NEW JERSEY DEPARTMENT OF AGRICULTURE
STATE SOIL CONSERVATION COMMITTEE
Chapter 251, PL 1975 as amended,
Engineering Policies- Technical Bulletin

Technical Bulletin: 2004-2.0	**Adoption Date:** July 12, 2004
Subject: NRCS change in stormwater modeling for the NJ Coastal Plain	**From:** Hunter Birckhead, P.E., Section Chief

1.01 PURPOSE

To distribute revisions to the NRCS stormwater modeling runoff procedures utilizing the the DelMarVa unit hydrograph.

1.02 SUMMARY

NRCS runoff modeling procedures utilize a dimensionless unit hydrograph in the computation of runoff rate and volume. Until recently, the hydrograph officially used by NRCS in New Jersey was the "Standard" unit hydrograph, which represents "average" conditions. This hydrograph is characterized by a unit peak discharge factor of 484, which is more representative of the Piedmont areas of the State.

Due to recent studies by NJDA as well as an accumulation of other data, NRCS-NJ has instructed its field staff to utilize the DelMarVa unit hydrograph for runoff estimation on agricultural lands which are located within the coastal zones identified on the attached map and NRCS bulletin. This hydrograph is characterized by a peak rate factor of 285, and will predict a substantially lower peak discharge than that of the Standard hydrograph. Volume of runoff will not be affected by this change.

DelMarVa hydrograph usage is primarily restricted to areas that have slopes less than 5%, permeable soils and are characterized by "ponded" topography capable of capturing and holding some degree of precipitation prior to runoff occurring. It should not be utilized for design in areas where the predeveloped conditions are heavily urbanized and the drainage area is characterized by significant areas of impervious cover. The Standard hydrograph should continue to be used in these areas.

Districts located within the specified zones are to use and require usage of the DelMarVa unit hydrograph in the preparation of Chpt. 251 applications where it is necessary to compute runoff rate and volume with NRCS modeling methods.

This requirement is effective 60 days from the date of this bulletin.

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To: Distribution List

From: Hunter Birckhead, P.E., Section Chief
State Soil Conservation Committee

Re: USDA-NRCS, Technical Bulletin NJ210-3-1

Date: July 12, 2004

The SSCC is transmitting this bulletin to advise you of the changes outlined in NRCS-NJ Technical Bulletin NJ210-3-1, issued September 8, 2003 regarding the Dimensionless Unit Hydrograph (copy enclosed).

Bulletin NJ210-3-1 describes the application of the DELMARVA unit hydrograph for use in modeling surface runoff in certain areas of the South Central flat inland and New Jersey Coastal Plain.

This change in modeling procedures is important to the State Soil Erosion and Sediment Control Act program. The use of the DELMARVA hydrograph should be applied to stormwater management runoff design for pre and post developed conditions in the applicable portions of the state identified in the attached documents. In general, flatter terrain, ponded areas and swales, wooded conditions and highly pervious soils characterize these areas. The DELMARVA unit hydrograph should not be utilized for design in areas where the predeveloped conditions area heavily urbanized and the drainage area is characterized by significant areas of impervious cover. The Standard NRCS hydrograph should continue to be used in those areas where the Delmarva unit hydrograph does not apply.

In order to implement this change consistently in the affected areas of the state, soil conservation districts will anticipate the use of the DELMARVA hydrograph in soil erosion and sediment control site plan designs, within sixty days of this letter. The SSCC is requesting your cooperation by advising your clientele of this bulletin.

This office is facilitating the distribution of the NRCS bulletin to Soil Conservation Districts, municipal, county and state government agencies and groups. Please feel free to contact this office if you have questions regarding this change.

Thank you for your cooperation and assistance.

Enclosure

Distribution:

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September 8, 2003

NEW JERSEY BULLETIN NO. NJ210-3-1

SUBJECT: ENG – Engineering Field Handbook Supplement
Dimensionless Unit Hydrograph

Purpose: To distribute a supplement to Chapter 2 of the Engineering Field Handbook regarding use of dimensionless unit hydrographs for modeling agricultural watersheds.

Effective Date: Effective upon receipt.

With the enhancement of NRCS modeling tools commonly used in the hydrologic design of conservation practices including EFH2 and WinTR55, it is now easier to vary the dimensionless unit hydrograph as a model input. Historically, the Standard Unit Hydrograph has been applied throughout New Jersey. Now, the Delamrva Unit Hydrograph may be used in modeling agricultural watersheds in the Coastal Plain that are characterized by flat topography (average watershed slope less than 5 percent), low relief, and significant surface storage in swales and depressions. Use of the Delamrva Unit Hydrograph will not affect the determination of runoff volume, but should result in lower peak discharges when compared to the Standard Unit Hydrograph.

Filing Instructions: Insert the attached supplement at the end of Chapter 2 in the Engineering Field Handbook.

DAVID LAMM, PE
State Conservation Engineer

Enclosure

Dist: O

Dimensionless Unit Hydrograph

The dimensionless unit hydrograph is one of several watershed related parameters incorporated into NRCS hydrologic modeling procedures. The unit hydrograph influences the shape of the runoff hydrograph generated by the model, particularly the peak rate of discharge. It does not affect the volume of runoff, which is determined by curve number. Unit hydrographs vary by watershed based on many factors including watershed size, slope and length; geomorphic and geologic characteristics; amount of storage; and degree of urbanization. A standard unit hydrograph has typically been used that represents an average condition for much of the country. It has been felt to be sufficiently accurate for the hydrologic design of conservation practices. Detailed studies, however, have been conducted in some watersheds or regions to develop more representative dimensionless unit hydrographs. With the enhancement of NRCS modeling tools, it is now easier to incorporate these unique unit hydrographs into more routine hydrologic analyses.

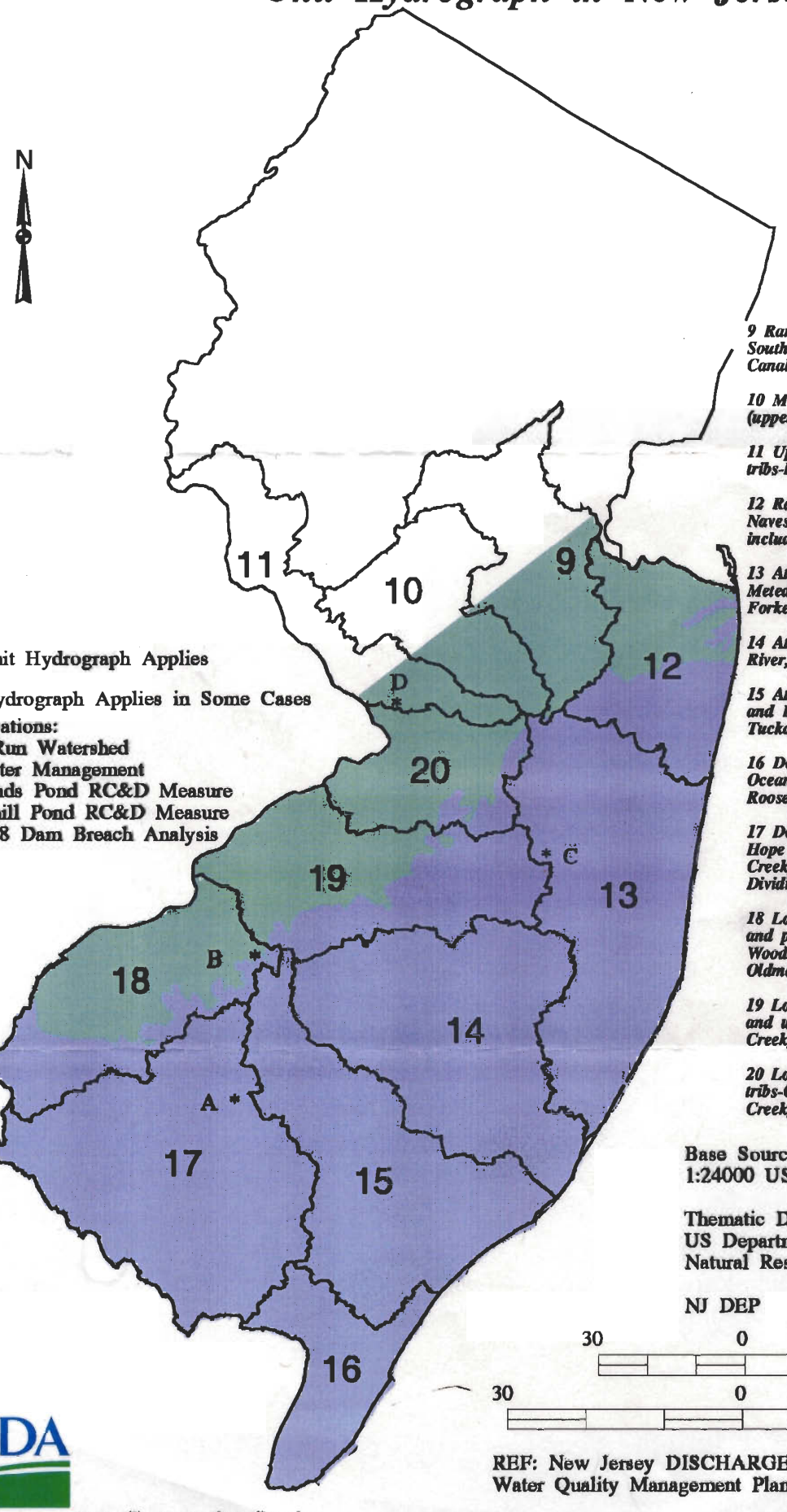
The following dimensionless unit hydrographs are applicable to New Jersey:

Delmarva Unit Hydrograph: Applies to watersheds in the Coastal Plain physiographic region that are characterized by flat topography (average watershed slope less than 5 percent), low relief, and significant surface storage in swales and depressions.

Standard Unit Hydrograph: Applies to watersheds in all other physiographic regions and to watersheds in the Coastal Plain that are not characterized by the Delmarva Unit Hydrograph.

When supported by detailed watershed studies, other unit hydrographs may be used. Study procedures are discussed in Chapter 16 of National Engineering Handbook Part 630, Hydrology.

Guide on Where to Use Delmarva Penninsula Unit Hydrograph in New Jersey



9 Raritan River Mainstem, Matchaponix Brook, South River, Green Brook, Middle Brook, D & R Canal (lower part)

10 Millstone River, Stony Brook, D & R Canal (upper part)

11 Upper Delaware (lower part of Zone 1E) and tribs-Lockatong, Alexauken Creek, Assunpink Creek

12 Raritan Bay and tribs-Shrewsbury River, Navesink River & Atlantic Ocean & tribs including Shark River

13 Atlantic Ocean and tribs-Manasquan River, Metedeconk River, Toms River, Barnegat Bay, Forked River, Little Egg Harbor, Tuckerton Creek

14 Atlantic Ocean and tribs-Mullica River, Wading River, Great Bay, Little Bay, Doughty Creek

15 Atlantic Ocean and tribs-Great Egg Harbor River and Bay, Peck Bay, Reeds Bay, Absecon Bay, Tuckahoe River

16 Delaware Bay (part of Zone 6) and Atlantic Ocean and tribs-Cape May County (south of Roosevelt Blvd, Ocean City) , East and West Creeks

17 Delaware Bay (part of Zones 5 & 6) and tribs-Hope Creek, Stow Creek, Cohansey River, Back Creek, Cedar Creek, Natuxent Creek, Dividing Creek, Maurice River

18 Lower Delaware (lower part of Zone 3, Zone 4, and part of Zone 5) and tribs-Big Timber Creek, Woodbury Creek, Mantua Creek, Raccoon Creek, Oldman's Creek, Salem River, Alloways Creek

19 Lower Delaware River (lower part of Zone 2 and upper part of Zone 3) and tribs-Rancocas Creek, Pennsauken Creek, Cooper River

20 Lower Delaware (upper part of Zone 2) and tribs-Crosswicks Creek, Doctors Creek, Blacks Creek, Crafts Creek, Assicunk Creek

Base Source:
1:24000 USGS orthophoto quads, 1986

Thematic Data:
US Department of Agriculture
Natural Resources Conservation Service

NJ DEP

30 0 30 Kilometers

30 0 30 Miles

REF: New Jersey DISCHARGER Vol 4. No 4. Spring 1997
Water Quality Management Planning Basins

USDA
Natural Resources Conservation Service

March 1997