# Appendix A: Criteria for Selecting Species of Greatest Conservation Need

State Wildlife Action Plans are focused on the conservation of species and habitats in an effort to prevent them from becoming more rare and costly to protect or restore.  As such, each state is required to identify the Species of Greatest Conservation Need (SGCN) and their habitats within the state that require conservation efforts to ensure their future. (See Chapter TBD)

SGCN are typically native species that through a combination of low and/or declining populations or vulnerability to threats, particularly anthropogenic threats, are considered to be at risk of becoming extinct, extirpated, endangered, or threatened, and would benefit from conservation attention.  SGCN in New Jersey span taxonomic groups including birds, marine and terrestrial mammals, reptiles, amphibians, fish and several invertebrate groups.  To provide a transparent and clearly defined mechanism for identifying SGCN, New Jersey Fish and Wildlife (NJFW) leverages the efforts of agencies and organizations who classify species' relative risk of imperilment.  Table 1 provides an overview of the resources used in the selection process. The tables that follow provide more details on how these resources were used for all taxonomic groups in Table 2, and for individual taxonomic groups in Tables 3-6. Data deficient species are also identified (Table 7). Finally, these data are reviewed by agency biologists, and any changes to SGCN status are documented using a set of standardized justifications.

**Table 1. Overview of species status assessments used for each taxonomic group.**

| | | Birds | Mammals | | Reptiles & Amphibians | | Fish | | Invertebrates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Status Assessment (Table containing details) | | Terrestrial | Marine | Terrestrial &Freshwater | Marine | Freshwater | Marine | Terrestrial | Freshwater | Marine |
| Global | NatureServe G-ranks (Table 2) | x | x | x | x | x | x | x | x | x | x |
| | IUCN RedList (Table 2) | x | x | x | x | x | x | x | x | x | x |
| | Convention on International Trade in Endangered Species (Table 6) | | | | x | x | | | | | |
| National & Continental | Federal Listing Status (Table 2) | x | x | x | x | x | x | x | x | x | x |
| | NatureServe N-ranks (Table 2) | x | x | x | x | x | x | x | x | x | x |
| | American Fisheries Society (Jelks 2008) (Table 5) | | | | | | x | | | | |
| | Marine Mammal Frequent Interactions with Fisheries (Table 4) | | | x | | | | | | | |
| | NOAA Climate Vulnerability (Table 5) | | | | | | | x | | | x |
| | Partners in Flight Avian Conservation Assessment Database (Table 3) | x | | | | | | | | | |
| | Road to Recovery (Table 3) | x | | | | | | | | | |
| Regional | Northeast RSGCN (Table 2) | x | x | x | x | x | x | X | x | x | x |
| | Adjacent State Listing Status (Table 4) | | x | | | | | | | | |
| | Adjacent State S-ranks (Table 4) | | x | | | | | | | | |
| | Saltmarsh Bird Conservation Plan for the Atlantic Coast (Table 3) | x | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| | Atlantic Coast Joint Venture Waterfowl Implementation Plan (Table 3) | x | | | | | | | | | |
| | Appalachian Mountain Joint Venture (Table 3) | x | | | | | | | | | |
| | Partners in Flight Bird Conservation Region Priorities (Table 3) | x | | | | | | | | | |
| State | New Jersey Listing Status (Table 2) | x | x | x | x | x | x | x | x | x | x |
| | State biologists rely on field experience and status and trend information from the literature in their review of the above information (Described below in "Fatal Flaw Analysis") | x | x | x | x | x | x | x | x | x | x |

## All Taxonomic Groups

**Table 2. References and data sources reviewed to select SGCN for all taxonomic groups at global, national, regional, and state scales.**

| Source | Criteria | Justification and Additional Information |
|---|---|---|
| **Global** | | |
| NatureServe G-ranks | Conservation Status G1, Critically Imperiled | NatureServe assigns global, national and state (subnational) species' ranks by "researching and recording information on a set of conservation status factors" (Faber-Langendoen et al. 2012). The protocol for assigning a conservation status rank is based on scoring an element against ten conservation status factors, which are grouped into three categories based on the characteristic of the factor*: rarity (six factors), trends (two factors), and threats (two factors). |
| | Conservation Status G2, Imperiled | |
| | Conservation Status G3, Vulnerable | G3 is the lowest global rank contributing to NJ's SGCN list. These include species that are at a "moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors." |

| | | |
|---|---|---|
| IUCN Red List | Critically Endangered | The IUCN Red List is a "system for classifying species at high risk of global extinction." The process for qualifying species is extensive** (IUCN Standards and Petitions Committee 2022). Extinct means that there is no reasonable doubt that the last individual has died. Extinct in the Wild means that the taxon is extinct in its natural habitat (see Introduced taxa above). The following three categories, Critically Endangered, Endangered and Vulnerable, are assigned to taxa on the basis of quantitative criteria that are designed to reflect varying degrees of threat of extinction; taxa in any of these three categories are collectively referred to as 'threatened'. The category Near Threatened is applied to taxa that do not qualify as threatened now, but may be close to qualifying as threatened, and to taxa that do not currently meet the criteria for a threatened category but are likely to do so if ongoing conservation actions abate or cease. |
| | Endangered | |
| | Vulnerable | |
| | Near Threatened | |
| **National and Continental** | | |
| US Fish and Wildlife Service (USFWS) | Endangered (E) | USFWS implements a rulemaking/regulatory procedure to assess a species' population status including those meeting the definition of Endangered or Threatened and soliciting biological information regarding Candidate species that will contribute to their status review. Endangered and Threatened species have been included as they have been found to be "in danger of extinction throughout all or a significant portion of its range" or "likely to become endangered within the foreseeable future throughout all or a significant portion of its range", respectively (Ecological Services 2023). USFWS Listed Species: https://ecos.fws.gov/ecp/species-reports *"Candidate* species are plants and animals for which the U.S. Fish and Wildlife Service (FWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities." (Ecological Services 2017) Additional information regarding candidate species can be found at the following websites:     USFWS jurisdiction: https://ecos.fws.gov/ecp/report/candidate-species |
| | Threatened (T) | |
| | Candidate Species (CS) | |
| NOAA Fisheries | Endangered | NOAA is the federal authority with jurisdiction over marine species. Proposed species are candidate species that were found to warrant listing as either T or E and were proposed as such in the Federal Register after completion of a status review. Candidate species are those petitioned species that are actively being considered for E or T status, as well as those for which NMFS has initiated an ESA status review. Species statuses were recorded from https://www.fisheries.noaa.gov/species-directory on March 13, 2023. Candidates for NMFS (NOAA) jurisdiction:https://www.fisheries.noaa.gov/endangered-species-conservation/candidate-species-under-endangered-species-act |
| | Threatened | |
| | Candidate and Proposed species for NJ waters | |

| | | |
|---|---|---|
| NatureServe N-ranks | National Conservation Status Rank (N1), Critically Imperiled | NatureServe assigns global, national and state (subnational) species' ranks by "researching and recording information on a set of conservation status factors. The protocol for assigning a conservation status rank is based on scoring an element against ten conservation status factors, which are grouped into three categories based on the characteristic of the factor*: rarity (six factors), trends (two factors), and threats (two factors). |
| | National Conservation Status Rank (N2), Imperiled | N3 is the lowest regional (i.e., national/subnational) rank contributing to NJ's SGCN list. Similar to G3 but more localized, these include species that are at a "moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors." |
| | National Conservation Status Rank (N3), Vulnerable | |
| **Regional** | | |
| Northeast Regional Species of Greatest Conservation Need | RSGCN and Proposed RSGCN If they occur in New Jersey | Regional Species of Greatest Conservation Need (RSGCN) are native species for which the Northeast region has a stewardship responsibility due to high conservation concern and/or populations that are concentrated in the Northeast Region and that have been identified as SGCN by at least one Northeast state. RSGCN are selected by considering current standard status assessments and by building consensus among taxonomic experts region-wide (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022). |
| **State** | | |
| NJDEP Fish and Wildlife | State-listed Endangered and candidates for listing as Endangered, typically S1 | New Jersey has adapted and implements the Delphi Status Review (or Delphi Technique) to determine the relative endangerment or stability of a species' population (Clark et al. 2006).  A systematic method for reaching consensus among experts, the Delphi Technique is an iterative process characterized by anonymity among the participating experts and controlled feedback via the principal investigator. The results of this status assessment are used to assign the legal status of species in the state.  Endangered (E), Threatened (T) and Special Concern (SC) species are included as they represent those species that warrant special attention due to their limited population and success as a result of numerous threats contributing to their continued decline. (NatureServe species' ranks S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) align with New Jersey's endangered, threatened, and special concern status, respectively, except for those that have not been reviewed using the Delphi Technique.) |
| | State-listed Threatened and candidates for listing as Threatened, typically S2 | |

| | State-listed Special Concern and candidates for listing as Special Concern, typically S3 | "Candidate" species include those species that have been reviewed by the Delphi process and have been recommended for listing as E, T, or SC. |
|---|---|---|

\* To read more about NatureServe's Conservation Status Assessments, Methodology for Assigning Ranks, please visit their website:

https://www.natureserve.org/conservation-status-assessment

\*\* IUCN Red List parameters for qualifying species is extensive. For more information, please visit their website:

https://www.iucnredlist.org/resources/categories-and-criteria

# Birds

**Table 3. Additional information used to select SGCN for birds.**

| Assessment | Criteria | Description |
|---|---|---|
| Partners in Flight Avian Conservation Assessment Database | Max of 3 BCR's RCS-b > 12 | The ACAD contains biological information used and generated by the PIF Species Assessment Process, a peer-reviewed, scientific methodology for evaluating information related to the conservation of birds (Partners in Flight 2021). The assessment scores can be viewed online or downloaded with additional information https://pif.birdconservancy.org/avian-conservation-assessment-database/. |
| Road to Recovery (2022) | On-Alert Tipping Point | Scientists for the Road to Recovery initiative, following methods established in 2019 (Rosenberg et al. 2019), have identified 90 On-Alert bird species in need of strong and immediate scientific action to pinpoint causes of declines and to support practitioners dedicated to recovering their populations. Tipping Point Species are on a trajectory to lose another 50% of their populations in the next 50 years (41 species), or already have perilously small populations and continue to face high threats, but lack sufficient monitoring data. Read more at r2rbirds.org. |
| Atlantic Coast Joint Venture Waterfowl Improvement Plan (2005) | Highest High Moderate High | Species meeting these criteria have decreasing or unknown population trends (ducks) or unknown or below population size objectives (geese and swans). Species ranked in these categories because of other reasons (harvest importance or negative impacts on other species) were removed from the list. (Atlantic Coast Joint Venture 2005) |
| Appalachian Mountain Joint Venture Priority Species | Highest and High Priority | Species meeting these criteria are designated as regional concern and included because of high population threats (Appalachian Mountains Joint Venture 2008) |

| | | |
|---|---|---|
| Salt Marsh Bird Conservation Plan for the Atlantic Coast (2019) | Tier A Tier B | All species that meet the criterion of being likely to undergo noticeable declines due to changes in the amount, quality, or types of salt marsh habitat were assessed (Atlantic Coast Joint Venture 2019). Each species was classified into one of three priority groups: (A) Imperiled species that may need consideration for ESA protection (B) Those likely to become imperiled in the relatively short-term (10 to 20 years), (C) Those which might become imperiled in the longer-term (more than 20 years), (D) Those for which there is insufficient data to classify ("data deficient"). |
| Bird Conservation Regions 28,29,30 | Regional concern status Highest Priority High Priority | Species meeting these criteria are designated as regional concern and included because of high population threats (BCR 28 citation: Appalachian Mountains Joint Venture. 2008. Implementation Plan for the Appalachian Mountains Joint Venture: A Foundation for All-Bird Conservation in the Region. (Priority list updated 2014). |

## Terrestrial and Marine Mammals

**Table 4. Additional information used to select SGCN for terrestrial and marine mammals.**

| Assessment | Criteria | Description |
|---|---|---|
| Adjacent state S-ranks | S1, S2, or S3 in any of 5 adjacent states (DE, MD, PA, NY, and CT) | Includes species ranked as S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) in states surrounding NJ. These state ranks are determined by each state using methods developed by NatureServe* and are based on the best available information and consider a variety of factors such as species abundance, distribution, population trends and threats. NatureServe state rank procedures often have different criteria, evidence requirements, purposes and taxonomic coverage than state lists of endangered and threatened species. |
| Adjacent state listing status | Listed Endangered, Threatened, or Special Concern in PA[1,2], NY[3], DE[4], MD[5], or CT[6] | The listing process in each surrounding state varies, but in each state a committee of experts is assembled to evaluate extinction risk of each species. Status of species in surrounding states is being used to complement limited data on species status in New Jersey. |
| NOAA List of Fisheries Summary Tables | Marine mammals frequently interacting with Atlantic commercial fisheries (Category I) | U.S. fisheries are classified under the Marine Mammal Protection Act according to the level of incidental mortality or serious injury of marine mammals. The 2023 List of Fisheries Summary Tables below list U.S. commercial fisheries by categories according to the level of incidental mortality or serious injury of marine mammals.[7] (United States, National Oceanic and Atmospheric Administration 2023) |

[1] https://www.pgc.pa.gov/Wildlife/EndangeredandThreatened/Pages/default.aspx
[2] https://www.fishandboat.com/Resource/SpeciesofSpecialConcern/Pages/ThreatenedEndangeredSpecies.aspx
[3] https://www.dec.ny.gov/animals/7494.html
[4] https://dnrec.alpha.delaware.gov/fish-wildlife/conservation/endangered-species/

# Fish species

**Table 5. Additional information used to select SGCN for marine and freshwater fish species.**

| Taxa | Assessment | Criteria | Description |
|---|---|---|---|
| Freshwater Fishes | American Fisheries Society publication, "Conservation Status of Imperiled North American Freshwater and Diadromous Fishes" and associated rankings, August 2008 | Extinct or Endangered (NJ Waters) Threatened (NJ Waters Vulnerable (NJ Waters) | The AFS-Endangered Species Committee used existing lists to develop a draft of the present list. AFSESC then added taxa meriting consideration and provided rationale for inclusion. Each taxon was assigned current status, listing criteria, and native ecoregion distribution. Endangered species includes taxon that is in imminent danger of extinction throughout all or extirpation from a significant portion of its range. Threatened species includes taxon that is in imminent danger of becoming endangered throughout all or a significant portion of its range. Vulnerable species includes taxon that is in imminent danger of becoming threatened throughout its range (Jelks et al. 2008). |
| Marine Fishes | NOAA Northeast Fish and Shellfish Climate Vulnerability Assessment[1] | Vulnerability to Changes in Abundance: High or Very High Climate Exposure and High or Very High Biological Sensitivity | In the first assessment of its kind, NOAA scientists applied a new methodology to assess the climate vulnerability of 82 fish and invertebrate species in the Northeast region (Hare et al. 2016). |
| | | Vulnerability to Changes in Distribution: High or Very High | |

[1] https://www.fisheries.noaa.gov/new-england-mid-atlantic/climate/northeast-vulnerability-assessment

## Turtle species

**Table 6. Additional information used to determine SGCN status for terrestrial turtle species.**

| Assessment | Criteria | Description |
|---|---|---|
| Convention on International Trade in Endangered Species of Wild Fauna and Flora | Appendices I and II | Over 40,900 species – including roughly 6,610 species of animals and 34,310 species of plants – are protected by CITES against over-exploitation through international trade. They are listed in the three Appendices and are grouped in the Appendices according to how threatened they are by international trade. In some cases only a subspecies or geographically separate population of a species (for example the population of just one country) is listed. The abbreviation "spp." is used to denote species; "sspp." for subspecies; "var." for varieties; "popns" for populations. |

## Data Deficient Species

**Table 7. Criteria that dictate if wildlife species are in need of further investigation are considered 'Data Deficient SGCN' based on the DFW.**

| Species suite | Source | Criteria | Justification |
|---|---|---|---|
| All taxonomic groups | NJDEP Fish and Wildlife | State Status of Undetermined/Unknown per Delphi process | New Jersey has adapted and implements the Delphi Status Review (or Delphi Technique) to determine the relative endangerment or stability of a species' population.  A systematic method for reaching consensus among experts, the Delphi process is an iterative process characterized by anonymity among the participating experts and controlled feedback via the principal investigator. The results of this status assessment are used to assign the legal status of species in the state. *Unknown (U)* species are those for which it is impossible to assign E, T, or SC because enough information on which to base a judgment simply does not exist. |

## Additional Data Sources

For some taxonomic groups, multi-species status assessment reports provide important information, but the information is not presented in a categorical format that can easily be incorporated into a systematic selection criteria as defined above. Here we recognize information that was referred to by taxa teams in their review of species' SGCN status.

For invertebrates, the Xerces Society lists of at-risk species were explored, but no additional species were identified beyond those that met criteria above. (Early Hairstreak (*Arogos Skipper*), Dot-dash firefly, and Keel-necked firefly are species found in New Jersey and identified as at-risk on the Xerces website.)

For turtles, the 2018 Global assessment of terrestrial and freshwater turtles, Turtles in Trouble, identified the Top 25+ most Endangered Tortoises and Freshwater Turtles. This reference reviews and ranks turtles specifically and includes IUCN ranks in the review (Stanford et al. 2018). In 2023, only one New Jersey species is included in this reference - the Bog Turtle (Glyptemys muhlenbergii). This species also met other criteria for SGCN status.

For marine, estuarine, and diadromous fishes, a comprehensive American Fisheries Society assessment is used to provide additional evidence of imperilment, as needed (Musick et al. 2000). This assessment recognizes the following categories of risk: endangered, high risk of extinction in the wild in the immediate future (years); threatened, not endangered but facing risk of extinction in the near future (decades); vulnerable, not endangered or threatened severely but at possible risk of falling into one of these categories in the near future.

The NOAA Fisheries Highly Migratory Species report is also referred to in understanding the SGCN status of marine species. NOAA Fisheries manages a number of fish species in U.S. Atlantic and Gulf of Mexico waters known as highly migratory species (HMS). These fish—tuna, sharks, swordfish, and billfish—often migrate long distances, crossing domestic and international boundaries. NOAA Fisheries is responsible for managing HMS under the Magnuson-Stevens Fishery Conservation and Management Act. In cooperation with an advisory panel, NOAA's HMS Management Division develops and implements fishery management plans for these species taking into account all domestic and international requirements under the Atlantic Tunas Convention Act, Marine Mammal Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act (Gamble 2006). https://media.fisheries.noaa.gov/dam-migration/atlantic-hms-consolidated-fmp.pdf

The Atlantic States Marine Fisheries Commission, the Mid-Atlantic Fishery Management Council, and the New England Fisheries Management Council all provide useful information through fisheries management plans that can determine the SGCN status of species. In addition, the New Jersey Fish and Wildlife Marine Resources Administration Survey Data are consulted in determining SGCN Status.

For birds, the Atlantic Flyway Shorebird Initiative Business Plan (2015) provides useful occurrence data that can help with the assessment of SGCN status for shorebirds. Consulting it as a selection resource did not change the status outcome of any species.

## Data Sources used in 2018 not used in 2025

The Northeast Partners in Amphibian and Reptile Conservation maintained an independent status assessment which was used in 2018. A similar approach of the Regional Species of Greatest Conservation Need status assessment led the team to rely on this regional review for 2025.

A 2011 Report "Vulnerability of At-risk Species to Climate Change in NY, based on the NatureServe Climate Change Vulnerability Index was used in 2015 for reptiles and amphibians(Schlesinger et al. 2011) . However, the report has not been updated and was not used in 2023.

Some data sources related to Partners in Flight and the Bird Conservation Regions have a different format in 2023 than in 2015, but are still used for SGCN selection. The North American Waterfowl Management Plan (2004), the US Shorebird Conservation Plan (2000), the North Atlantic Shorebird

Conservation Plan (2013), the North American Waterbird Conservation Plan (2001), the Southeast BCR 28 and 29 Waterbird Conservation Plan (2006), and the South Atlantic Migratory Bird Implementation Plan (2006) were not carried forward in 2023 because newer data sources that were more comprehensive met the need for identifying imperiled species.

For some taxonomic groups, federally petitioned species were considered SGCN but in 2023 petitioned species were not included. Additionally, in 2015 NOAA Species of Special Concern were included as SGCN, but this designation has not been maintained.

Several sources for invertebrate conservation status assessments used in 2015 have not been updated and were not needed in the current review:

- Rare, declining, and poorly known butterflies and moths (Lepidoptera) of forests and woodlands in the Eastern United States (Schweitzer et al. 2011)
- American Fisheries Society publication, "Conservation Status of Crayfish Species" and associated rankings (August 2007)
- Northeastern Regional Odonata Status Assessment

## Data Sources used in 2025 not used in 2018

The Northeast Regional Species of Greatest Conservation Need Concern Level was used in the current SGCN review (Terwilliger Consulting Inc. & Northeast Fish and Wildlife Diversity Technical Committee 2022).

For birds updated information from Partners in Flight replaced older versions of assessments (Partners in Flight 2021). Road to Recovery and the Salt Marsh Bird Conservation Plan for the Atlantic Coast (Atlantic Coast Joint Venture 2019) were also added for birds.

For marine species, a recent climate vulnerability assessment was added, the NOAA Northeast Fish and Shellfish Climate Vulnerability Assessment (following (Hare et al. 2016)). For marine mammals, those with frequent interactions with commercial fisheries was added (United States, National Oceanic and Atmospheric Administration 2023).

## Selection Process

A dataset capturing all the data sources above was systematically filtered to identify species meeting one or more criteria to be considered SGCN.

## Fatal Flaw Analysis

Taxonomic Teams were provided with species that were pre-screened according to the above criteria. Adjustments to SGCN listing status were made based on standardized justifications below.

**STANDARDIZED JUSTIFICATIONS FOR STATUS CHANGE**
Note: Here "responsibility" is a category that is based on NJDFW biologists' knowledge of the species.
      A. Justifications to move species **ON** the SGCN list:

1. NJ its northern edge of range, but its population is expanding and likely to increase. There are indications of concern such as the species is listed in adjacent states, known to be a habitat specialist, or other ecological or biological concern. NOTE: This includes naturalized species that were **not** anthropogenically introduced.
2. Concern: It is listed in adjacent states or has a low s-rank in adjacent states.
3. Concern: Emerging threats that have yet to get captured in the status assessments used in the screening (i.e. new diseases, decline in host trees/plants).
4. Concern: There is new information about status and trend that indicate the status meets the criteria outlined for SGCN. (i.e. new peer reviewed studies or papers).
5. Responsibility: It is an important subspecies or a population of a secure (not SGCN) species, but the NJ population is not secure.
6. Responsibility: NJ is an important migratory stopover state. This includes birds that are USFWS conservation concern and/or PIF ACAD management attention, in areas north of NJ.
7. Concern: It is a sensitive indicator species of environmental conditions (e.g., fish population levels, toxin levels, disease) that reflect ecosystem health and function.

B. Justifications to move species **OFF** the SGCN list. Issue/concern is that the factor/s triggering a SGCN status may not be enough to justify SGCN status in NJ.

1. The species is secure in NJ.
2. Responsibility: It is geographically peripheral in NJ and is unlikely to naturally expand its range.
3. Concern: Nationally and Regionally there is some concern, but it is secure in NJ
4. Concern and responsibility indicate SGCN status, but the species is naturalized and therefore a lower priority.
5. Responsibility: While the species is documented as occurring in NJ in the past, it is now likely extirpated in NJ.
6. Responsibility: NJ's responsibility is currently low because we are at its northern or southern edge of range, but its population is expanding and likely to increase. There are no indications of concern at the range wide or state levels. NOTE: This includes naturalized species that were **not** anthropogenically introduced.

C. Justifications to **MOVE** species from SGCN to Data Deficient SGCN.

1. Concern: Regional and/or Global data indicate greater confidence in the status of species than we have in NJ.

D. Justifications to **MOVE** species from not SGCN to Data Deficient SGCN.

1. Concern: It is questionable that it is secure in New Jersey.

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