# **The Landscape Project**

**New Jersey Department of Environmental Protection** 

#### **Division of Fish and Wildlife**

**Endangered and Nongame Species Program** 





### New Jersey is...

One of the smallest states in the country



Yet it boasts a surprisingly wide diversity of habitat. It is the northern limit of many southern species, and the southern limit of many northern species.













New Jersey's Changing Landscape

Hasse and Lathrop (2010). *Changing Landscapes in the Garden State: Urban Growth and Open Space Loss in NJ 1986 thru 2007.* 

- 2 7% increase in development rate to 16,061 acres per year by 2007
- NJ increased impervious surface by nearly 9 football fields per day during 2002 – 2007.
- Deforestation largely due to sprawling residential development. In 2007, urban developed land surpassed upland forest in total acres.





Executive

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Center for Remote Sensing and Spatial Analysis. Rutgers University



### Changing Landscapes in the Garden State:

#### Urban Growth and Open Space Loss in NJ 1986 thru 2007



1986 land urbanized per capita (0.14 acres)



2002 – 2007 urban growth per capita population growth (0.76 acres)



#### John E. Hasse,

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#### Richard G. Lathrop,

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### Many Animals Move Across Large Areas

Bobcat movements derived from GPS collar data (March – December '04)





### **Development Reduces Habitat Connectivity**

- Increases barriers to movement
- Decreases population viability

Bog turtles rely on early successional, interconnected wetlands. If connectivity between populations is not maintained and the habitat surrounding the wetland protected, subpopulations of turtles are vulnerable to extirpation





### Development Increases Mortality

## >> by increasing human-wildlife conflicts and road mortality





### What is the Landscape Project?

Landscape Project Maps: - a set of GIS layers that...

depict habitat for endangered, threatened and special concern <u>wildlife</u> species based on *documented occurrences* from the Biotics database

Biotics is the Department's database for tracking rare species occurrences. Expert biologists *review all species sighting reports* according to a specific protocol for acceptability/reliability and subsequently accept or reject species records

combine species location information with NJDEP land-use/land-cover data

provides users with science-based, peer-reviewed maps of species habitat areas in the state

supply data without compromising sensitive species locations



### Landscape Project Maps Habitat Patch Ranking:

- 1) Suitable Habitat Meets suitability requirement defined for each habitat type. No <u>documented</u> occurrences.
- 2) State Special Concern At least one documented occurrence of a state special concern species.
- 3) State Threatened At least one occurrence of a state threatened species.
- 4) State Endangered At least one documented occurrence of a state endangered species.
- 5) Federally Listed At least one documented occurrence of a federally listed.

### Landscape Regions



## Version 3.1



### **Creating the Landscape Project Maps:**

HABITAT DATA DEVELOPMENT









by





LULC

Erased by

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Major Roads

#### **SPECIES DATA** DEVELOPMENT

Species-Based Habitat



### **Biotics Database**



<sup>2</sup>The ONLY statewide database of all rare animal species in NJ.

Same database used throughout the NatureServe network, which extends across all 50 states, Canada, Latin America and the Caribbean, for tracking imperiled and rare species occurrences.



# Overview of data in Biotics Sources of Data (5yr average all data)



### Protocol for Accepting or Rejecting Species Sighting Reports

- **2** Did the sighting occur within the known range of the species?
- Did the sighting occur in the known/recognized habitat for the species?
- **2** Is the species easily identified, or is it often confused with another?
- **2** Did anyone else confirm the sighting, or can someone else vouch for the observer's identification skills?
- **2** Do we have first-hand knowledge of the observer's identification skills?
- **2** Did the observer include a photograph?
- Is the species listed as endangered, threatened or special concern for the season in which it was reported? (Some species can have a separate status for breeding season and non breeding season.)
- If uncertainty remains about the validity of the sighting, the observer is interviewed by the ENSP biologist.

### Species Occurrence Data Development <u>Feature Label</u>

#### **Species Occurrence Area (SOA)**

**2** Species-specific polygon used to value habitat in the Landscape Project.

**2** Based on the average home range/territory size, or other appropriate lifehistory parameter as reported in peer-reviewed scientific literature or from information obtained through ENSP research.

- **2** Can represent one or many individuals
- **2** Often indicates the presence of a local population beyond the occurrence



Feature Label	SOA		
Hibernaculum	4 kilometer buffer		
Non-breeding Sighting	2 kilometer buffer		
Maternity Colony	2 kilometer buffer		
Breeding Sighting	2 kilometer buffer		

### **Species Occurrence Area Justifications – Appendix II**

#### Indiana Bat

#### Myotis sodalis

SpcF LID	LUC	Feature Label	Buffer Size	Point Rule	Line Rule	Poly Rule	LP
4781	N/A	Hibernaculum	4.0 Kilometer Buffer	Apply a buffer	Apply a buffer	Apply a buffer	Yes
4782	N/A	Non-breeding Sighting	2.0 Kilometer Buffer	Apply a buffer	Convert to a point and buffer	Convert to a point and buffer	Yes
4783	N/A	Maternity Colony	2.0 Kilometer Buffer	Apply a buffer	Convert to a point and buffer	Convert to a point and buffer	Yes
4786	N/A	Breeding Sighting	2.0 Kilometer Buffer	Apply a buffer	Convert to a point and buffer	Convert to a point and buffer	Yes

#### Justification:

Fall roosting and foraging distance from hibernacula ranged from 2.4km-6.8km with an average distance of 4.33km. A 4km radius buffer was therefore selected to protect foraging and roosting habitat surrounding hibernacula. Summer roosting and foraging distances ranged from 0.679km-5km to create an average radius buffer of 2km.

#### Literature:

Callahan, E.V., R.D. Drobney, and R.L. Clawson. 1997. Selection of summer roosting sites by Indiana bats (Myotis sodalist) in Missouri. J. Mamm. 78:818-825.

The furthest distance documented between roosts occupied by bats within a single maternity colony was 5km.

### **Creating the Landscape Project Maps:**

HABITAT DATA DEVELOPMENT









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Major Roads

#### **SPECIES DATA** DEVELOPMENT

Species-Based Habitat



### NJDEP '07 Land Use/Land Cover Classes – Appendix III

1110         URBAN         RESIDENTIAL, HOLD DENSTY, MLT PLE DYRLING         4411         FORST         MICED FORST F-MAX COMPERCIS WITH 10-MS CROWN ALCOURD)           113         URBAN         RESIDENTIAL, REDUX MEDIAN DENSTY         4432         FORST         MICED FORST F-MS COMPERCIS WITH 10-MS CROWN ALCOURD)           114         URBAN         RESIDENTIAL, RUBAL, R	LU07	TYPE07	LABEL07	LU07	TYPE07	LABEL07
1130         UBBAN         RESIDENTIAL SHOLE UNT, MEDIA DENSITY         432         FOREST         MACED FOREST (~MSC COMEREDUS WTM + 39% CROWN CLOSURE)           113         UBBAN         RESIDENTIAL, RURAL, BINGLE UNT         432         FOREST         MACED FOREST (~MSC DORUST (~OLSURE)           114         UBBAN         RESIDENTIAL, RURAL, BINGLE UNT         432         FOREST         MACED FOREST (~MSC DORUST (~OLSURE)           115         UBBAN         RESIDENTIAL, RURAL, BINGLE UNT         432         FOREST         MACED FOREST (~MSC DORUST (~OLSURE)           116         UBBAN         MACED RESIDENTIAL, RURAL, BINGLE UNT         443         FOREST         MACED FOREST (~MSC DORUST (~MSC	1110	URBAN	RESIDENTIAL HIGH DENSITY, MULTIPLE DWELLING	4311	FOREST	MIXED FOREST (>50% CONIFEROUS WITH 10%-50% CROWN CLOSURE)
1130     URBAN     RESIDENTIAL, RURAL, SINGLE LUNT     422     FOREST     MIXED FOREST (%% DECIDUUS WITH 10%% CROWN CLOSURE)       1140     URBAN     RESIDENTIAL, RURAL, SINGLE LUNT     422     FOREST     MIXED FOREST (%% DECIDUUS WITH 10%% CROWN CLOSURE)       1141     URBAN     MIXED RESIDENTIAL, RURAL, SINGLE LUNT     442     FOREST     OLD PLLO P-2% RULA FOX COUNCE ON LOSURE)       1200     URBAN     MIXED RESIDENTIAL, RURAL, SINGLE LUNT     444     FOREST     OLD PLLO P-2% RULA FOX COUNCE ON RURAL COURSED       1211     URBAN     MULTITARY, USE TO BETTERMINED     444     FOREST     CONFERIOUS SINGHERICIAND       1411     URBAN     NOLOKRER MULTARY, USE TO BETTERMINED     444     FOREST     CONFERIOUS SINGHERICIAND       1420     URBAN     MULTITARY, USE TO BETTERMINED     444     FOREST     CONFERIOUS SINGHERICIAND       1430     URBAN     MULTITARY, USE TO BETTERMINED     444     FOREST     CONFERIOUS SINGHERICIAND       1440     URBAN     MULTITARY, USE TO BETTERMINED     444     FOREST     CONFERIOUS SINGHERICIAND       1441     URBAN     MULTITARY, USE TO BETTERMINED     540     MATER     STELEMA AND CANALY       1441     URBAN     MULTITARY, USE TO BETTERMINED     540     MATER     STELEMA AND CANALY       1441     URBAN     MULTITARY, USE TO B	1120	URBAN	RESIDENTIAL SINGLE UNIT, MEDIUM DENSITY	4312	FOREST	MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)
1140     UBBNN     PERDENTIAL, RUAL, SINGLE UNIT     432     FOREST     MIXED FOREST (45%, BOCIDUOUS WITH -45%, CROWN CLOBURE)       1150     UBBNN     COMMERCIAL/SERVICES     441     FOREST     OLD FELD 0: 25 RUUS COVERED)       121     UBBNN     MILTARY RESERVATIONS     441     FOREST     OLD FELD 0: 25 RUUS COVERED)       121     UBBNN     MILTARY RESERVATIONS     441     FOREST     CONTERUOS BRUISHARULAND       130     UBBNN     INDUSTRAL     4400     FOREST     CONTERUOS BRUISHARULAND       140     UBRNN     TRANSPORTATION CORRICO OVERFLAP AREA     550     WATER     SERVERS BURNED UPLAND VOETATION       141     UBRNN     MALOR ROAD/VAY     1400     FOREST     CONTERUOS BRUISHARULAND       1410     UBRNN     MALOR ROAD/VAY     1400     SERVERS BURNED UPLAND VOETATION       1410     UBRNN     MALOR ROAD/VAY     1400     VATER     EXPOSED FLATS       1410     UBRNN     RARLAGABS     550     WATER     ARTERIOLULAKES       1420     UBRNN     RUROSC TACULTIES     550     WATER     ARTERIOLULAKES       1420     UBRNN     UPLAND RIGHTS-OF-WAY MODIFIED)     540     WATER     ARTERIOLULAKES       1430     UBRNN     UPLAND RIGHTS-OF-WAY MODIFIED)     5411     WATER     ARTERIO	1130	URBAN	RESIDENTIAL SINGLE UNIT. LOW DENSITY	4321	FOREST	MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)
1150     URBAN     MIXED RESIDENTIA,     4411     FOREST     OLD FIELO (~ 27% BRUGH COVERED)       1200     URBAN     COMMERCIALSSIN/CES     4411     FOREST     DECIDUUS BRUGHSHRUEAND       1211     URBAN     MULTARY UBL TO BE DETERMINED     4402     FOREST     DECIDUUS BRUGHSHRUEAND       1214     URBAN     MULTARY UBL TO BE DETERMINED     4402     FOREST     DECIDUUS BRUGHSHRUEAND       1214     URBAN     MULTARY UBL TO BE DETERMINED     4402     FOREST     DECIDUUS BRUGHSHRUEAND       1410     URBAN     MULTARY UBL TO BE DETERMINED     4404     FOREST     DECIDUUS BRUGHSHRUEAND       1410     URBAN     MULTARY UBL TO BE DETERMINED     4404     FOREST     DECIDUUS BRUGHSHRUEAND       1410     URBAN     MULTARY UBL TO BE DETERMINED     5400     WATER     STREAM AND CANLAS       1411     URBAN     MULTARD ROADWAY     MARCE TRANSPORTATION CORROOR OVERLAP AREA     5000     WATER     NATER     ARTERICA LARSS       1420     URBAN     ARAROADS     5100     WATER     TOLA ROADSAY     MATER     ARTERICA LARSS       1430     URBAN     ARAROADS     5410     WATER     ARTERICA LARSS     MATER     MATER     MATER     MATER     MATER     MATER     MATER     MATER     MATER     MATE	1140	URBAN	RESIDENTIAL RURAL SINGLE UNIT	4322	FOREST	MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)
120     URBAN     COMMERCIAL/JERVICES     4411     POREST     POREST     POREST     DECENCIONATION       121     URBAN     NULTARY RESERVATIONS     4400     POREST     DECENCIONAL RUTARY CLASS       130     URBAN     NOLUSTRIAL     4400     POREST     DECENCIONAL RUTARY CLASS       130     URBAN     INDUSTRIAL     4400     POREST     DECENCIONAL RUTARY CLASS       140     URBAN     TRANSPORTATION/COMMUNICATIONS/UTBLITIES     5100     WATER     STREAMS AND CANLES       1410     URBAN     MALOR ROAD/WAY     STREAMS AND CANLES     5100     WATER     STREAMS AND CANLES       1411     URBAN     MALOR ROAD/WAY     STREAMS AND CANLES     5100     WATER     NATIONAL LARES       1410     URBAN     MALOR ROAD/WAY     STREAMS AND CANLES     5100     WATER     NATIONAL LARES       1420     URBAN     ALROAD ROAD/WAY     WATER     DECOLOUS AND CANLES     500     WATER     NATIONAL LARES       1440     URBAN     ALROAD ROAD/WAY     WATER     DECOLOUS AND CANLES     500     WATER     NATIONAL LARES       1440     URBAN     MALOR ROAD ROAD/WAY     WATER     NATIONAL LARES     500     WATER     NATIONAL LARES       1441     URBAN     MATER CAD ROAD     1101	1150	URBAN	MIXED RESIDENTIAL	4410	FOREST	OLD FIELD (< 25% BRUSH COVERED)
1211     URBAN     MLITARY RESERVATION3     4400     POREST     DECOLUCUS BRUSHSHRULAND       1214     URBAN     NOLCNORE MUTARY, USE TO BE DETERMINED     4400     FOREST     CONFERCIS BRUSHSHRULAND       1214     URBAN     INCLUSTRAL     6400     FOREST     CONFERCIS BRUSHSHRULAND       1400     URBAN     TRANSPORTATION/COMMINICATIONS/UTLITIES     500     WATER     SEVERE BURNED UTLAND VEDERTION       1410     URBAN     MALOD TANSPORTATION/COMMINICATION/SUTLITIES     500     WATER     SEVERE BURNED UTLAND VEDERTION       1411     URBAN     MALED TANSPORTATION/COMMINICATION CORRECAP AREA     500     WATER     SEVERE BURNED UTLAND VEDERTION       1420     URBAN     MALED RADEODOR OVERFLAP AREA     500     WATER     NATIRAL LAKES       1431     URBAN     ARALROADS     510     WATER     ATORNULSER, NAAD DAYS, AND OTHER TIDAL WATERS       1440     URBAN     ARALROADS     5410     WATER     ATORNULSER, NAAD DAYS, AND OTHER TIDAL WATERS       1441     WEITLAND     WATER     ATORNULSER, NAAD DAYS, AND OTHER TIDAL WATERS     5410       1450     URBAN     URBAN     WATER     ATORNULSER     5410       1451     URBAN     UPLAND ROHTS-OF-WAY (INDEVECORED)     5411     WITLANDS     54111       1452     URBAN     <	1200	URBAN	COMMERCIAL/SERVICES	4411	FOREST	PHRAGMITES DOMINATE OLD FIELD
1214         URBAN         NOLLONGER MILITARY, UBE TO BE DETERMINED         4440         FOREST         COMPTENDUS BRUSHERHUBLAND           1330         URBAN         INDUSTRIAL         4440         FOREST         MEDIO ECOLUDUSCONFEROUS BRUSHERHUBLAND           1340         URBAN         TRANSPORTATION COMMUNICATIONSUTLITIES         5500         WATER         SEVERE BURIND UPLAND VIECHTON           1410         URBAN         MAJOR ROJONAY         SEVERE BURIND UPLAND VIECHTON         5500           1411         URBAN         MAJOR ROJONAY         SEVERE BURIND UPLAND VIECHTON         5500           1411         URBAN         RARENDAS         SEVERE BURIND UPLAND VIECHTON         5500           1411         URBAN         ARRENDAS         SEVERE BURIND UPLAND VIECHTON         5500           1420         URBAN         ARRENDAS         SEVERE BURIND UPLAND VIECHTON         5500           1440         URBAN         ARRENDAS         5500         WATER         ARTERIOL LAKES           1441         URBAN         URBAN RUBHARSHINGUND         5411         WATER         ARTERIOL LAKES           1442         URBAN         MULTAND RIGHTSOFWAY (MODIFIED)         5411         WATER         ARTERIOL LAKES           1444         URBAN         URLAND RUBHARSHINGUNDA	1211	URBAN	MILITARY RESERVATIONS	4420	FOREST	DECIDUOUS BRUSH/SHRUBLAND
Automation         Descention         Descention         Multiple           1000         INDUSTRIAL         MULTIPLE         MULTIPLE <t< td=""><td>1214</td><td>LIRBAN</td><td>NO LONGER MILITARY, USE TO BE DETERMINED</td><td>4430</td><td>FOREST</td><td>CONIFEROUS BRUSH/SHRUBLAND</td></t<>	1214	LIRBAN	NO LONGER MILITARY, USE TO BE DETERMINED	4430	FOREST	CONIFEROUS BRUSH/SHRUBLAND
1000     URBAN     TRANSPORTATION/COMMUNICATION/SUITILITIES     4000     FOREST     SEVERE BURNED UPLAND YOU TAND MADE       1410     URBAN     MALOR ROADWAY     5000     VATER     SEVERE BURNED UPLAND YOU TAND MADE       1411     URBAN     MALOR ROADWAY     5000     VATER     SEVERE BURNED UPLAND YOU TAND MADE       1411     URBAN     MALOR ROADWAY     SEVERE BURNED UPLAND YOU TAND YO	1300	LIRBAN	INDUSTRIAL	4440	FOREST	MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND
Instant ALL AND RUNCE AND ALL AND REAL MARKAN MAR	1400	LIRBAN	TRANSPORTATION/COMMUNICATIONS/LITHITIES	4500	FOREST	SEVERE BURNED UPLAND VEGETATION
1410       URBAN       MACED TRANSPORTATION CORREDOR OVERFLAP AREA       5300       WATER       EXPOSED FLATS         1411       URBAN       MALCD TRANSPORTATION CORREDOR OVERFLAP AREA       5300       WATER       NUTRAL LAKES         1411       URBAN       RALEOR ALL ALSS       5300       WATER       ARTIFICIAL LAKES         1412       URBAN       RALEORAS       5300       WATER       ARTIFICIAL LAKES         1420       URBAN       AREPORT FACLITIES       5410       WATER       ARTIFICIAL LAKES         1440       URBAN       AREPORT FACLITIES       5410       WATER       ARTIFICIAL LAKES         1441       URBAN       AREPORT FACLITIES       5410       WATER       ARTIFICIAL LAKES         1442       URBAN       AREPORT FACILITIES       5410       WATER       ARTIFICIAL LAKES         1442       URBAN       UPLAND RIGHTS-OF-WAY (IDEVELOPED)       5410       WATER       CENTON         1450       URBAN       INDUSTRALACOMMERCIAL COMMERCIAL COMPRESE       5410       WATER       CENTON         1500       URBAN       INDUSTRALACOMMERCIAL COMPRESE       6111       WETLANDS       CENTERY       6120       WETLANDS       CENTERY         1710       URBAN       CENTERY <t< td=""><td>1410</td><td>LIDDAN</td><td>MAJOB POLICIALLY</td><td>5100</td><td>WATER</td><td>STREAMS AND CANALS</td></t<>	1410	LIDDAN	MAJOB POLICIALLY	5100	WATER	STREAMS AND CANALS
H11       UNDAWS       MIXED LINNSPORTATION CONTRACTOR CONTRA	1410	URDAN	MIXED TRANSPORTATION CORP.DOD OVERELAD AREA	5190	WATER	EXPOSED FLATS
H112       URBAN       RAREOADS         H42       URBAN       ARREOADS         H44       URBAN       ARREOADS         H44       URBAN       ARREOADS         H44       URBAN       ARREOADS         H44       URBAN       ARREOADS         H45       WETLAND RIGHTS-OF-WAY (DEVELOPED)       5411         H46       URBAN       UPLAND RIGHTS-OF-WAY (DEVELOPED)         H47       URBAN       URBAN STORMATER BASIN         H500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES         H500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES         H500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES         H500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES         H500       URBAN       MIXELD URBAN OR BUILT-UP LAND         H511       WETLANDS       SALINE MARSHES (HOL MARSH)         H511       WETLANDS       SALINE MARSHES (HOL MARSH)         H511       WETLANDS       SALINE MARSHES HOL MARSH)         H512       WETLANDS       SALINE MARSHES HOL MARSH)         H511       WETLANDS       SALINE MARSHES HOL MARSH)         H511       WETLANDS       SALINE MARSHES HOL MARSHES         H511       WETLANDS       SA	1410	WATER	BRIDGE OVER WATER	5200	WATER	NATURAL LAKES
1440     URBAN     ANALYER     TOAL REVERS, MULAND BAYS, AND OTHER TIDAL WATERS       1440     URBAN     WETLANDS     WETLANDS INGHTS-OF-WAY (WODIFIED)     540     WATER     OPENTIONAL BAYS       1441     URBAN     UPLAND RIGHTS-OF-WAY (WODIFIED)     540     WATER     OPENTIONAL BAYS       1442     URBAN     UPLAND RIGHTS-OF-WAY (WODIFIED)     540     WATER     ALAND BAYS, AND OTHER TIDAL WATERS       1442     URBAN     UPLAND RIGHTS-OF-WAY (WODIFIED)     540     WATER     ALAND BAYS, AND OTHER TIDAL WATERS       1450     URBAN     STORMWATER BASIN     611     WETLANDS     SALINE MARSHES (LOW MARSH)       1460     URBAN     STORMWATER RASH     MARSHES     612     WETLANDS     SALINE MARSHES (LOW MARSH)       1460     URBAN     OTHER URBAN OR BUILT-UP LAND     6111     WETLANDS     FRESMARTER TOLAL MARSHES       1700     URBAN     CEMETERY ON WETLAND     6120     WETLANDS     DECIDIOUS SCORES WATERS ON MARSHES       1711     WETLANDS     CEMETERY ON WETLAND     6220     WETLANDS     DECIDIOUS SCRUBSHEEM       1711     WETLANDS     CEMETERY ON WETLAND     GENETERY ON WETLANDS     GENETEROUS WOODED WETLANDS       1720     WETLANDS     CEMETERY ON WETLAND     GENETEROUS WOODED WETLANDS     GENETEROUS WOODED WETLANDS       1720<	1419	WATER	BRIDGE OVER WATER	5300	WATER	ARTIFICIAL LAKES
1410     URBAN     AIROUKI FAULTINES       1421     WETLAND ROWERS OF WAY (INDEVELOPED)     5411       1422     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1433     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1443     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1443     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1444     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1450     URBAN     UPLAND RIGHTS-OF-WAY (INDEVELOPED)       1451     URBAN     INDUSTRIALICOMMERCIAL COMPLEXES       1500     URBAN     INDUSTRIALICOMMERCIAL COMPLEXES       1500     URBAN     CEMETERY       1511     WETLANDS     CEMETERY       1511     WETLANDS     CEMETERY ON WETLAND       1512     WETLANDS     CEMETERY ON WETLANDS       1510     URBAN     CEMETERY ON WETLAND       1510     URBAN     CEMETERY ON WETLAND       1511     WETLANDS     MARAGEWETLANDS       1512     WETLANDS     MARAGEWETLANDS       1513     WETLANDS     MARAGEWETLANDS       1514     URBAN     ATHLETC FIELDS (SCHOOLS)       1514     WETLANDS     MARAGEWETLAND       1510     URBAN     ATHLETC FIELDS (SCHOOLS)       1511     WETLANDS     MAR	1420	URBAN	NALROADS	5410	WATER	TIDAL RIVERS, INLAND BAYS, AND OTHER TIDAL WATERS
Heil Will LANDS     WILLANDS     WILLANDS     State       Heig Ungan     UPLAND Rights-OF-WAY (WODERLD)     5400     State       1462     URBAN     UPLAND Rights-OF-WAY (WODERLD)     5400       1463     URBAN     UPLAND Rights-OF-WAY (WODERLD)     6111       1464     URBAN     Stormware     State       1463     URBAN     Stormware     State       1464     URBAN     Stormware     State       1469     URBAN     Stormware     State       1460     URBAN     Stormware     State       1460     URBAN     Stormware     State       1460     URBAN     Other URBAN OR BUILT-UP LAND     6111       1470     URBAN     Other URBAN OR BUILT-UP LAND     6120       1471     URBAN     Other URBAN ARE CEMITERY     6120       1471     URBAN     PHRAGMITES DOMINATE URBAN AREAS     6220       1471     URBAN     RECREATIONAL LAND     RECREATIONAL LAND       1471     URBAN     RECREATIONAL LAND     State       1472     URBAN     ATHLETIC FIELOS (SCHOOLS)     CONFEROUS SCRUBSHRUB WETLANDS       1474     URBAN     ATHLETIC FIELOS (SCHOOLS)     CONFEROUS SCRUBSHRUB WETLANDS       1474     URBAN     ATHLETICS FIELOS (SCHOOLS)     CO	1440	UNDAN	ARPORT PACIENTES	5411	WATER	OPEN TIDAL BAYS
142. URBAN     UPLAND RIGHTS-OF-WAY (DEVELOPED)     543.0     MATER     ATLANTIC OCEAN       143.0     URBAN     UPLAND RIGHTS-OF-WAY (DEVELOPED)     6111     WITLANDS     SALINE WARSHES (JGW MARSH)       149.0     URBAN     STORMWATER BASIN     6111     WITLANDS     SALINE WARSHES (JGW MARSH)       1500     URBAN     INDUSTRIAL/COMMERCIAL COMPLEXES     6120     WITLANDS     SALINE WARSHES (JGW MARSH)       1500     URBAN     MIXED WIELAND OR BUILT-UP LAND     6130     WITLANDS     PHRAGMITES DOMINATE COASTA, WETLANDS       1710     URBAN     CEMETERY     6200     WETLANDS     DOMINATE COASTA, WETLANDS       1711     WIELANDS     CEMETERY ON WIELAND     6214     WETLANDS     ALANTO WHITE CEDAR SWAMP       1710     URBAN     CEMETERY     6220     WETLANDS     ALANTO WHITE CEDAR SWAMP       1711     WIELANDS     MANAGED WETLAND AREAS     6221     WETLANDS     6221     WETLANDS       1710     URBAN     ACREMITERY ON WIELAND     GENERATIONAL LAND	1401	WETLANDS	WETLAND RIGHTS-OF-WAY (MODIFIED)	5420	WATER	DREDGED LAGOON
1430       URBAN       UPLAND RIGHTS-DF-WAY (UNDEVELOPED)       6111       WITLANDS       SALINE MARSHES (KOW MARSHE)         1490       URBAN       STORMATER BASIN       6112       WITLANDS       SALINE MARSHES (KOW MARSHE)         1500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES       6120       WITLANDS       SALINE MARSHES (KOW MARSHE)         1700       URBAN       OTHER URBAN OR BUILT-UP LAND       6130       WITLANDS       SALINE MARSHES (KOW MARSHE)         1700       URBAN       OTHER URBAN OR BUILT-UP LAND       6130       WITLANDS       SALINE MARSHES (KOW MARSHE)         1700       URBAN       CEMETERY       6210       WITLANDS       COMFEROUS WOODED WITLANDS         1711       WITLANDS       CEMETERY       6221       WITLANDS       COMFEROUS WOODED WITLANDS         1714       URBAN       PHRAGMITES DOMINATE URBAN AREAS       6221       WITLANDS       COMFEROUS WOODED WITLANDS         1720       URBAN       RECREATIONAL LAND       MARAGED WITLAND IN MAINTAINED LAWN GREENSPACE       6221       WITLANDS       COMFEROUS SCRUBSHRUB WITLANDS (CONFEROUS DOM.)       6221         1804       URBAN       ATHETIC FIELDS (SCHOOLS)       MARAGED WITLANDS       MARAGED WITLANDS (CONFEROUS DOM.)       6221       WITLANDS       MILE LANDS       CONFEROUS SCRUBSHRU	1462	URBAN	UPLAND RIGHTS-OF-WAY (DEVELOPED)	5430	WATER	ATLANTIC OCEAN
1499       URBAN       STORMWATER BASIN       6112       WETLANDS       SALINE MARSHES (NON MARSH)         1500       URBAN       INDUSTRIAL/COMMERCIAL COMPLEXES       6112       WETLANDS       FRESIMATER TDAL, MARSHES         1600       URBAN       MIXED URBAN OR BUILT-UP LAND       6113       WETLANDS       PIRAGMITER TDAL, MARSHES         1710       URBAN       OTHER URBAN OR BUILT-UP LAND       6114       WETLANDS       DECIDIOUS WOODED WETLANDS         1711       URBAN       CEMETERY ON WETLAND       6220       WETLANDS       DECIDIOUS WOODED WETLANDS         1711       URBAN       PERAGMITES DOMINATE URBAN AREAS       6221       WETLANDS       DECIDIOUS SCRUB-SRUB WETLANDS         1700       URBAN       RECREATIONAL LAND       6221       WETLANDS       DECIDIOUS SCRUB-SRUB WETLANDS         1800       URBAN       ATHETCHELS (CHUTARL CENTERS AND ZOOS       6231       WETLANDS       MIXED SCRUB-SRUB WETLANDS (CONFEROUS DOM.)         1801       URBAN       ATHETCHELAND       CONFEROUS SCRUB-SRUB WETLANDS (CONFEROUS DOM.)       6241       WETLANDS       MIXED SCRUB-SRUB WETLANDS (CONFEROUS DOM.)         1804       URBAN       ATHETCHELAND       CONFEROUS SCRUB-SRUB WETLANDS (CONFEROUS DOM.)       6241       WETLANDS       MIXED SCRUB-SRUB WETLANDS (CONFEROUS DOM.)       6241	1463	URBAN	UPLAND RIGHTS-OF-WAY (UNDEVELOPED)	6111	WETLANDS	SALINE MARSHES (LOW MARSH)
1000     URBAN     INDUSTRIAL/COMMERCIAL COMPLEXES     61.0     VELTANDS     PRESHWATER TUAL MARKES       1000     URBAN     OTHER URBAN OR BUILT-UP LAND     61.0     WETLANDS     VERTATED DUNE COMMUNITIES       1710     URBAN     OTHER URBAN OR BUILT-UP LAND     61.1     WETLANDS     PHRSHWATER DOMINATE COASTAL WETLANDS       1710     URBAN     CEMETERY     6210     WETLANDS     DECIDUOUS WOODED WETLANDS       1711     WETLANDS     GEMETERY ON WETLAND     6211     WETLANDS     DECIDUOUS WOODED WETLANDS       1711     WETLANDS     MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE     6221     WETLANDS     ATLANTIC WHITE CEDAR SWAMP       1750     WETLANDS     MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE     6221     WETLANDS     6221     WETLANDS     COUNTEROUS SCRUB-SRUB WETLANDS       1860     URBAN     RECREATIONAL LAND     GEOCHOLS     6221     WETLANDS     MIXED SCRUB-SRUB WETLANDS       1860     URBAN     STADIUM THEATERS CULTURAL CENTERS AND 2005     6231     WETLANDS     MIXED SCRUB-SRUB WETLANDS       1860     WETLANDS     MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA     6241     WETLANDS     MIXED SCRUB-SRUB WETLANDS       1860     WETLANDS     AGRICULTURE     CORPERATION IN BUILT-UP MAINTAINED REC AREA     6241     WETLANDS     MIXED SCRUB-SRUB WE	1499	URBAN	STORMWATER BASIN	6112	WETLANDS	SALINE MARSHES (HIGH MARSH)
1000       URBAN       MILED URBAN OR BUILT-UP LAND       6130       WIELANDS       VIGRANTED DURIE COMMARKETES         1700       URBAN       OTHER URBAN OR BUILT-UP LAND       6210       WIELANDS       PLRAGMITES DOMINATE COASTAL WETLANDS         1710       URBAN       CCMETERY       6210       WIELANDS       DECIDIOUS WOODED WETLANDS         1711       WIELANDS       CEMETERY ON WIELAND       6220       WIELANDS       CONFEROUS WOODED WETLANDS         1720       WIELANDS       CEMETERY ON WIELAND       GONFEROUS WOODED WETLANDS       6220         1741       URBAN       PHRAGMITES DOMINATE URBAN AREAS       6220       WIELANDS       DECIDIOUS SCRUB/SHRUB WETLANDS         1800       URBAN       RECREATIONAL LAND       GECRUB/SHRUB WETLANDS       CONFEROUS SCRUB/SHRUB WETLANDS         1801       URBAN       ATHETIC FIELDS (SCHOOLS)       6233       WIELANDS       MIXED SCRUB/SHRUB WETLANDS       CONFEROUS DOM.)         1804       URBAN       ATHETIC CENTRAL CENTERS AND ZOOS       6234       WIELANDS       MIXED SCRUB/SHRUB WETLANDS       CONFEROUS DOM.)         1810       URBAN       ATHETIC CULTURE       CROPLAND AND PASTURELAND       MIXED CONSING WETLANDS       6240       WIELANDS       MIXED FORESTED WETLANDS       MIXED FORESTED WETLANDS       6241       WIELAN	1500	URBAN	INDUSTRIAL/COMMERCIAL COMPLEXES	6120	WETLANDS	FRESHWATER TIDAL MARSHES
1700       URBAN       OTHER URBAN OR BUILTUP LAND       6141       WEILANDS       PRAKAMITES DOMINATE COASTAL WEILANDS         1710       URBAN       CEMETERY       6210       WEILANDS       DECIDUOUS WOODED WEILANDS         1711       URBAN       PHRAGMITES DOMINATE URBAN AREAS       6221       WEILANDS       ATLANDS         1750       WEILANDS       MANAGED WEILAND IN MAINTAINED LAWN GREENSPACE       6221       WEILANDS       DECIDUOUS SCRUB/SHRUB WEILANDS         1860       URBAN       RECREATIONAL LAND       MAINTAINED LAWN GREENSPACE       6221       WEILANDS       CONFEROUS SCRUB/SHRUB WEILANDS         1800       URBAN       RECREATIONAL LAND       MAINTAINED LAWN GREENSPACE       6221       WEILANDS       CONFEROUS SCRUB/SHRUB WEILANDS         1801       URBAN       ATHLETIC FIELDS (\$CHOOL\$)       6234       WEILANDS       MIXED SCRUB/SHRUB WEILANDS       6234       WEILANDS       MIXED SCRUB/SHRUB WEILANDS       6244       WEILAND	1600	URBAN	MIXED URBAN OR BUILT-UP LAND	6130	WETLANDS	VEGETATED DONE COMMUNITIES
1710       URBAN       CEMETERY       CEMETERY         1711       WETLANDS       CEMETERY ON WETLAND       CONFEROUS WOODED WETLAND         1711       WETLANDS       CEMETERY ON WETLAND       6224         1711       WETLANDS       CONFEROUS WOODED WETLAND       6224         1750       WETLANDS       ANAGED WETLAND       MANAGED WETLAND         1750       WETLANDS       MANAGED WETLAND       MAINAGED WETLAND         1800       URBAN       RECREATIONAL LAND       6233       WETLANDS       CONFEROUS SCRUBISHIUB WETLANDS         1800       URBAN       ATHLETIC FIELDS (SCHOOLS)       6233       WETLANDS       MIXED SCRUBISHIUB WETLANDS         1800       URBAN       ATHLETIC FIELDS (SCHOOLS)       6234       WETLANDS       MIXED SCRUBISHIUB WETLANDS         1800       WETLANDS       MANAGED WETLAND       MULTUP MAINTAINED REC AREA       6244       WETLANDS       MIXED SCRUBISHIUB WETLANDS         1800       WETLANDS       MAINAGED WETLAND       MAINAGED WETLANDS       MIXED SCRUBISHIUB WETLANDS       6241       WETLANDS	1700	URBAN	OTHER URBAN OR BUILT-UP LAND	6141	WEILANDS	PHRAGMITES DOMINATE COASTAL WEILANDS
1711       WETLANDS       COMPENDUS WOODED WETLAND         1741       URBAN       PHAGMITES DOMINATE URBAN AREAS         1750       WETLANDS       MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE         1800       URBAN       RECREATIONAL LAND         1804       URBAN       ATHLETIC FIELDS (SCHOOLS)         1804       URBAN       STADIUM THEATERS CULTURAL CENTERS AND 200S         1804       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (DOCINEROUS DOM.)         1804       URBAN       STADIUM THEATERS CULTURAL CENTERS AND 200S         1804       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (DOCINEROUS DOM.)         1804       URBAN       STADIUM THEATERS CULTURAL CENTERS AND 200S         1804       WETLANDS       MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA         2100       AGRICULTURE       CONFINED PEEDING OPERATIONS         2100       AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)       6241       WETLANDS         2200       AGRICULTURE       ORCHARDS/VINEYARDS/VINEYARDS/VINESERIES/HORTICULTURAL AREAS       6500       WETLANDS         2200       AGRICULTURE       ORCHARDS/VINEYARDS/VINESERIES/HORTICULTURAL AREAS       6500       WETLANDS       SEVERE BURNED WETLANDS         2200       AGRICULTURE       OTHER AGRICULTURE       THEAD       62	1710	URBAN	CEMETERY	6210	WETLANDS	DECIDUOUS WOODED WETLANDS
1741       URBAN       PHRAGMITES DOMINATE URBAN AREAS       522       ALLEANDS       ALLEANDS       ALLEANDS         1750       WETLANDS       MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE       623       WETLANDS       DECIDUOUS SCRUB/SHRUB WETLANDS         1800       URBAN       RECREATIONAL LAND       MAINTAINED LAWN GREENSPACE       623       WETLANDS       DECIDUOUS SCRUB/SHRUB WETLANDS         1804       URBAN       ATHETIC FIELDS (SCHOOLS)       623       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)         1804       URBAN       STADIUM THEATERS CULTURAL CENTERS AND ZOOS       623       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)         1850       WETLANDS       MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA       624       WETLANDS       HERBACEOUS WETLANDS       6241       WETLANDS       HERBACEOUS WETLANDS (DECIDUOUS DOM.)         1850       WETLANDS       AGRICULTURE       CROPLAND AND PASTURELAND       6241       WETLANDS       MIXED PORESTEO WETLANDS (DECIDUOUS DOM.)         2140       WETLANDS       FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)       6241       WETLANDS       MIXED FORESTEO WETLANDS (DECIDUOUS DOM.)         2200       AGRICULTURE       OCHARDSMINEYARDSMURSERIESINGRTICULTURAL AREAS       6500       WETLANDS       MIXED FORESTEO WETLANDS <td>1711</td> <td>WETLANDS</td> <td>CEMETERY ON WETLAND</td> <td>6220</td> <td>WEILANDS</td> <td>CONFERIOUS WOODED WEITLANDS</td>	1711	WETLANDS	CEMETERY ON WETLAND	6220	WEILANDS	CONFERIOUS WOODED WEITLANDS
1750       WETLANDS       MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE       6231       WETLANDS       DECIDIOUS SCRUBSHRUB WETLANDS         1800       URBAN       ATHLETIC FIELDS (SCHOOLS)       6232       WETLANDS       MIXED SCRUBSHRUB WETLANDS         1801       URBAN       ATHLETIC FIELDS (SCHOOLS)       6233       WETLANDS       MIXED SCRUBSHRUB WETLANDS         1804       URBAN       ATHLETIC FIELDS (SCHOOLS)       6234       WETLANDS       MIXED SCRUBSHRUB WETLANDS         1805       WETLANDS       MANAGED VETLAND IN BUILT-UP MAINTAINED REC AREA       6240       WETLANDS       HERBACEOUS WETLANDS         1806       WETLANDS       AGRICULTURE       CROPLAND AND PASTURELAND       6241       WETLANDS       HERBACEOUS WETLANDS         1807       WETLANDS       FORMER AGRICULTURAL WETLAND (MODIFIED)       6241       WETLANDS       MIXED FORESTED WETLANDS (CONIFEROUS DOM.)         1809       WETLANDS       FORMER AGRICULTURAL WETLAND (MECOMING SHRUBBY, NOT BUILT-UP:       6241       WETLANDS       MIXED FORESTED WETLANDS (CONIFEROUS DOM.)         1800       WETLANDS       FORMER AGRICULTURAL WETLANDS (MODIFIED)       6252       WETLANDS       MIXED FOREST (DECIDUOUS DOM.)         2100       AGRICULTURE       ORCHARDSINESERIESHORTICULTURAL AREAS       6500       WETLANDS       SEVERE BURNED WETLANDS	1741	URBAN	PHRAGMITES DOMINATE URBAN AREAS	6221	WEILANDS	ATEANTIC WHITE CEDAR SWAMP
1800       URBAN       RECREATIONAL LAND       6221       WETLANDS       COMPENDOS SCHUB/SHRUB WETLANDS (DECIDUOUS DOM.)         1804       URBAN       ATHLETIC FIELDS (SCHOOLS)       6223       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)         1810       URBAN       STADIUM THEATERS CULTURAL CENTERS AND ZOOS       6233       WETLANDS       MIXED SCRUB/SHRUB WETLANDS (CONFEROUS DOM.)         1854       WETLANDS       MANAGED WETLAND       MIXED SCRUB/SHRUB WETLANDS (CONFEROUS DOM.)         1850       WETLANDS       MANAGED WETLAND       MIXED SCRUB/SHRUB WETLANDS (CONFEROUS DOM.)         2100       AGRICULTURE       CROPLAND AND PASTURELAND       6241       WETLANDS       HERBACEOUS WETLANDS         2140       WETLANDS       FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UPI       6251       WETLANDS       MIXED FORESTED WETLANDS (CONFEROUS DOM.)         2200       AGRICULTURE       ORCHARDS/VINEYARDSINURSERIES/HORTICULTURAL AREAS       6500       WETLANDS       SEVERE BURNED WETLANDS (CONFEROUS DOM.)         2200       AGRICULTURE       CONFINED FEEDING OPERATIONS       UNVEGETATED FLANDS       UNVEGETATED FLANDS       (CONFEROUS DOM.)         2200       AGRICULTURE       OTHER AGRICULTURE       FOREST       DECIDUOUS FOREST (10-50% CROWN CLOSURE)       6290       WETLANDS       SEVERE BURNED WETLAND	1750	WETLANDS	MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	6231	WETLANDS	CONFEEDOURS SCRUB/SHRUB WETLANDS
1804       URBAN       ATHLETIC FIELDS (\$CHOOLS)       6233       WETLANDS       MIXED SCRUBSHRUB WETLANDS (DECIDUOUS DOM.)         1810       URBAN       STADIUM THEATERS CULTURAL CENTERS AND ZOOS       6234       WETLANDS       MIXED SCRUBSHRUB WETLANDS (CONFEROUS DOM.)         1860       WETLANDS       MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA       6240       WETLANDS       HERBACEOUS WETLANDS (DECIDUOUS DOM.)         2100       AGRICULTURE       CROPLAND AND PASTURELAND       GECOMING SHRUBBY, NOT BUILT-UPI       6241       WETLANDS       PHRAGMITES DOMINATE INTERIOR WETLANDS         2100       AGRICULTURE       CONFINED AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UPI       6252       WETLANDS       MIXED FORESTED WETLANDS (CONFEROUS DOM.)         2100       AGRICULTURE       CONFINED FEEDING OPERATIONS       MIXED FORESTED WETLANDS       GEODUOUS DOM.)         2200       AGRICULTURE       CONFINED FEEDING OPERATIONS       6250       WETLANDS       MIXED FORESTED WETLANDS         2300       AGRICULTURE       CONFINED FEEDING OPERATIONS       6290       WETLANDS       SEVERE BURNED WETLANDS         2400       AGRICULTURE       OTHER AGRICULTURE       TOO BARREN LAND       BEACHES       7100       BARREN LAND       BEACHES         2400       AGRICULTURE       OTHER AGRICULTURE       TOSON CROWN	1800	URBAN	RECREATIONAL LAND	6232	WEILANDS	CONFERIOUS SCRUEISHRUE WETLANDS
1810       URBAN       STADIUM THEATERS CULTURAL CENTERS AND 200S       MAED SCHUBSCHUBSCHUBSCHUBSCHUBSCHUBSCHUBSCHUB	1804	URBAN	ATHLETIC FIELDS (SCHOOLS)	6233	WETLANDS	MIXED SCRUB/SHRUB WETLANDS (DECIDIOUS DOM.)
1850       WETLANDS       MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA       6240       WETLANDS       HERDADS         2100       AGRICULTURE       CROPLAND AND PASTURELAND       6241       WETLANDS       PHRAGMITES DOMINATE INTERIOR WETLANDS         2140       WETLANDS       AGRICULTURAL WETLANDS (MODIFIED)       6241       WETLANDS       MIXED FORESTED WETLANDS (DECIDUOUS DOM.)         2150       WETLANDS       FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UPI       6290       WETLANDS       UNVEGETATED FLANDS (CONFEROUS DOM.)         2200       AGRICULTURE       ORCHARDSVINEYARDSNURSERIES/HORTICULTURAL AREAS       6600       WETLANDS       UNVEGETATED FLANDS         2300       AGRICULTURE       ORTHER AGRICULTURE       OPERATIONS       7100       BARREN LAND       BEACHES         2400       AGRICULTURE       OTHER AGRICULTURE       TECENDUS FOREST (10-50% CROWN CLOSURE)       7300       BARREN LAND       BARE EXPOSED ROCK, ROCK SLIDES, ETC.         4110       FOREST       DECIDUOUS FOREST (10-50% CROWN CLOSURE)       7400       BARREN LAND       ALTERED LANDS       MODIFIED)         4120       FOREST       CONFEROUS FOREST (>50% CROWN CLOSURE)       7430       WETLANDS       DISTUNESED WETLANDS       MODIFIED)         4220       FOREST       CONFEROUS FOREST (>50% CROWN CLOSURE)	1810	URBAN	STADIUM THEATERS CULTURAL CENTERS AND ZOOS	6240	WEILANDO	MIXED SURVERSHINDS WETEANUS (CONFERIOUS DOM.)
2100       AGRICULTURE       CROPLAND AND PASTURELAND       6011       METLANDS       PRODUCT EST DOMARE METLANDS (DECIDUOUS DOM.)         2140       WETLANDS       AGRICULTURAL WETLANDS (MODIFIED)       6251       WETLANDS       MIXED FORESTED WETLANDS (DECIDUOUS DOM.)         2150       WETLANDS       FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UPI       6252       WETLANDS       MIXED FORESTED WETLANDS (CONIFEROUS DOM.)         2200       AGRICULTURE       ORCHARDSAVINEYARDSINURSERIES/HORTICULTURAL AREAS       6650       WETLANDS       UNVEGETATED FLATS         2300       AGRICULTURE       CONFINED FEEDING OPERATIONS       7100       BARREN LAND       BEACHES         2400       AGRICULTURE       OTHER AGRICULTURE       OTHER AGRICULTURE       7200       BARREN LAND       BEACHES         2410       FOREST       DECIDUOUS FOREST (10-50% CROWN CLOSURE)       7300       BARREN LAND       EXTRACTIVE MINING         4120       FOREST       CONIFEROUS FOREST (10-50% CROWN CLOSURE)       7400       BARREN LAND       ALTERED LANDS       MIXED FOREST         4201       FOREST       CONIFEROUS FOREST (10-50% CROWN CLOSURE)       7400       BARREN LAND       ALTERED LANDS       MIXED FOREST (10-50% CROWN CLOSURE)         4201       FOREST       CONIFEROUS FOREST (0-50% CROWN CLOSURE)       7500 <td>1850</td> <td>WETLANDS</td> <td>MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA</td> <td>6240</td> <td>WETLANDS</td> <td>PURACEUOS WEILANDS DURACENTES DOMENATE INTERIOR WETLANDS</td>	1850	WETLANDS	MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	6240	WETLANDS	PURACEUOS WEILANDS DURACENTES DOMENATE INTERIOR WETLANDS
2140       WETLANDS       AGRICULTURAL WETLANDS (MODIFIED)       6251       WETDANDS       MixED FORESTED WETDANDS (Decidioos bowl)         2150       WETLANDS       FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP1       6252       WETLANDS       MixED FORESTED WETDANDS (CONIFEROUS DOM.)         2200       AGRICULTURE       ORCHARDS/MINEYARDS/MURSERIES/HORTICULTURAL AREAS       6500       WETLANDS       UNVEGETATED FLATS         2300       AGRICULTURE       CONFINED FEEDING OPERATIONS       7100       BARREN LAND       BEACHES         2400       AGRICULTURE       OTHER AGRICULTURE       OTHER AGRICULTURE       7200       BARREN LAND       BEACHES         2410       FOREST       DECIDUOUS FOREST (10-50% CROWN CLOSURE)       7300       BARREN LAND       EXTRACTIVE MINING         4120       FOREST       DECIDUOUS FOREST (10-50% CROWN CLOSURE)       7400       BARREN LAND       ALTERED LANDS (MODIFIED)         4210       FOREST       CONIFEROUS FOREST (10-50% CROWN CLOSURE)       7430       WETLANDS       DISTURBED WETLANDS (MODIFIED)         4220       FOREST       CONIFEROUS FOREST (10-50% CROWN CLOSURE)       7430       WETLANDS       DISTURBED WETLANDS (MODIFIED)         4220       FOREST       CONIFEROUS FOREST (10-50% CROWN CLOSURE)       7430       WETLANDS       DISTURBED WETLANDS (MOD	2100	AGRICULTURE	CROPLAND AND PASTURELAND	6241	WETLANDS	MYED EORESTED WET ANDS (DECIDIOUS DOM)
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4220 FOREST CONFEROUS FOREST (>50% CROWN CLOSURE) 7500 BARREN LAND TRANSITIONAL AREAS	4210	FOREST	CONIFEROUS FOREST (10-50% CROWN CLOSURE)	7430	WETLANDS	DISTURBED WETLANDS (MODIFIED)
4210 EXPERT PLANTATION 7800 BARDEN LAND UNDEEDENTIATED BARDEN LANDS	4220	FOREST	CONIFEROUS FOREST (>50% CROWN CLOSURE)	7500	BARRENLAND	TRANSITIONAL AREAS
TOUL DAMAGE LAND UNDEFENSIVE COMPANY COMPANY	4230	FOREST	PLANTATION	7600	BARRENLAND	UNDIFFERENTIATED BARREN LANDS

### Version 3.1

#### **The Species-Based Habitat approach:**

In Version 3.1, each species has a specific set of LULC classes that are designated as appropriate habitat relating to that species needs *that can be valued* by a SOA.



### Creating the Landscape Project Maps (v3.1) <u>Riparian Corridor:</u>

Based on a modified CRSSA methodology the following are combined and dissolved into one layer:

NJDEP 2007 Land-use/Land-cover (LULC)
Waterbodies and 2002 stream centerlines buffered
by 50 meters

NJDEP 2007 LULC – all Type07 coded as "wetlands"

NJDEP USGS Flood-Prone Areas – all areas coded as "USGS Documented Flood-prone Area"

■ <u>SSURGO</u> – all soils defined as "hydric"

Dissolved layer clipped by 100 meter buffer on streams centerlines and waterbodies

Resulting areas are kept if they intersect stream centerlines.



### Delineating Species-Based Habitat (Version 3.1)

#### Land Use/Land Cover Selections and Patch Type Justifications – Appendix V.

#### Land Use Land Cover Selections and Patch Type Justifications

Blue-sp	notted Salamander BIOPID 207 REGION S	Statewide PATCH TYPI	CH TYPE Cardinal-Proximate *		
LU07	LABEL 07	LULC TREATMENT	CITATIONS		
1461	WETLAND RIGHTS-OF-WAY (MODIFIED)	Undissolved and Adjacent Undissolved	2-5		
1463	UPLAND RIGHTS-OF-WAY (UNDEVELOPED)	Undissolved	2-5		
1711	CEMETERY ON WETLAND	Undissolved and Adjacent Undissolved	2-5		
1750	MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	Undissolved and Adjacent Undissolved	2-5		
1850	MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	Undissolved and Adjacent Undissolved	2-5		
2140	AGRICULTURAL WETLANDS (MODIFIED)	Undissolved and Adjacent Undissolved	2-5		
2150	FORMER AGRICULTURAL WETLAND (BECOMING SHRUBBY, NOT BUILT-UP)	Undissolved and Adjacent Undissolved	2-5		
4110	DECIDUOUS FOREST (10-50% CROWN CLOSURE)	Undissolved	2-5		
4120	DECIDUOUS FOREST (>50% CROWN CLOSURE)	Undissolved	2-5		
4210	CONIFEROUS FOREST (10-50% CROWN CLOSURE)	Undissolved	2-5		
4220	CONIFEROUS FOREST (>50% CROWN CLOSURE)	Undissolved	2-5		
4230	PLANTATION	Undissolved	2-5		
4311	MIXED FOREST (>50% CONIFEROUS WITH 10%-50% CROWN CLOSURE)	Undissolved	2-5		

#### Land Use - Land Cover Selection and Patch Type Rationale

Blue-spotted salamanders (*Ambystoma laterale*) breed in fish-free ponds, often defined as vernal pools, in New Jersey (Anderson and Giacosie 1967). Much of each species' distribution is within 300-meters of a breeding habitat, although individuals will disperse outside of this range (Regosin et al. 2005). Vernal pools, a type of ephemeral wetland, are identified in the LULC as various wetland and forest classes and are a critical component to the persistence of this salamander. Many types of non-urban land use classes, primarily deciduous forest and deciduous wooded wetlands, surrounding a vernal pool will serve as the non-breeding habitat (Faccio 2003, Regosin et al. 2005).

Because of their limited dispersal ability and fidelity to vernal pools and other fish-free wetlands as breeding habitats, patch type Cardinal-Proximate is the best model to capture the species' critical habitat requirements. This patch type limits the amount of habitat valued beyond the normal dispersal distances of the salamanders from their breeding habitats. To better identify important breeding locations near to the species observation (along with the associated upland, non-breeding habitat that may not have been captured by the patch type Cardinal-Proximate method alone), a separate GIS layer of potential vernal and vernal habitat areas was used in the mapping for marbled salamander. This vernal GIS layer was used to value the selected LULC classes, following the same patch type approach, given they intersected the SOA. This process results in most important breeding and upland habitats associated with the SOA to be selected.

In a final step, after polygons from the initial set of LULC classes are valued based on intersection with the SOA or an associated potential vernal or vernal habitat area, polygons from a second set of wetland LULC classes are valued, provided they are immediately adjacent to the valued area made up of the initial set of LULC classes. This was done to best represent the important habitat needs for this species near the breeding sites and in the surrounding uplands or wetlands.

#### Literature Citations

- 1. Anderson, J.D. and R.V. Giacosie. 1967. Ambystoma laterale in New Jersey. Herpetologica 23 (2): 108-111.
- Faccio, S.D. 2003. Postbreeding emigration and habitat use by Jefferson and spotted salamanders in Vermont. Journal of Herpetology 37:479-489.
- 3. Madison, D. M. 1997. The emigration of radio-implanted spotted salamanders, Ambystoma maculatum, Journal of Herpetology 31:542-551.
- 4. Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington D.C., USA.
- Regosin, J.V., B.S. Windmiller, R.N. Homan, and J.M. Reed. 2005. Variation in Terrestrial Habitat Use By Four Pool-Breeding Amphibian Species. Journal of Wildlife Management 69 (4): 1481-1493.

### Version 3.1 method

**Patch Type** – a category that describes the method employed to form the valued habitat area from the Landscape base layer for each species-feature label combination. Each species-feature label combination is grouped into one of the following patch type categories.

• **Limited Extent** – polygons from a select set of LULC classes are valued upon intersection with a SOA. Once the valued habitat area is identified, any internal holes or gaps containing polygons of selected LULC classes are also valued if they are completely enclosed by, and contiguous with, the valued area.

• **Contiguous Area** – polygons from a select set of LULC classes are dissolved/combined into contiguous areas and valued upon intersection with a SOA.

• **Cardinal-Proximate** – polygons from an initial, or cardinal, set of LULC classes are valued upon intersection with a SOA and then polygons from a second, proximate set of LULC classes are valued based on a spatial relationship (e.g., adjacency) with polygons from the cardinal set of LULC classes and/or a SOA. Once the valued habitat area is identified, any internal holes or gaps containing polygons of selected LULC classes are also valued if they are completely enclosed by, and contiguous with, the valued area.

• **Stream Centerline** – stream centerlines are valued upon intersection with a SOA.



### **Habitat Patch Attributes:**

- **LINKID** Unique ID used to link polygons with species look-up tables
- **LNDR (RANK)** patches are classified, or "valued," based on the status of the species present
- LU07 Numeric 4 digit code representing land use/land cover category, (2007)
- LABEL07 Description of land use/land cover category, (2007)
- TYPE07 Generalized (Level I) land use/land cover category, (2007)
- **RIPARIAN** Designates if polygon is inside/outside riparian corridor
- **FOR\_CORE (FOREST CORE)** Designates if a polygon is inside/outside a patch that meets the 10 hectare core requirement
- **GRASS\_MIN (GRASSLAND MINIMUM SIZE)** Designates if a polygon is inside/outside a patch that meets the 18 hectare minimum size requirement
- **REGION** The Landscape Region where the geographic centrum of the polygon occurs
- **VERSION** Number used to track version
- **CONTACT** Contact info for US Fish and Wildlife Service

### **Species Occurrence Attributes:**

LINKID - Unique ID used to link species information with habitat polygons COMNAME (Common Name) - Common name of species present

- SCINAME (Scientific Name) Scientific name of species present
- **FEAT\_LABEL (Feature Label)** A label assigned to each occurrence that describes the occurrence type (e.g., nest, den, dead on road, etc.).
- CLASS a taxonomic level
- **RANK** the conservation status of the species
- FED\_STATUS (Federal Status) Federal status of species present
- NJ\_STATUS (New Jersey Status) The New Jersey Status of species present
- MAX\_YEAR (LAST OBSERVATION YEAR) Year species was last observed
- **CNT\_SOA (SPECIES OCCURENCE AREA COUNT) c**ount of the number of species occurrence areas that intersect the patch of habitat

### Creating the Landscape Project Maps (v3.1) <u>Freshwater Mussel Habitat</u>

In Version 3.1, stream and water- body centerlines are valued exclusively by freshwater mussel species.





### **Creating the Landscape Project Maps (v3.1)**

#### Vernal Habitat:

▲ All areas mapped as "potential vernal habitat areas" and "vernal habitat areas" include a point location estimated to be the center of an individual vernal pool, plus all areas within 300 meters of the point.

Potential vernal habitat area - These are areas identified by CRSSA as possibly containing a vernal pool based on remote sensing

Vernal habitat areas - These are areas that contain pools that have been fieldverified



### **Landscape Project Applications**

Landscape Project Maps are used...

- to prioritize conservation acquisitions
- for environmental review
- in local environmental resource inventories and ordinances
- for conservation planning at the regional, state, county and municipal level
- to protect habitat through a number of state regulations



### **Prioritize Conservation Acquisitions**





Green Acres provided grant funding to the New Jersey Conservation Foundation to help purchase the Interboro tract in the Forked River Mountains area that serves as habitat for a number of threatened and endangered wildlife species.

### **Project Review/Environmental Impact Assessment**



Landscape Project data used for project review: Left) Landscape Project data used to show the extent of Pine Barrens Treefrog habitat in order to determine if a proposed new access road for the Ocean County College campus would impact this species. Right) Landscape Project data used to help conduct a habitat assessment for a proposed Garden State Parkway bridge replacement project over Great Egg Harbor Bay and Drag Channel in Atlantic and Cape May counties. The map shows areas of suitable habitat capable of supporting State and Federal listed threatened and endangered species within the project area, including Black Skimmer, Black-crowned night-heron, Yellow-crowned night-heron, Least Tern, and Osprey.

### **Environmental Resource Inventories**

Landscape Project maps enable state, county, municipal and private agencies to identify important habitats and protect them in a variety of ways:

Prioritize conservation acquisitions: The Landscape Project is used to assist with prioritizing land parcels for puchase through acquisition programs such as Farmland Preservation and the USFWS's refuge system.

Guide regulators and planners: Landscape Project maps provide those who administer land use regulations and state, county and local planners with a crucial tool used to enhance protection and properly plan development through the regulatory and planning process.

Provide citizens with conservation tools: The Landscape Project provides a transparent and readily accessible tool to help guide citizen actions to protect impenied and special concern species habitat at the local level.

Guide stewardship of conserved areas: New Jersey has more than 400,000 hectares of open space. These lands are managed by a variety of agencies and organizations, both public and private. Landscape Project maps identify important imperiled and special concern species habitats on these lands. ENSP staff work closely with land managers and landowners to develop appropriate best management practices for the long-term conservation of imperiled and special concern species.



Landscape Project maps are widely used in municipal and county Environmental Resource Inventories (ERI) to document threatened and endangered wildlife habitat. ERI for Kingwood Township, Hunterdon County, shown above.

### **Environmental Resource Inventories**



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or the TOWASHIP of

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### **Regional Conservation Planning**



#### Bayshore-Highlands Fund



**Open Space Institute** 



The Bayshore Highlands Fund (the "Fund") supports projects that accelerate strategic land conservation in the New Jerrey Dayshore and the Pennsylvaria Highlands.

The Fund provides grants and loans for land obtervation transactions that conserve wildlife habitat, provide new and expended outdoor recreational access, protect clean water, or preserve form and forestland. The Fund also will help to faile visibility about the regions and conservation transactions within them; and research, provote and pliot, where possible, encovative conservation financing tools and practices.

### **Regional Conservation Planning**









### **Regional Conservation Planning**

# State Regulations with E&T Habitat Protection **Provisions**

- New Jersey Freshwater Wetlands Protection Act Rules
- New Jersey Flood Hazard Area Control Act Rules
- Coastal Zone Management and Coastal Permit Program Rules
- Highlands Water Protection Act Rules
- Water Quality Management Planning Rule
  - **2** Sewer Service Area Mapping
- Pinelands Comprehensive Management Plan (Pinelands Protection Act)

### **Data Accessibility:**

Download from NJDEP's Bureau of GIS website: <u>http://www.nj.gov/dep/gis/</u> (Also, internally on DEPView)



Report and supplemental documentation:



**2**Online via DEP's interactive mapping application: <u>http://www.nj.gov/dep/gis/</u>



GeoLab at Rowan University – NJ Municipal Asset Profiler (NJ MAP).



### **Education and Outreach Efforts:**

#### Landscape Training and Information Program

 Sessions held statewide (in person and remote) to guide interpretation, use and application of the mapping

#### **≤**Stakeholder meetings (2010)

gather input from cross-section of users (federal agencies, county governments, environmental commissions and the consultant community)

#### "Frequently Asked Questions" (FAQs) document

address issues of mischaracterization and misinformation

#### **> NJMAP** - Municipal Asset Profile (GeoLab at Rowan University)

make tool easily accessible on a municipal level

### **Documentation:**



### Appendices

Appendix I. Protocol for Accepting or Rejecting Species Sighting Reports.

Appendix II. Species Occurrence Area Justifications.

Appendix III. NJDEP 2007 Land Use/Land Cover Categories.

Appendix IV. Land Use/Land Cover Analysis for Species and their Feature Label components.

Appendix V. Land Use/Land Cover Selections and Patch Type Justifications.

### **Questions?**





· Antenna Communities Planting

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