown, sometimes white, with 70 to 80 more dark spots on the back from the neck to the anal opening. These dorsal spots usually have dark edges with centers of a lighter hue. The maximum size of this snake is about 2 meters (6.5 feet). In captivity, the boa diet consists of birds, small mammals and lizards, and their diet in the wild is estimated to be similar. The boa feeds by swallowing its prey head first, taking the prey in its jaws, then coiling and squeezing to suffocate the victim.

This species exists only in Puerto Rico; however, there are no estimates as to the population numbers. During radio telemetry studies in the Reserva de Mata de Plátano, the average area covered by females during the breeding season was 7,800 square meters, and 5,000 square meters for males (USFWS 1990). The average area covered by females during the non-breeding season was 22,119 square meters and 1,326 m^2 for males. During the breeding season, all females under study covered an average area of 16,940 square meters and all males covered 18,500 square meters.

The Puerto Rican boa was listed as "endangered" on October 13, 1970. The decline in the snake's population resulted from the popularity of the oil produced from the snake's fat and impacts to the snake's preferred habitat. Deforestation and poaching continue to affect the population. Predation by the mongooses, introduced in Puerto Rico in the 1900s, is thought to be another possible element contributing to the decrease in the boas' numbers, although this has not yet been substantiated.

During field reviews of the pipeline corridor, two individuals were encountered. The species is considered to have a high potential of occurrence in the proposed pipeline corridor.

A conservation measures/plan has been prepared for protection of the Puerto Rican boa during the clearing and construction of the pipeline (see Section 6.2). With adoption of the Puerto Rican boa Conservation plan, it is recommended that the proposed Via Verde pipeline project have a "May Affect, but not likely to Adversely Affect" (MANLAA) determination.

4.3 Birds

4.3.1 *Accipiter striatus venator* – (Puerto Rican sharp-shinned hawk)

Federal Status: Endangered

This small hawk is approximately 28-33 cm (11-13 inches) long. The upperparts are gray and the sub-adult is distinctive. Sub-adults are brown with stripes on their undersides. While in flight, the noticeable characteristics are the short, round wings, and long, narrow tail. Nesting hawks may prefer modified habitats and may select plantations and natural forest with similar plant structures and topography (closed and dense coverings). The breeding populations have been located in the mountain forests in Maricao, Toro Negro, Guilarte, Carite and the Caribbean national forest.

In 1992, a census of 285.6 miles square (178 square miles) found 82 Puerto Rican sharp-shinned hawks; 40 in the Maricao forest, 30 in Toro Negro forest, 10 in Carite forest, and 2 in the Caribbean National Forest. Courtship and territorial activities in the Maricao forest for this species has been located in the north-central, in the lower moist subtropical forest and wet subtropical forest. In the Carite Forest, courtship and territorial activities occurred in the northeastern and north central regions. In the Caribbean National Forest, only two individuals were detected in the Palo Colorado forest and the lower-montane forest (USFWS 1990).

The species was listed as "Endangered" on September 9, 1994. Threats to this hawk include logging, construction of roads, the increase in the number of recreational facilities, the effects of hurricanes, and issues of genetic variation. Additionally, high attrition rates of eggs and high mortality of chicks due to the parasitic botfly larvae (*Philornis* spp.) have affected the numbers of this species.

The project corridor traverses habitat that has been determined to be appropriate for the species, however the species was not observed during field reviews for this biological evaluation. The species is considered to occur within pipeline corridor as proposed. To assist in compliance with the federal Endangered Species Act (ESA) of 1973, the project owner (PREPA) contracted Tetra Tech, Inc. (Tetra Tech) to complete a Biological Evaluation (BE) to evaluate the effects of the proposed project on the Puerto Rican Broad-winged Hawk (Buteo platypterus brunnescens) and Puerto Rican Sharp-shinned Hawk (Accipiter striatus venator). Mr. Derek Hengstenberg, a recognized expert on these raptor species and current avian biologist with Tetra Tech, conducted the evaluation. The following results and recommendations pertaining to the sharp-shinned hawk have been excerpted from Mr. Hengstenberg's study.

> Extant population of Sharp-shinned Hawks have been mostly found from the upland forests (elevation of 200 meters or greater) of Puerto Rico including Maricao, Toro Negro, Carite, and Luquillo. Sharp-shinned Hawks are noticeably absent from karst forests and coastal plains. Sharp-shinned Hawk habitat appears restricted to upper elevation habitat. Sharp-shinned Hawks showed high site fidelity within subtropical wet forest and subtropical lower montane wet forest life zone. It appears that Sharp-shinned Hawks are selecting certain habitat over others (Delannoy 1997). High stem density, closed-canopy, and tall-large diameter trees are important habitat features for Sharp-shinned Hawks.

Of the approximately 92 miles of pipeline proposed, approximately 20 miles is within potential Sharp-shinned Hawk habitat in parts of Focal Area 1 (Figure 1). A no impact area was calculated from mileage marker 30 to mileage marker 91 along the central and northern part of the pipeline and then again from mileage marker 0 to 10 along the southern section. Sharp-shinned hawks are not known from the karst region and are typically found at elevations greater than 900 feet.

Northern Coast: There should be no impact to Sharp-shinned Hawks from mileage marker 38 to mileage marker 91 along Via Verde Pipeline.

Central Karst Region: There should be no impact to Sharp-shinned Hawks in these sections ofthe Via Verde Pipeline from mileage marker 30 to mileage marker 37.

Central Mountain Volcanic Region: The proposed Via Verde pipeline does not pass through any commonwealth forests that support known Sharp-shinned Hawks. However, the pipeline crosses stretches of continuous forest tracts in the Cordillera Central that may provide habitat for the Sharp-shinned Hawk (mileage marker 10 to 30). According to the Puerto Rico Breeding Bird Atlas, the Adjuntas Pueblo survey route (# 0910) confirmed the presences of Sharp-shinned hawks. This survey route is in close proximity to the proposed path of the pipeline.

The moist/wet subtropical forested tracts of land that occur north of the subtropical dry forest life zone and extend until the karst region near Lago Dos Bocas is the area that should be further evaluated (Figure 2). In this section, the pipeline follows some mountainous roads but the majority of the pipeline will be overland (through intact forests) and will require a temporary 100-foot corridor (in places of forested habitat) to be cleared during the construction process and then a 50-foot corridor maintained for the life of the project. In these interior forest sections, very little data exists on Sharp-shinned Hawks. Although sporadic, the data suggest the occurrence of Sharp-shinned hawks in these mountainous montane sections. Sections of pipeline that are proposed for overland development and contain intact forest structure in the moist/wet lifezone should be evaluated.

4.3.2 *Angelaius xanthomus* (Yellow-Shouldered Black Bird)

Federal Status: Endangered

The Yellow-Shouldered Black Bird is a brilliant black with yellow spots on the shoulder of each wing. Adults reached a size of 8 inches, the female being slightly smaller than the male. Young of both sexes resemble the adults. This species is one of nine species of the genus *Agelaius*. There are two subspecies: *Agelaius xanthomus xanthomus*, known only in Puerto Rico and Vieques, and *Agelaius xanthomus m. monensis*, found only in the island of Mona and Monito island.

The breeding season for this species extends from May to August. The nest is a structure of grass and dried herbs faced and lined in soft materials. These nests are built in trees and usually in aggregate. The entire process of incubation is done by the female, however, the couple also shares the feeding of nestlings. The yellow-shouldered black bird has been known to feed on animal material or vegetable matter, but can best be classified as an arboreal insectivore.

The Yellow-Shouldered Black Bird is an endemic species, or that exists only in Puerto Rico. In the past, this species was considered abundant and was distributed throughout the island. After 1976, the population suffered a dramatic decline. Three major populations exist for this species: South West coast of Puerto Rico (State Boquerón forest), South-East Coast (Roosevelt Roads Naval Station), and Mona and Monito Islands. Current estimates of the population in the South-West of Puerto Rico range from approximately 300 to 500 individuals, approximately 400 individuals in Mona and a few individuals in the southeast of the island. Limited sightings of the Yellow-Shouldered Black Birds have been found in San Germán, Salinas, Laguna, Cartagena, Lajas, Cabo Rojo and Naguabo municipalities.

Among the main reasons for the population decline of this species are: the destruction or modification of nesting habitat, nest predation by rats and mice in mangrove areas, and in coastal areas of the southwest of Puerto Rico, competition for nest and breeding areas with the Shiny Cowbird (*Molothrus bonariensis*). Coastal forests of southwestern Puerto Rico have additionally been severely affected by agricultural use, and accelerated and unplanned residential/tourist development. The La Parguera mangrove system in Lajas, including cays close to the coast, were a very important breeding area for Yellow-Shouldered Black Bird several decades ago. At present, these areas continue to be used by the Yellow-Shouldered

Black Bird as critical habitat. Although the Parguera mangrove system is part of the Boquerón State Forest and it is designated as a nature reserve by the Planning Board, the importance for the survival and recovery of this species has been limited due to unrestricted use of the area by houseboats and stilts houses and their along with their debris, continually modify and impact their habitat.

The Yellow-Shouldered Black Bird was placed on the federal list of endangered species in the 1976 and designated areas in the southwest of Puerto Rico including the village of San Germán, Roosevelt Roads Naval Station and the island of Mona were identified as critical habitat for the species. The DRNA, and the United States Fish and Wildlife Service share a cooperative yellow-shouldered black bird recovery program in the southwest of Puerto Rico (Boquerón State Forest). This program is mainly to provide artificial nest structures and the control of the population of Shiny Cowbirds. Improved reproductive success of this kind is important to increase of the population of Yellow-Shouldered Black Bird, incorporating increasingly more youth to the existing population. However, the protection of critical habitat required by the species to survive is essential for the recovery of the same.

The proposed Via Verde pipeline route has been designed to avoid impacts to coastal forested habitats. The Yellow-Shouldered Blackbird will not be affected by this project (Recommended: No Affect).

4.3.3 *Amazona vittata* – (Cotorra Puertorriqueña)

Federal Status: Endangered

The Puerto Rican Parrot is bright green with red front and blue primary feathers in the wings, with flesh-colored beak and legs and is approximately 30.5 cm (1 foot) long. This bird feeds mainly on wild fruits with the Sierra palm (*Prestoea montana*), being a preferred food source. The species also eats flowers and tender shoots. During October, when other fruits are scarce, Tabonuco (*Dacryoides excelsa*) fruit becomes an important food. Observations in the 1990s indicated that nesting was limited almost exclusively to natural cavities in Palo Colorado trees (*Cyrilla racemiflora*). The parrots cleaned a cavity inside the tree but did not add materials. Nest height varies between 7 - 15 meters (23-49 feet) above the forest floor. The breeding begins in January and females generally lay two to four eggs. The incubation period is about 13 weeks. An intense management program began in 1973, greatly increasing the success rate of the Puerto Rican Parrot chicks.

The preferred Puerto Rican parrot habitat consists of mature rainforest between 396-929 meters (1,300 - 2,700 ft) in elevation. The species does not use dwarf forests at higher elevations or second succession lowland forests. The parrots are limited to the areas that have the largest number of old Palo Colorado trees, which supply the cavities for nests. Historically the parrots have also nested in the hollow crags of cliffs, being less specialized in habitat preferences, and also have been reported to use more diversified habitat in lower elevations.

The captive breeding program for the Puerto Rican Parrot program began in 1968, mating some wild and some parrots already in captivity. A captive flock is used to increase the amount of parrots; to maintain a second group of birds, in particular if a natural disaster occurs; to provide and manipulate different strains of genetic material for its exchange with the wild flock and eventually back into the wild. While the Caribbean National Forest contains approximately 26,000 acres, the parrots are concentrated in a small area of 3,000 acres in central west and western regions of the forest. The karst region in the north has been identified as the site for the release of the Puerto Rican parrot. The species was listed as "endangered" on March 11, 1967. The initial decline of the species is attributed to extensive deforestation. Additional factors contributing to their decline are hunting, devastating hurricanes, natural predation and illegal pet trade. The small size of the current population makes any adverse pressure very serious.

The proposed pipeline corridor will not affect any critical habitat for this parrot as no suitable habitat exists on the pipeline corridor route. The proposed Via Verde Pipeline corridor will not impact the Puerto Rican parrot. "No Affect" is the recommended determination

4.3.4 *Buteo platypterus brunnescens* – (Guaraguao de Bosque)

Federal Status: Endangered

The Puerto Rican Broad-winged Hawk is a small falcon, dark brown in color, with a total length of approximately 39 cm (15 inches). Adult characteristics are broad bands of black and white on the tail and a russet chest. Unlike the adults, juveniles have dark bars on the chest and lack distinctive bands on the tail. Its wings are broader than the similar but larger Red-tailed hawks. This species normally preys on centipedes, frogs, lizards, mice, rats and other birds. The species is rare and localized. Existing populations are restricted to mountain habitats in three forest: Caribbean National Forest, Carite Forest, and Río Abajo Forest. The total area currently identified as Puerto Rican broad-winged hawk habitat is approximately 338 square kilometers (132 sq mi). In the north-central area of the Caribbean National Forest, the species is found in

subtropical wet forest where the Tabonuco is the dominant forest type. In the Carite National forest, this species has been reported in limestone slopes occupied by Caimitillo (*Chrysophyllum mexicanum*), Tabonuco (*Dacryodes excelsa*), Granadillo (*Buchenavia tetraphylla*), and elfin forests. Additional observations of this species have been reported in other areas including Cayey (near of forest Carite), Utuado, Jayuya, Adjuntas and Villalba.

The species was listed as endangered on September 9, 1994. Timber harvest, poor forest management practices, road construction, an increased number of recreational facilities, demands for public use, destruction of habitats, hurricanes, and the potential loss of genetic variation due to low levels of population are all potential threats to the species.

To assist in compliance with the federal Endangered Species Act (ESA) of 1973, the project owner (PREPA) contracted Tetra Tech, Inc. (Tetra Tech) to complete a Biological Evaluation (BE) to evaluate the effects of the proposed project on the Puerto Rican Broad-winged Hawk (Buteo platypterus brunnescens) and Puerto Rican Sharpshinned Hawk (Accipiter striatus venator). Mr. Derek Hengstenberg, a recognized expert on these raptor species and current avian biologist with Tetra Tech, conducted the evaluation. The following results and recommendations pertaining to the broad-winged hawk have been excerpted from Mr. Hengstenberg's study:

> Northern Coast: A smaller area of evaluation is between the towns of Manati and Vega Baja where the proposed pipeline intersects karst topography of mogotes and sinkholes for a 9 mile stretch of pipeline. The section from mile marker 59 to mile marker 68 is an overland pipeline section through karst topography. There is potential Broad-winged Hawk habitat and a survey is recommended for this area. The remaining coastal area from mileage marker 38 to 58 and 69 to 91 do not contain Broad-winged Hawk habitat. No surveys are recommended in these sections.
>
> Central Karst Region: The proposed Via Verde pipeline will pass through the Rio Abajo Forest (karst region) where there is the highest abundance of Broad-winged Hawks nesting on the island (Delannoy 1997; Hengstenberg and Vilella 2004, 2005). This forest is also home to a recently re-introduced population of endangered Puerto Rican Parrots (Amazona vittata). In 2000 and 2001, one Broad-winged Hawk had a home range (Hengstenberg and Vilella 2004, 2005; Vilella and Hengstenbeg 2006) that encompassed area on both sides of Highway Route 10 in the northern section of Rio Abajo. In addition, the Puerto Rico Breeding Bird Atlas recorded Broad-winged Hawks

on a couple of their survey routes in this region: # 0608, # 0610, # 0613, #0537, and #0687. Broad-winged Hawks in this stretch of pipeline, from mile marker 30 to 37.5 have been studied in the early 1990s and early 2000's. In this particular section, the pipeline is to be co-located in the same right-of-way as the Highway Route 10. Due to the co-location of the Via Verde pipeline, there should not be any greater disturbance to Broad-winged Hawks than the already existing highway. For this reason, the pipeline in this section may affect but is not likely to adversely affect the Broad-winged Hawk. We still recommend conducting a Broad-winged Hawk survey along the pipeline corridor in this section to document presence/absence along the proposed route. Three survey points should be established, one at the northern, one in the central portion, and one at the southern extreme of the forest boundary to cover the Rio Abajo Forest section of pipeline.

Central Mountain Volcanic Region: The section of pipeline running just south of Rio Abajo through the volcanic region to just north of Ponce in subtropical dry forest zone is a section that needs to be evaluated for the Broad-winged Hawk. The evaluation area is a stretch of pipeline of approximately 20 miles. This section contains a combination of upper elevation forests with forested habitat and there have been historical,, as well as recent, records of Broad-winged Hawks. The Puerto Rico Breeding Bird Atlas recorded birds from the Guaraguao, Ponce survey route (# 0987). In this section, the pipeline follows some roads but the majority of the pipeline will be overland (through intact forests) and will require a temporary 100-foot corridor (in places of forested habitat) during the construction process and then maintaining a 50-foot corridor. Due to the limited data from this area, the occurrence during a breeding bird survey, historic incidental observations, and potential habitat in this region, a Broad-winged Hawk survey is recommended.

4.3.5 *Caprimulgus noctitherus* – (Puerto Rican Nightjar)

Federal Status: Endangered

The Puerto Rican Nightjar, *Caprimulgus noctitherus*, is a rare bird found in the coastal dry scrub forests in localized areas of southwestern. The Spanish common name "Guabairo de Puerto Rico" is derived from the Taino Indian name. Active only after dark, the Puerto Rican Nightjar is rarely detected during daylight hours. Its excellent camouflage of mottled black, brown and gray, broken by a white band across the throat and white spots at the ends of the tail feathers, makes

this robin-sized bird scarcely distinguishable from the leaf-litter on the forest floor where it rests motionless all day. Shortly after twilight, and again before dawn, the male may call from a tree branch, giving a rapid series of whistled "whip" notes. It is heard far more often than seen. Most sightings are mere glimpses of the bird in flight at dusk after it has betrayed its presence by vocalizing, but individuals may also make repeated foraging flights from favorite perches. The loud, distinctive territorial calling makes this species especially easy to census.

The Puerto Rican Nightjar was federally listed as Endangered in 1973. The U.S. Fish and Wildlife Service approved a Puerto Rican Whip-poor-will (nightjar) Recovery Plan in 1984. The plan recommends research to gain knowledge of the population, range and natural history of the imperiled species, the cause of its decline, and potential threats to its survival. It also calls for protection of existing populations on both public and private lands, and education of the public against adverse habitat modification.

The historical range probably comprised moist limestone and coastal forest in northern Puerto Rico, as well as currently occupied dry limestone forest, drier sections of the lower cordillera forest and perhaps dry coastal forest. It is presently more abundant in closed canopy dry forest on limestone soils, composed mainly of semi-deciduous hardwood trees with abundant leaf litter and an open understory (little or no ground vegetation) at elevations up to 230 m, but more commonly above 75 m. It occurs in lower densities in dry, open, scrubby secondary growth, xeric or dry scrubland, open scrub-forest and thorny forest undergrowth, with a few birds in *Eucalyptus robusta* plantations. Birds are perhaps permanently territorial, exhibiting strong inter-annual site fidelity.

Puerto Rican Nightjars make short foraging flights from perches to capture night-flying insects (beetles, moths). They feed almost entirely below the forest canopy. As in all caprimulgids, the wide gape is edged with stiff bristles to aid the bird in localizing its prey. Foraging activity may increase on bright moonlit nights, as calling has been observed to diminish at those times.

Breeding occurs from late February to early July, but mainly in April-June. The territorial male is vocal throughout the year, but calling peaks at the height of the breeding season during April and May. The female lays 1 or 2 eggs directly on leaf litter under low bushes, constructing no nest. Evidence of nesting is common at elevations above 100 m; usually being characterized by a deep layer of leaf litter and an open mid-story beneath a closed canopy. The light brown eggs are ringed and splotched with purple. Incubation is by both sexes and takes about 19 days. In Guánica forest area, approximately 87% of nests in one year produced at least one fledgling.

After hatching, the young chicks are moved away from the incubation site by the attending parents. Adults use distraction displays to lure predators away from their eggs or chicks. The young begin to fly in the third week after hatching, and become independent shortly thereafter.

The Puerto Rican nightjar once inhabited coastal lowlands all around western Puerto Rico, but habitat loss and introduced predators have now restricted it to a very small fraction of its former breeding range. The species is now found only in dry limestone forest along the southwest coast of the island on public lands designated as state forests and biosphere reserves, the most notable of which is the Bosque Estatal de Guanica (Commonwealth Forest of Guanica), where it is most numerous, but also in the Bosque Estatal de Susua, the Sierra Bermeja, and in hills near Guayanilla and Parguera. The Conservation Trust of Puerto Rico has also acquired lands in the Guayanilla-Peñuelas region, this area includes mature dry forest where nightjars are abundant. The present distribution represents only a small fraction (estimated at 3%) of the nightjar's former range, which is known to have included moist limestone forests along the north coast as far eastward as Bayamon, and may have extended inland to the lower cordillera.

The current population is estimated to be between 1,400 and 2,000 mature birds and expected to be stable as long as the habitat is not altered and introduced predators such as and cats, are controlled. The current classification is mainly due to the special habitat on which it depends being heavily fragmented and degraded. As a result of this habitat fragmentation, the population is very patchily distributed. Disturbances that could significantly threaten nightjars in their remaining forest refuges include tree cutting, road and utility line construction and maintenance, extensive recreational use of the forests, wild fires, and grazing by domestic stock. About half of the current nightjar habitat is in protected public forests, but the remainder, including lands adjacent to the public forests, is privately held forestland susceptible to conversion to other uses.

The mongoose (*Herpestes jarvanicus*) may have played an important role in eliminating nightjars from the moist forests of the north coast after its introduction to Puerto Rico in 1877. Any changes that make the dry forests in the southwest of the island more hospitable to mongooses or more accessible to dogs, cats, and rats could adversely impact the nightjar.

The Guabairo is legally protected throughout much of its current range. Guánica, Susúa and Maricao are public lands designated as state forests, and Guánica is a biosphere reserve. The

Conservation Trust of Puerto Rico lands in the Guayanilla-Peñuelas region includes mature dry forest where nightjars are abundant, constituting the only protected nightjar habitat in this portion of their range. The population is surveyed regularly and spatial analysis is being used to identify areas of potentially suitable habitat for protection and examine changes in habitat cover over time.

To avoid impacts to nightjars during construction, commencement of any clearing of vegetation required for construction within or adjacent to mature dry forest where nightjars are abundant, will occur outside of the April-June nightjar nesting season. However, in emergency situations, if vegetation needs to be cleared during the nesting season, experienced and qualified biologists will survey the area proposed for clearing for Nightjar nests prior to any clearing activity being undertaken. In the event that nests are found, the nests will be avoided by reducing or relocating the right-of-way, or by delaying the activity until the nightjars fledge their young.

A determination of May Affect but Not Likely to Adversely Affect (MANLAA) is proposed for this the species, if appropriate avoidance measures are taken. Portions of this species habitat are likely to be affected. Habitat restoration, conservation, etc. may be proposed to compensate for habitat loss.

Columba inornata wetmorei – (Puerto Rican Plain Pigeon)

Federal Status: Endangered

The Puerto Rican Plain Pigeon is similar to the dove in size and shape. At a distance, the species seems to be pale blue-grey. Head, back of neck, chest, and the top center of the collected wing are colored wine. The edge of the wing is marginalized with white, while the legs are dark red. A variety of fruits, seeds and livestock feed make up the diet of this species. Mating occurs throughout the year, but reaches its peak in late winter and spring. Some nests are weak twigs, occasionally placed on an accumulation of garbage in reeds or nests of rats without using platforms. More typically, nests are built in the crook of tree branches or near the top of a stalk of bamboo. The Plain Pigeon produces only one egg per brood, but females have been observed to have three broods per year. The formation of flocks may occur at any time when food is abundant. Adult pigeons congregate in small packs for feeding during the breeding season.

In 1990, this species had a minimum of 204 individuals in the wild and 116 in captivity (USFWS 1990). Observations carried out since 1973 indicate that the only existing population is found in the mountainous forest and in Cidra and surrounding municipalities, particularly Cayey. Also a few birds were reported in Gurabo and Utuado (USFWS 1990). Historical habitats used by this bird includes the low swamps and timber lands, open land and land in the mountains, the limestone karst area and coffee plantations in the high hills.

The Puerto Rican Plain Pigeon was listed as "Endangered" on October 13, 1970. Extensive deforestation and over hunting have contributed to the reduction of the population. Loss of habitat due to the rapid development of the Cidra area is the most serious threat to the existence of the species. Most of the observed failed nests were a direct result of human disturbance. The species' reluctance to colonize new areas has hindered the establishment of new populations.

Portions of the proposed corridor route contain habitat historically appropriate for the species (limestone Karst area) but none have been identified in any study corridor during field reviews.

5 Direct Impacts, Indirect Impacts, and Cumulative Impacts

Construction impacts associated with the Via Verde Pipeline will be temporary. The total project area encompasses 1,113.8 acres, over one-half of which will be allowed to recruit back to, or will be restored to, its natural pre-construction state. The permanent right-of-way, to be maintained in a naturally vegetated state, will be limited to 553.7 acres. The natural vegetation to be allowed in this area will include all but the largest and most deep rooted of the tree species and will continue to provide habitat.

5.1 Construction Impacts to Existing Land Use, Land Cover, and Conservation Areas

Construction impacts to existing land use/land cover would typically be temporary and are expected to have minimal, long-term impacts. Activities associated with the construction of the Via Verde Pipeline Project would result in temporary impacts to existing land use/land cover, such as clearing of vegetation and excavation of the pipeline trench. Typically, an approximately 150-foot-wide construction ROW would be needed for the construction of the proposed mainline and laterals. Following construction, the ROW would be reestablished to its pre-existing contours to the extent practicable, and the temporary construction ROW would be allowed to

revert to natural conditions. The permanent ROW would consist of an approximately 50-foot-wide easement that would be re-contoured and maintained free of deeply rooted vegetation throughout the life of the Project. The permanently maintained ROW would provide open areas to aid in aerial surveillance and to permit access to the pipeline for inspection and maintenance. In areas where the Via Verde Pipeline corridor is collocated within existing utility ROWs, PREPA will use the existing ROWs to the extent practicable to avoid the clearing of additional lands.

The vast majority of the Project is located in low-populated rural areas. Impacts to land use/land cover would vary according to the type crossed and the distance traversed. Only a minor portion of the land use/land cover potentially impacted by the construction of the proposed Project would include conservation areas maintained under local or state jurisdiction (i.e., state forests, wildlife preserves, forested wetlands, and forests) and residential areas. Long-term impacts lasting the life of the Project would occur within the permanent ROW with regard to certain agricultural uses and development of commercial or residential structures. Silviculture and citrus groves would not be permitted within the permanent ROW, and commercial or residential building construction within the permanent ROW would be prohibited. To the extent these uses or development rights exist in the permanent ROW prior to construction, there may be a permanent loss of these uses. Other agricultural uses may be allowed over the permanent ROW after the Project's construction phase is complete.

All other land use/land cover would not be lost or changed, but would be allowed to revert to natural conditions. Tree removal would be required for construction within forested areas, and would be conducted in accordance with applicable local nonprocedural standards to the extent practicable

5.2 Construction Impacts to Existing Listed Species

The temporary construction impacts required for the pipeline installation may result in impacts to hawks, the nightjar, and the boa.

A study prepared by Mr. Derek Hengstenberg, a recognized expert on these raptor species and current avian biologist with Tetra Tech, provides recommendations for studies and impact minimization procedures which, if adhered to, will result in the project not likely having an adverse effect on the broad-winged and sharp-shinned hawks.

The Puerto Rican boa was assumed to exist throughout the project area. Minimal disturbances to selected habitat types will not likely effect this species. In addition, a boa management plan

has been prepared which includes active and on-going monitoring of all construction activities and provisions for relocation of this species.

Puerto Rican nightjar exists within a limited range along the southernmost expanse of the project area. Provisions have been made to allow for nightjar critical habitat to be assessed during the breeding/nesting season (April to June) with limited clearing allowed should nest sites be located. The project will enlist the services of a professional avian biologist, familiar with the nightjar, to monitor construction activity in the night jar habitat areas during the breeding/nesting season.

6 Conservation Measures to be Implemented

6.1 Plant Relocation Procedures

Unless limited by the size (e.g. large trees), all listed species of plants found inside the established construction right of way which will be or have the potential to be impacted by the pipeline construction, will be relocated pursuant to an agreement to be established between Departamento de Recursos Naturales y Ambientales (DRNA) and the United States Fish and Wildlife Service (USFWS). The relocation of threatened and endangered plant species will be accomplished by DRNA biologists, with prior notification to the USFWS. Relocations will be to established protection areas (Guajataca and Río Abajo forest, and other public properties) whenever possible to ensure long-term protection. The area chosen for the transplantation of individuals will be selected in conjunction with the USFWS (for species listed by the federal Government) and/or the DRNA; with concurrent permission from the Manager/Owner of the forest or place where sowing or transplants will occur. The characteristics of the premises where transplants (soils, geology, associated vegetation, etc.) are carried out shall be similar to the affected location.

Relocation methodology could include transplantation, spreading seed, and/or division by vegetative methods. Propagation of seeds and cuttings may be more appropriate for woody species since transplantation of these species often fails. Seeds and cuttings will be taken of all individuals affected to the maximum extent possible.

In those areas where listed species have been identified, detailed studies of the vegetation will be undertaken by professional botanists prior to commencing clearing activities. The purpose of this study is to identify and mark all plants listed by the USFWS and the DRNA for relocation.

After of this study, a plan detailing specific procedures will be prepared for the USFWS (for species listed by the federal Government) or the DRNA (for species listed by the State Government) for final approval. These procedures will be developed or compiled by botanical professionals or horticulturists. Methodology of relocation for transplants of trees will be prepared by a certified arborist (International Society of Arboriculture) and will comply with ANSI 300 "Transplanting Standards" (parameters of transplants). Once the relocation procedures are completed, funds will be provided to the DRNA for the long-term maintenance and monitoring required for the relocated species.

6.2 Puerto Rican Boa (*Epicrates inornatus*) Protection Plan

Puerto Rican conservation measures proposed for the Puerto Rican boa include educating project staff, pre-construction studies, and relocation of individuals to protected areas. Conservation measures are as follows:

(1) All construction personnel will be required to attend instructive meetings related to the Puerto Rican boa. Information to be presented at these meetings will include a description of the snake, protection measures which must be undertaken to insure their survival, penalties for harassing boas, and the relocation and capture procedures described below.

(2) During the clearing and construction of the right-of-way, two field biologists will carry out daily surveys to detect for presence of the Puerto Rican boa in each construction area before starting work. Heavy equipment will be checked to see if any boa entered it overnight. Observations are to be carried out daily and any changes to the work plan shall be considered when planning for examinations. A search will take place from 5: 00 a.m. to 7: 30 a.m., any day that major equipment is used.

(3) In the event the presence of any individual is noticed, the protocol below will be followed to capture the individual for reloaction. If construction staff discover a snake in the workspace, all machinery 50 feet around the snake shall cease and the resident engineer shall be notified. An authorized project biologist will capture the snake for relocation in accordance with the Protocol that follows. Construction activities can continue once the snake has been removed.

(4) Any captured snake will be relocated to the Guajataca or Río Abajo forest, or other public land in an area with habitat similar to the capture area.

(5) Boa monitoring reports will be prepared monthly, summarizing the results of surveys, the capture of any boas, and relocation activities. Reports are to be forwarded to the USFWS and the DRNA as per permit conditions.

Capture and Relocation Protocol for the Puerto Rico Boa

Resident project biologists are responsible for implementing these procedures in the event a snake is found within the limits of the established ROW during construction. At least one resident biologist project will be present during all working hours. The following steps will be taken in the event a snake is found:

(a) workers up to 50 feet away will stop all work.

(b) a person will keep watch on the snake while another alerts the project engineer or biologist.

(c) the project biologist will capture the snake with a snake rod or other appropriate instrument, not inflicting any damage to the snake. The snake will be placed in a bag or box in a cool, dark place to wait for transport to the relocation site.

(d) if a Puerto Rican Boa is positively identified, the snake is to be released in the forests of Guajataca or Rio Abajo, or any other public land with habitat similar to the area where the snake was captured. All other species of snake will be released within the established construction ROW at the end of the work day: outside the limits of the existing or future construction site.

(e) the project biologist releasing the snake will be responsible for ensuring an incident report is completed and properly filed. This report shall contain the following information:

(1) Exact location of the snake when observed and the circumstances of the observation.

(2) The order and the procedures followed after the observation time.

(3) Personnel involved in every step of the procedure.

(4) The perceived condition of the snake at the time of observation and the snake's condition when removed.

(5) Species of snake, if known.

(6) The time and location where the Snake is released.

(7) Any photograph taken of the snake.

(8) In the event a dead snake is discovered inside the construction right-of-way, the carcass will be placed in a sealed plastic bag with ice or frozen until a positive identification can be made. If the snake is identified as a Puerto Rican boa, the body must remain frozen and the USFWS and the DRNA will be notified for additional instructions.

(9) The report shall be signed by the project biologist and included in the monthly report submitted to the USFWS and the DRNA.

6.3 Puerto Rican Nightjar (*Caprimulgus noctitherus*) Protection Plan

To avoid impacts to nightjars, commencement of any clearing of vegetation required for construction within or adjacent to mature dry forest where nightjars exist, will occur outside of the April-June nightjar nesting season. However, in emergency situations, if vegetation needs to be cleared during the nesting season, experienced and qualified biologists will survey the area proposed for clearing for nightjar nests prior to any clearing activity being undertaken. In the event that nests are found, the nests will be avoided by reducing or relocating the right-of way, or by delaying the activity until the nightjars fledge their young.

6.4 Puerto Rican Crested Toad (*Peltophryne lemur*) Protection Plan

The Puerto Rican crested or Concho toad (*Bufo lemur*) is very difficult to detect due to their small size and secretive habits. However, due to the potential for occurrence of this species in the project corridor right-of-way, the following conservation measures will be implemented:

(1) During the initial establishment and clearing of the construction right-of-way, two biologists will conduct daily sampling for detecting the concho toad in every area of construction before work begins.

(2) These monitoring activities will be carried out daily, concurrent with the monitoring required for the Puerto Rican boa and will be focused on cover areas (cracks in rocks and trees species) that are regularly used by these species.

(3) All monitoring events will be incorporated into and will be carried out in coordination with the work plan of the contractor; daily changes to these work plans shall be considered in planning the work.

(4) Monitoring events will be carried out between 5:00 a.m. and 7:30 a.m. on days when major equipment will be operated within the construction right-of way.

(5) When a species is detected, established capture and relocation protocols (similar to those identified for the boa) will be implemented. Data regarding all species identified within the ROW, captured and/or relocated, will be incorporated into the daily environmental monitoring logs.

(6) All collections, relocations and data transmissions will be coordinated with the appropriate local, state, and federal regulatory agencies.

7 Conclusions

Since critical habitat areas exist and certain populations were not sampled, it is assumed that the PREPA Via Verde pipeline corridor may provide habitat for Federally listed species. The proposed construction activities are temporarily intrusive to any such critical habitat and no habitat will be completely lost.

Table 15 presents the findings determination for each species and where applicable makes recommendations for mitigation measures, future studies, and resource conservation/preservation. If all of the procedures identified are implemented, it is expected that any effects to critical habitat and individual species will be mitigated and a MANLAA determination could be given for most plant species. Pre-construction surveys would avoid direct impacts to listed species whenever possible and others could be transplanted, etc. More detailed protection, conservation, compensation, restoration measures may need to be included so as to get to the point of MANLAA on plant habitats.

Table 15: Section 7 Affects Determination

PREPA VIA VERDE PIPELINE USACE/USFWS SECTION 7 AFFECTS DETERMINATION							
SCIENTIFIC NAME	COMMON NAME	NAME SPANISH	GROUP	STATUS	DISTRIBUTION	DETERMINATION	COMMENTS
Accipiter striatus venator	Puerto Rican Sharp-Shinned Hawk	Falcon de Sierra	Bird	E	Monte Guilarte State Forest	D. Hengstenberg	See Appendix D of the USACE Joint Permit Application
Agelaius xanthomus	Yellow-Shouldered Black Bird	Mariquita	Bird	E, CH	Coastal Forest	No Affect	
Amazona vittata vittata	Puerto Rican Parrot	Cotorra Puertorriqueña	Bird	E	Rio Abajo State Forest	No Affect	Project within PR 10 ROW
Auerodendron pauciflorum	No Common Name	No Common Name	Plant	E	Rio Abajo State Forest	No Affect	Project within PR 10 ROW
Banara vanderbiltiii	No Common Name	Palo de Ramon	Plant	E	Rio Lajas Hills	No Determination	
Buteo platypterus brunnescens	Puerto Rican Broad-Winged Hawk	Guaraguao de Bosque	Bird	E	Monte Guilarte State Forest	D. Hengstenberg	See Appendix D of the USACE Joint Permit Application
Buxus vahalii	Val's Boxwood	Diablito de Tres Cuernos	Plant	E	Tallaboa Limestone Hills	No Determination	
Calyptronoma rivalis	No Common Name	Palma de Manaca	Plant	T	Rio Abajo State Forest	No Determination	
Caprimulgus noctitherus	Puerto Rican Nightjar	Guabairo	Bird	E	Coastal Forest	No Determination	
Catesbaea melanocarpa	No Common Name	No Common Name	Plant	E	Dry Limestone Hills, Guayanilla to Ponce	No Determination	
Chamaecrista glandulosa var mirabilis	No Common Name	No Common Name	Plant	E	Tortuguero Lagoon Natural Reserve	No Determination	
Chelonia mydas	Green Sea Turtle	Peje Blanco	Reptile	T, CH	Coastal Zones	No Affect	Marine/Coastal Secies
Cordia bellonis	No Common Name	No Common Name	Plant	E	Rio Abajo State Forest	No Determination	
Cordia rupicola	Chigger Palo	Palo de Nigua	Plant	E		No Determination	
Cornutia obovata	No Common Name	Palo de Nigua	Plant	E	Rio Abajo State Forest	No Determination	
Cyathea dryopteroides	Elfin Tree Fern	Helecho de Bosque Enano	Plant	E	Monte Guilarte State Forest	No Determination	
Daphnopsis hellerana	No Common Name	No Common Name	Plant	E	Nevares Limestone Hills, Near Sabana Seca, Primate Center	No Determination	
Dermochelys coriacea	Leatherback Sea Turtle	Tinglar	Reptile	E, CH	Coastal Zones	No Affect	Marine/Coastal Species
Eleutherodactylus jasperi	Golden Coqui	Coqui Dorado	Amphibian	T, CH	Forested Mountains w/ elevations over 700 meters.		
Epicrates inornatus	Puerto Rican Boa	Boa Puertorriqueña	Reptile	E	Forested Volcanic and Limestone (Karst) Hills	MANLAA	Management Plan to be Provided
Eretmochelys imbricata	Hawksbill Sea Turtle	No Common Name	Reptile	E, CH	Coastal Zones	No Affect	Marine/Coastal Species
Eugenia woodburyana	No Common Name	No Common Name	Plant	E	Encarnacion West of Las Cucharas	No Determination	
Goetzea elegans	Beautiful Goetzea	Matabuey	Plant	E	Coastal Zones	No Determination	
Juglans jamaicensis	West Indian Walnut	Nogal	Plant	E	Monte Guilarte State Forest (La Silla de Calderon)	MANLAA	

PREPA VIA VERDE PIPELINE USACE/USFWS SECTION 7 AFFECTS DETERMINATION							
Mitracarpus maxwelliae	No Common Name	No Common Name	Plant	E	Guanica Commonwealth Forest	No Affect	
Mitracarpus polycladus	No Common Name	No Common Name	Plant	E	Guanica Commonwealth Forest	No Affect	
Myrcia paganii	No Common Name	No Common Name	Plant	E	Biafara Arrozal	No Determination	
Patagioenas (Columba) inornata wetmorei	Puerto Rican Plain Pigeon	Paloma Sabanera	Bird	E	Lower Montane Forest and Riparian Habitats		
Ottoschulzia rhodoxylon	No Common Name	Palo de Rosa	Plant	E	Media Luna Ward, Candelaria Ward, Sabana Ward	No Determination	
Pelecanus occidentalis	Brown Pelican	Pelicano Pardo	Bird	E	Coastal Zones, Lago Dos Bocas, No Nesting	No Affect	
Peltophryne lemur	Puerto Rican Crested Toad	Sapo Concho	Amphibia n	T	Northern Karst Regions	MANLAA	Management Plan to be Provided
Pleodendron macranthum	No Common Name	Chupacallos	Plant	E	Rio Abajo State Forest	No Determination	
Polystichum calderonense	No Common Name	No Tiene Nombre Comun	Plant	E	Cerrote Peñuelas		
Schoepfia arenaria	No Common Name	No Tiene Nombre Comun	Plant	T	Rio Abajo State Forest (Cuesta de los Perros)	No Determination	
Solanum drymophilum	No Common Name	Erubia	Plant	E	Rio Abajo State Forest	No Determination	
Stahlia monosperma	No Common Name	Cobana Negra	Plant	E	Northern Wetlands and White Sands	No Affect	Coll Rivera Determination
Sterna dougallii	Roseate Tern	Palometa	Bird	T, CH	Coastal Areas and Offshore Cays, Nesting	No Affect	Marine/Coastal Species
Tectaria estremerana	Halberd Fern	Helecho alabarda	Plant	E	Rio Abajo State Forest	MANLAA	
Thelypteris inabonensis	No Common Name	No Common Name	Plant	E	None Identified near project	No Determination	
Thelypteris yaucoensis	No Common Name	No Common Name	Plant	E	None Identified near project	No Determination	
Thelypteris verecunda	No Common Name	Helecho doncella del Barrio Charcas	Plant	E	None identified near project	No Determination	
Trichechus manatus manatus	Antillean Manatee	Manati Antillano	Mammal	E	Coastal Zones	No Affect	Marine/Coastal Species
Trichilia triacantha	No Common Name	Bariaco	Plant	E	Encarnacion, (Urb. El Peñon), Tallaboa Poniente	No Determination	
Zanthoxylum thomasianum	St. Thomas Prickly Ash		Plant	E	Northern Karst Regions	No Determination	

Status
E = Endangered
T = Threatened
CH = Critical Habitat

Determination
No Affect = No Affect
MANLAA = May Affect Not Likely to Adversely Affect
May Affect = May Affect
No Determination = Determination to be Made by USFWS

APPENDIX 1
USFWS CARIBBEAN ENDANGERED SPECIES TABLES

APPENDIX 2
PUERTO RICO ENVIRONMENTAL SENSITIVITY INDEX MAPS

APPENDIX 3
UNITED STATES FISH AND WILDLIFE SERVICE
Technical Assistance/Guidance Letter