NATIONAL WETLANDS INVENTORY

MAP REPORT

NORTH CAROLINA WESTERN PIEDMONT
1:100,000 Scale Maps

Charlotte NE, Charlotte NW, Charlotte SE, Charlotte SW
Winston-Salem SE, Winston-Salem SW

I. INTRODUCTION

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

Purpose

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

II. FIELD RECONNAISSANCE

Field reconnaissance of the work area is an integral part of the accurate interpretation of aerial photography. Photographic signatures are compared to the wetland's appearance in the field by observing vegetation, soil, and topography. This information is weighted for seasonality and conditions existing at the time of photography and at ground truthing.

Project Area

The project consists of three work areas in the western piedmont region of North Carolina. The three work areas are Winston-Salem SE and Winston-Salem SW which are located in the northwestern region of the state, Charlotte NE and Charlotte NW are in the central region and Charlotte SE and Charlotte SW lie in the southwestern part of the state. (See Appendix A)

Field Personnel

John Hefner - U.S. Fish and Wildlife Service, Region IV
Amy Alford - Geonex, Inc.
Chuck Attardo - Geonex, Inc.
Vicki Calligan - Geonex, Inc.

Date of Field Trip

June 22 - 26, 1992

Aerial Photography

Type: NHAP Color Infrared Transparencies
Scale: 1:58,000

Charlotte NE	-	01/19/83, 03/02/83, 02/02/84
Charlotte NW	-	03/03/83, 02/02/84, 02/15/84, 04/11/84
Charlotte SE	-	01/19/83, 03/02/83, 03/03/83, 02/02/84
Charlotte SW	-	03/03/83, 02/02/84, 02/15/84, 04/11/84
Winston-Salem SE	-	04/17/80, 04/01/82, 04/17/82, 04/23/82, 05/10/82
Winston-Salem SW	-	04/04/83, 04/11/84, 03/24/86

Collateral Data

United States Geological Survey 1:24,000 Topographic Quadrangles.

United States Geological Survey 1:100,000 Topographic Quadrangles.

United States Geological Survey 1:250,000 Topographic Quadrangles.

Bailey, Robert G. Descriptions of the Ecoregions of the United States. U.S. Department of Agriculture, Forest Service, 1980.

Lobeck, A.K. Physiographic Diagram of North America. Geographical Press, Maplewood, New Jersey.

Hydric Soils List for the state of North Carolina.

Wetland Plant List for the state of North Carolina.

Soil Conservation Surveys for the following counties:

Aleghany	Gaston
Anson *	Guilford *
Ashe	Iredell
Cabarres	Richmond *
Caldwell	Stanley
Catawba	Yadkin
Forsyth	

* advance copies

III. PHYSICAL DESCRIPTION OF THE PROJECT AREA

According to Bailey, Description of the Ecoregions of the United States (1980), the study area falls within two provinces: the Eastern Deciduous Forest Province and the Southeastern Mixed Forest Province. A.K. Lobeck (1950), places the Western Piedmont into the Older Appalachians Province.

Geography

The project area contains a variety of geographic features from tall mountains to low rolling hills. The majority of the region field checked is a transitional zone between these two features. The Piedmont has a gently rolling upland surface with moderate relief. Small steep sided stream valleys, rarely over 100 feet deep, are common.

The nearly level upland surface was not affected by glaciation; therefore, it contains very deep residual soil favorable for agriculture. For this reason, most roads, railroads, towns and other cultural features were started in the Piedmont. Since railroads and roads were constructed with little attention to drainage courses, they are usually straight for long distances.

Because transportation was easily accessible, the Piedmont has becomes a highly developed area. Many important universities and educational institutions of the Atlantic Seaboard are located there. The Piedmont is also home to the south's largest city, Atlanta. Industry which depended on cotton, tobacco and lumber also thrives on the Piedmont.

The field reconnaissance included the blue ridge section of the Piedmont. This area was characterized accurately in Bailey's Eastern Deciduous Forest Province. The inner border of the Piedmont upland, as it is sometimes referred to, was encountered near the base of the Blue Ridge Mountains. This region was interrupted by numerous monadocks. These dome shaped knobs of granite seem to rise conspicuously out of the peneplain. The field trip extended into the Blue Ridge Mountains, where we found the mountains to be heavily forested up to the peaks.

Within the mountain tract there are several areas of lower elevation. The Ashville Basin, at slightly over 2,000 feet is nearly a thousand feet below the upland level. The Blue Ridge Mountains are responsible for the head waters of the Tennessee, the New River, Roanoke, the James and the Potomac Rivers. No important minerals are found within the mountains, but the region serves as a birthplace for resort towns and an important source of lumber.

Climate

The climate of the Eastern Deciduous Forest Province and Southeastern Mixed Forest Province of the Piedmont falls into the Moist Continental Category, (Alan H. Strahler and Strahler, 1992). Midlatitude regions that fall into this climate are subject to polar and tropical air masses. Seasonal temperature contrasts are strong and day to day weather is highly variable. Ample precipitation falls throughout the year, but is higher in summer months. Because of the availability of water through a warm growing season, nearly 250 days, the moist continental climate provides an enormous potential for food production. Temperatures fall into a mean annual range between 40°F and 60°F.

Vegetation

Most of the Western Piedmont falls into the Eastern Deciduous Forest Province community. This community is dominated by broadleaf deciduous trees which create dense canopies. These canopies are lost in the winter allowing some herbaceous growth in the understory. It is often difficult to distinguish what forest type you are in, since there is extensive overlap in this region. Such overlap is common because of soil type, soil moisture and climate.

Some of the Western Piedmont falls into the Southern Mixed Pine-Oak Forest. This forest type is characterized by a poorly defined understory and a lack of species richness. The Pine-Oak Forest usually contains dry or sandy soils enabling fires to become a hazard. In the more moist soils, less likely to be subject to fire, the hardwoods tend to invade. An interesting adaptation to the frequent fires is that of the longleaf pine. In this case the seeds lie dormant in the soil until there is a fire. The fire burns off the grass and litter layer, and triggers the seedlings mechanisms to start germination. The seedling devotes most of its energy to rapidly growing a thick, deep root called a taproot. Once the root is grown, the tree transfers most of its energy to developing height. This keeps the longleaf free from hazard of ground fires. Loblolly pine, which is often encountered in saturated wetlands, is easily out completed by hardwoods. In this case fire can kill back dense hardwood canopies and allow the quick growing loblolly to take a strong foothold before hardwoods have a chance to recover.

Some common wetland species of the Western Piedmont include: red maple, sweetgum, black willow, speckled alder, green ash, beech, various oaks, loblolly pine, hickory, and river birch.

Soils

Since soils have important links to climate, geography and vegetation, they become an essential ingredient in forming the parameters of wetlands within the project area. Three soil orders that dominate the project area are Alfisols, Ultisols and Inceptisols.

Alfisols are uniquely defined by the following combination of properties: (1) a gray, brownish, or reddish horizon not darkened by humus close to the surface; (2) a horizon of clay accumulation; (3) a medium to high percentage base saturation (PBS); and (4) soil water available to plants more than half the year or more than three consecutive months during a warm season. (Alan H. Strahler and Strahler, 1992). Alfisols can be agriculturally productive under simple management because soil water is available throughout the growing season and a minimum of leaching occurs.

The second soil order within the project area are the Ultisols. These are characterized by three main properties: (1) there is an argillic horizon; (2) the supply of exchangeable bases (CEC) is low, particularly in the lower horizons; (3) the mean annual soil temperature is greater than 8°C (47°F). In the season where water is at a surplus, some water will pass through the soil into the substratum allowing leaching to occur. As a result, nutrients not held by the plant will be lost. Ultisols are found throughout the eastern United States and can be farmed with adequate fertilizers and management techniques.

The last soil order encountered in the project area are the Inceptisols. These soils are defined by a number of properties: (1) soil water is available to plants more than half the year for more than three consecutive months during a warm season; (2) one or more pedogenic horizons formed by alterations of concentration of matter are present, but without accumulation of translocated materials other than carbonate minerals or amorphous silica; (3) soil textures are finer than loamy sand; (4) the soil contains some weatherable materials; (5) the clay fraction of the soil has a moderate to high cation exchange capacity (Alan H. Strahler and Strahler, 1992).

Inceptisols are mostly found on relatively young geomorphic surfaces, or on recently accumulated alluvial sediments of floodplains where sedimentation is no longer active and pedogenic zones have developed.

IV. DESCRIPTION OF WETLAND HABITATS

Lacustrine

Water bodies greater than 20 acres are included in this system with both limnetic and littoral subsystems represented. The numerous lake and reservoirs within the study area High Rock Reservoir, Salem Lake, Badin Lake, Lake Liberty, Lake Stewart, Lake Concord, Lake Norman (north end only), Lake Hickory, Lake James, and Rhodhiss Lake.

The nonvegetated water bodies are limnetic, unconsolidated bottom (L1UB), or littoral, unconsolidated shore (L2US), depending on the water depth. The impounded modifier (h) will be utilized on bodies of water impounded by locks, dams or any other artificial means. The beaver modifier (b) will be used for beaver impoundments when evident.

Riverine

Three riverine subsystems will be used in the work area; Lower Perennial (R2), Upper Perennial (R3), Intermittent (R4). The major drainages with the study are the Yadkin, Catawba, Pee Dee, South, and North Fork Rivers.

The rivers classified as lower perennial will have a low gradient with a developed floodplain. The streams having a high gradient and a fast water velocity will be identified as upper perennial. Creeks and small drainages with water only present part of the year will be intermittent.

Palustrine

Palustrine areas include unconsolidated bottom, unconsolidated shore, aquatic bed, emergent, scrub-shrub, and forested. Naturally occurring ponds are identified as unconsolidated bottom, permanently flooded (PUBH). A majority of these ponds were found to be impounded. These will have the impounded modifier (h) added where applicable. Excavated and beaver impounded ponds will labeled with their respective modifier (PUBHh and PUBHb).

Aquatic vegetation is represented by Nymphaea odorata (PAB3H). The species Spirodela polyrhiza (PAB4H) can be found in this study area but none were seen at the time of ground truthing so the majority of aquatic delineations were classified as (PAB3H). Any classifications (PAB4H) were done by photo signature alone and will require checking at draft map review.

Emergent vegetation ranged from temporarily flooded to semipermanently flooded (PEM1A, PEM1C, and PEM1F). These were usually dominated by Alternanthera philoxeroides, Arundinaria gigantia, and Typha latifolia.

Scrub-shrub wetlands observed contain a variety of species ranging from temporary to semipermanently flooded (PSS1A, PSS1C, and PSS1F). Ilex opaca, Myrica cerifera, Parthenocissus quinquefoilia, and several species of vitis were commonly found in temporarily flooded wetlands. The seasonally flooded scrub-shrub wetlands generally contained by Alnus rugosa, Alnus serrulata, and Sambucus canandensis. Salix negra or Cephalanthus occidentalis usually dominated the permanently flooded scrub-shrub areas.

The temporary forested areas were represented by Acer rubrum, Acer negundo, Fraxinus pennsylvanica, Liriodendron tulipifera, Carya laciniosa, Carya ovata, Liquidambar styraciflua, and several species of Quercus. Common species found in seasonally flooded areas were Platanus occidentalis, Quercus palustris, and Quercus phellos. The permanently flooded wetlands species commonly seen were Betula nigra, Nyssa aquatica, Quercus lyrata, and Quercus michauxii.

Some of the temporary, seasonal, and semipermanently flooded wetlands were found to have beaver influence, therefore these areas will carry the beaver (b) modifier.

TABLE 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE (WATER REGIME)	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
R2UB (H)	Riverine, lower perennial, unconsolidated bottom	Rivers with low gradient	Sand, mud
R2US (A,C)	Riverine, lower perennial, unconsolidated shore	Sand bar	Sand, gravel
R3UB (H)	Riverine, upper perennial, unconsolidated bottom	Rivers with high gradient	Sand, gravel, and pebbles
R3RB (H)	Riverine, upper perennial, rock bottom	Rivers with high gradient	Rock, boulders, or bedrock substrate
R4SB (A,C)	Riverine, intermittent, stream bed	Streams, creeks	Sand, gravel, mud
L1UB (H)	Lacustrine, limnetic, unconsolidated bottom	Lakes	Sand, mud
L2US (A,C)	Lacustrine, littoral, unconsolidated shore	Lakes	Sand and mud bars
PUB (H)	Palustrine, unconsolidated bottom	Ponds, borrow pits, or impoundments	Sand and mud
PUS (A,C)	Palustrine, unconsolidated shore	Ponds	Mud bars
PAB3 or 4 (H)	Palustrine, aquatic bed	Ponds or deep marshes with floating or rooted vascular vegetation	*Nymphaea odorata* (white water lily)

TABLE 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE (WATER REGIME)	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM1 (A,C,F)	Palustrine, emergent, persistent	Meadows, marshes, depressions or drainage areas	Agalinis fasciculata (falseglove) Alternanthera pheloxeroides (alligator weed) Arundinaria gigantea (giant cane) Carex ssp. (sedges) Dichromena colorata (whitetop sedge) Eriocaulon decangulare (pipewort) Erianthus ssp. (plumegrasses) Impatients capensis (spotted touch-me-not) Impatients pallida (pale touch-me-not) Juncus ssp. (rush) Oxypolis filiformis (cowbane)
PSS1 (A,C,F)	Palustrine, scrub-shrub, broad-leaved deciduous	Scrub-shrub forests	Alnus serrulata (hazel alder) Alnus rugosa (speckled alder) Salix negra (black willow) Lonicera ssp. (honeysuckle) Sambucus canandensis (american elder) Caphalanthus occidentalis (buttonbush)

TABLE 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE (WATER REGIME)	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PFO1 (A,C,F)	Palustrine, forested, broad-leaved deciduous	Floodplains, depressions, thickets, river banks, and drainage areas	Carpinus carolinia (ironwood) Betula nigra (river birch) Quercus michauii (swamp chestnut oak) Salix nigra (black willow) Quercus nigra (water oak) Quercus laurifolia (laurel oak) Quercus lyrata (overcup oak) Quercus palustris (pin oak)
PFO1 (A,C,F,)	Palustrine, forested, broad-leaved, deciduous	floodplains,depressions, thickets, river banks, and drainage areas	Quecus phellos (willow oak) Nyssa sylvatica (blackgum) Nyssa aquatica (water tupelo) Liriodendron tulipifera (tulip poplar) Liquidambar styraciflua (sweetgum) Acer rubrum (red maple) Fraxinus pennsylvanica (green ash) Platanus occidentalis

V. WATER REGIME DESCRIPTION

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

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

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

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

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

Special Modifiers

(x) Excavated - Water lies in or flows through a basin or channel dug by man.

(h) Impounded - The normal flow of water is impeded by a manmade dike or barrier.

(b) Beaver - Wetlands created or modified by beaver activity.

(d) Partially Drained/Ditched - The water level has been artificially lowered in wetlands, but the soils are still capable of supporting hydrophytes.

VI. IMAGERY

The NHAP color infrared photography ranged from well balanced color to dark and blue. This darker imagery created problems differentiating vegetation types. In addition, approximately eight frames of photography were flown during high water conditions. Although during ground truthing most areas were determined to be upland these areas should be checked at draft map review. There is also some photography flown during leaf on conditions creating difficulty identifying some upland/wetland breaks.

VII. MAP PREPARATION

The classification and delineation of wetlands is in accordance with Cowardin et al (1979). Delineations are produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. The dates of the photography range from 1980 through 1986. The months the missions were flown were January through May.

Field check sites were conducted in each of the six 1:100,000 maps in the study area prior to delineation of wetlands. The check sites were selected to clarify wetland/upland breaks and compare signatures to the various vegetation types.

The user of the map is cautioned that due to the limitation of mapping primarily through aerial photointerpretation, a small percentage of wetlands may have not been mapped. Since the photography was obtained during and specific time and season, there may be discrepancies between the maps and current field conditions. Landscape changes after the date of photography would result in such discrepancies.

Aerial photointerpretation and drafting were compiled by Geonex, Inc., St. Petersburg, Florida with quality assurance provided the United States Fish and Wildlife Service.

VIII. SPECIAL MAPPING PROBLEMS

None

IX. MAP ACQUISITION

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

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To order maps only, contact:

Earth Science Information Center (ESIC)
National Cartographic Information Center
U.S. Geological Survey
507 National Center
Reston, VA 22092

1-800-872-6277

Maps are identified by the name of the corresponding USGS 1:24,000 scale topographic quadrangle name. Topographic map indices are available from the U.S. Geological Survey.

nc-wpied.rpt
CA/drs.nwi

X. REFERENCES

Bailey, Robert G., 1980. Descriptions of the Ecoregions of the United States. United States Department of Agriculture, Forest Service. Miscellaneous Publications No. 1391.

Cowardin, L.M.; V. Carter; F.C. Golet and E.T. LaRoe, 1979. The Classification of Wetlands and Deepwater Habitats of the United States. United States Department of the Interior, United States Fish and Wildlife Service. Biological Services Program, Washington, D.C.

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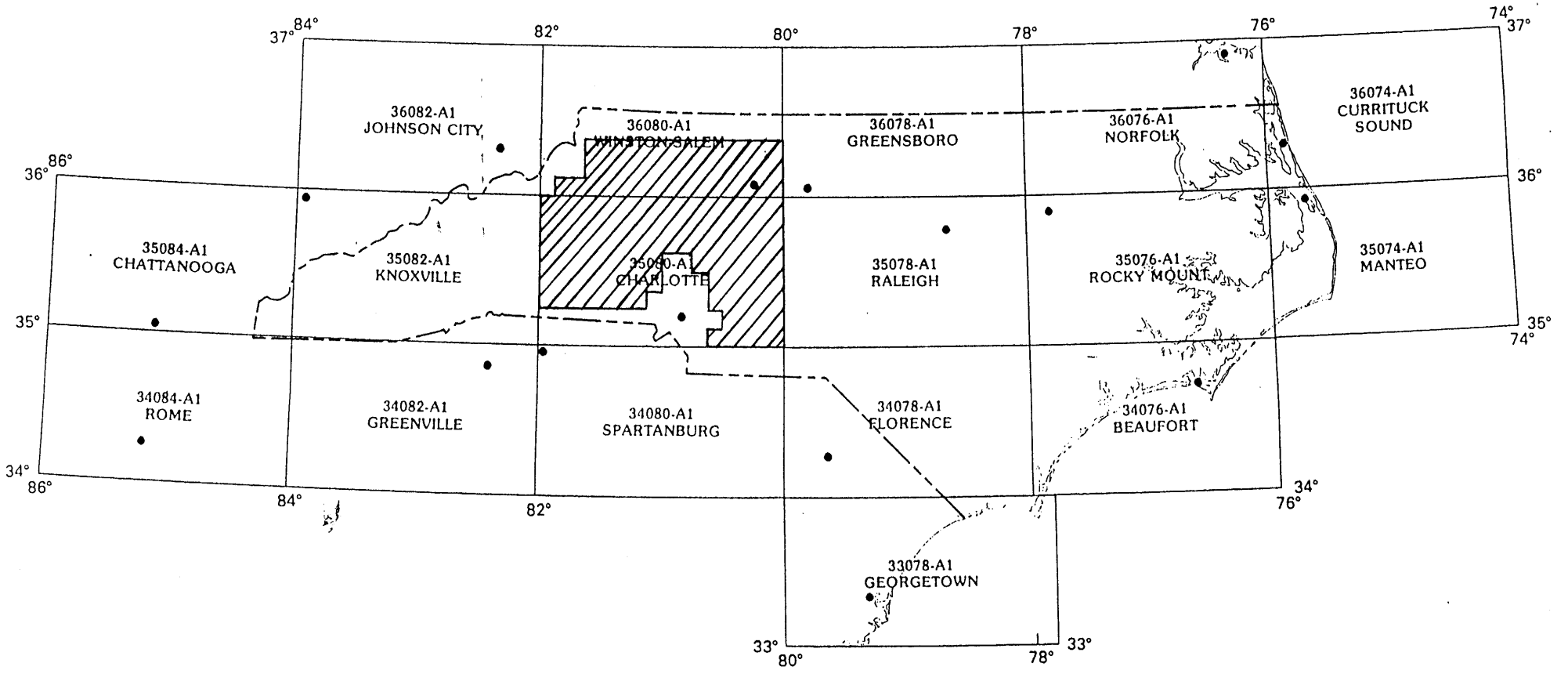
Strahler, Alan H., 1992. Modern Physical Geography, Fourth Edition. John Wily and Sons, Inc., New York.

1 X 2 DEGREE SERIES
1:250 000 SCALE



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