

Policy Consideration: **Critical Habitat Protection Requirements**
Status: **For Consideration by the Highlands Council at
the October 5, 2006 Work Session**
Date: **October 3, 2006**

EXECUTIVE SUMMARY

The Highlands Act, in Section 10, establishes a goal to protect and enhance the significant values of the resources with the Highlands Region. The Highlands Council has been charged with the development of a Resource Assessment to lay the groundwork for scientific management and long term sustainability of habitat that is critical for the survival of rare, threatened or endangered plant and wildlife species. Biodiversity is the variety of species, both plant and animal, that is important to maintaining the ecological viability of natural systems. The protection of critical habitat contributes to the protection of the Region's biodiversity. The purpose of this policy paper is to recommend protection requirements for critical habitat for inclusion in the Regional Master Plan

Staff's specific recommendations are set forth in the following sections and listed by number.

I. STAFF POLICY RECOMMENDATIONS

(*) FOR THE PURPOSE OF DEVELOPING THE LAND USE CAPABILITY MAP

[The Regional Master Plan will have a section describing how the Land Use Capability Map was created. The Council will review that language in the next several weeks when reviewing the draft Plan before release.]

- 1) The Regional Master Plan (RMP) shall provide for the protection of **Critical Habitat**, habitat that is critical for the survival of rare, threatened or endangered plant and wildlife species that occur within the Highlands Region. Lists of rare, threatened and endangered species of animals and plants of the Highlands Region are included as Appendix A and B, respectively.

Rationale: The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora (Section 10.b.3). Section 11 of the Highlands Act requires Resource Assessment of Highlands resources in order to maintaining the overall ecological values of the Highlands Region.

Critical Habitat will be included in the RMP to protect habitat for rare, threatened and endangered species of plants and animals that occur within the Highlands Region. The protection of critical habitat for plants and animals contributes to the protection of the Region's biodiversity. Biodiversity is the variety of species, both plant and animal, that is important to maintaining the ecological viability of natural systems. The Highlands Council utilized NJDEP-Endangered and Nongame Species Program (ENSP) Landscape Project data and NJ Natural Heritage Program to identify plant and animal species of concern.

The Highlands Act provides for the protection of rare, threatened and endangered plants and animal species and their habitats. Sections 2, 11.a(1)(a), 34.j, 34.k, 36.a.(4). The Federal Endangered Species Act (ESA) of 1973 (16 U.S.C. §Chapter 35) provides protection to federally listed plant and animal species that are listed at 50 CFR §17.11 (animals) and 17.12 (plants). The NJDEP also maintains a State list of threatened and endangered species that include species whose prospects for survival are in jeopardy in New Jersey. State-listed animal species are found in N.J.A.C. 7:25-4, Endangered, Nongame and Exotic Wildlife, promulgated pursuant to the Endangered and Nongame Species Conservation Act, N.J.S.A. 23:2A-1 et seq. State-listed plant species are found in N.J.A.C. 7:5C-5.1 promulgated pursuant to the Endangered Plant Species List Act, N.J.S.A. 13:1B-15.151 et seq.

Plant and animal species that are not endangered or threatened, but are considered to be Rare are based on the following Natural Heritage state ranks: S1 (critically imperiled in New Jersey because of extreme rarity), S2 (imperiled in New Jersey because of rarity), and S3 (rare in New Jersey). Lists of rare, threatened and endangered species of animals and plants of the Highlands Region are included as Appendix A and B, respectively.

- 2) The RMP shall incorporate the **NJDEP Landscape Project** for identification of **Critical Habitat** for animal species within the Highlands Region.

Rationale: The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora (Section 10.b.3). Section 11 of the Highlands Act requires Resource Assessment of Highlands resources in order to maintaining the overall ecological values of the Highlands Region.

Critical Habitat will be included in the RMP to protect habitat of rare, endangered, and threatened species, including species of special concern, within the Highlands Region. The protection of critical habitat contributes to the protection of the Region's biodiversity. Biodiversity is the variety of species, both plant and animal, that is important to maintaining the ecological viability of natural systems. Habitat designated as Rank 2 through 5 by the NJDEP-Endangered and Nongame Species Program (ENSP) Landscape Project (Version3) will be utilized to inventory Critical Habitat.

The Landscape Project identifies habitat areas that are used by or necessary for the protection of rare, endangered and threatened species. The Landscape data depict areas of contiguous habitat that are ranked based upon documented occurrences of rare, endangered or threatened species. Rank 5 is assigned to areas containing one or more documented occurrences of at least one federally listed wildlife species. Rank 4 is assigned to areas with one or more documented occurrences of at least one State endangered species. Rank 3 is assigned to areas containing one or more documented occurrences of at least one State threatened species. Rank 2 is assigned to areas containing one or more documented occurrences of at least one Species of Special Concern with a designated state heritage rank of S1, S2 or S3.

- 3) Critical Habitat shall also include protection buffers for **Vernal Pools** including 300 feet for those contained within a Highlands **Riparian Area** or 1000 feet for those that are isolated from a Highlands **Riparian Area**.

Rationale: Vernal pools are confined wetland depressions, either natural or man-made, that hold water for at least two consecutive months out of the year and are devoid of breeding fish populations. They are unique ecosystems that provide critical habitat to many species of amphibians, insects, reptiles, plants, and other wildlife. All vernal pools either dry out completely or draw down to very shallow levels unsuitable for sustaining fish. Fish are highly predatory on amphibian eggs and larvae, and several species of salamanders and frogs depend upon fish-free vernal habitats for breeding. The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora (Section 10.b.3). Vernal pools interconnected with a riparian corridor shall receive a 300 foot protection buffer that is in accordance with protection buffers for Highlands Open Waters. Vernal pools isolated from a riparian corridor shall receive a 1000 foot protection buffer. A 1000 foot buffer is supported by scientific studies to be protective of those species which depend upon vernal pools for breeding (ASNH 2006; Milam and Melvin 2001; Petranka 1998).

- 4) Establish a **Critical Habitat Resource Area** in the Land Use Capability Map to protect important habitat for rare, threatened and endangered wildlife species.

Rationale: A Critical Habitat Resource Area includes contiguous areas of important habitat for wildlife based on a concentration of habitat designated as Landscape Rank 2, 3, 4 and 5 and a Highlands Rank of Critically Significant or Significant. The NJDEP-Endangered and Nongame Species Program (ENSP) assigned a rank for species based upon how critical the Highlands Region is to the continued existence of the species within the state. This “Highlands Rank” includes three classifications:

- Critically Significant – If habitats in the Highlands Region were lost, that species would not exist in the State.
- Significant – Highlands Region habitats play a significant role for that species’ existence in the State.
- Low significant –Highland Region habitats do not play an important role for that species’ existence in the State.

The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora (Section 10.b.3). The evaluation of the Critical Habitat Resource Area provides guidance for where critical habitat and environmentally sensitive lands are located in the Highlands Region.

- 5) The Land Use Capability Map will include protection needs of **Highlands Open Waters** based on **Regional Watershed Indicators** which will include an indicator of habitat quality for each HUC14 subwatershed based on the extent of habitat for animal species of concern including rare, threatened or endangered species.

Rationale: Section 11 of the Highlands Act requires Resource Assessment of Highlands resources in order to maintaining the overall ecological values of the Highlands Region.

Critical Habitat integrity is a measure of the importance of landscape features to protect watershed characteristics that are important to maintaining the Region's biodiversity. Critical Habitat integrity includes landscape level metrics applied on a watershed basis to identify those Critical Habitats that include criteria most suited to support ecological processes. The integrity of Critical Habitat is reflected by the percentage of lands containing Landscape rank 2,3,4,5. The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, and critical habitat for fauna and flora (Section 10.b.3). The evaluation of Critical Habitat integrity provides guidance for where those habitats are located in the Highlands Region. The integration of the Critical Habitat integrity indicators occurs through a decision model that assesses the extent to which one or more values indicate high, medium or low watershed protection needs, and how differences among them inform the overall rating.

- 6) The Land Use Capability Map will include protection needs of **Riparian Areas**. A **Riparian Area Integrity** value will be assigned to each HUC14 subwatershed and will include an indicator of habitat quality based on the extent of habitat for wetland and riparian-dependent rare, threatened or endangered animal species.

Rationale: Section 11 of the Highlands Act requires Resource Assessment of Highlands resources in order to maintaining the overall ecological values of the Highlands Region. A Critical Habitat indicator is a component of riparian corridor integrity as measure of the importance of landscape features to protect riparian characteristics. The integrity riparian corridors is affected by the percentage of Critical Habitat located within that corridor. The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, and critical habitat for fauna and flora (Section 10.b.3).

- 7) District overlay zones in the **Land Use Capability Map** (Regional Protection Zone, Regional Conservation Zone and Regional Development Zone) will be created using the value classes of the resource as follows:

- Put into the **Regional Protection Zone** areas identified as the **Critical Habitat Resource Area**.

Rationale: The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12. An assessment of the extent of the Critical Habitat Resource Area facilitates an understanding of its regional significance to ensure that the level of protection afforded is adequate and appropriate. The results are used as an input to the Land Use Capability Map.

(*) ZONE AND SITE STANDARDS

[These standards are to be applied at the zone and site plan level. Following each bullet is language that is proposed for inclusion in the Policy Guidance Element of the Plan.

Though Members will have the opportunity to review that language when you review the Policy Guidance Element, your input at this juncture would be very beneficial.]

- 8) The following standards shall be incorporated into the **Regional Protection Zone** of the Land Use Capability Map (LUCM), as follows:
- Prohibit new land uses or the alteration of existing land uses in the Regional Protection Zone that would alter or be detrimental to the ecological integrity of a Critical Habitat.
 - Identify opportunities where the restoration and enhancement of previously impaired Critical Habitat Resource Area are feasible and appropriate.
 - Prioritize acquisition, development restrictions and/or TDR credit bonuses for lands within both Critical Habitat Resource Area.

Rationale: The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12. An assessment of the extent of the Critical Habitat Resource Area and high integrity HUC14 subwatersheds facilitates an understanding of its regional significance to ensure that the level of protection afforded is adequate and appropriate. The results are used as one input to the Land Use Capability Map. Applicable Resource Protection and Smart Design standards can then be assigned to the extent they are appropriate and necessary to maintain ecological value.

- 9) The following standards shall be incorporated into the **Regional Conservation Zone** of the Land Use Capability Map, as follows:
- Prohibit new land uses or the alteration of existing land uses in the Regional Conservation Zone that would alter or be detrimental to the ecological integrity of a Critical Habitat.
 - Identify opportunities where the restoration and enhancement of previously impaired Critical Habitat are feasible and appropriate.
 - Require Critical Habitat Protection and Restoration Plans and Low Impact Development (LID) Best Management Practices (BMPs) to avoid and minimize impacts to Critical Habitat.

Rationale: The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12. An evaluation of the condition and ecological integrity of Critical Habitat within a subwatershed facilitates an assessment of its regional significance to ensure that the level of protection afforded is adequate and appropriate. The integrity of the Critical Habitat supports the goals of the Act with consideration of the impacts of the dominant land use (e.g., open space, agriculture, low density development, higher density development) within the HUC 14. The results are used as one input to the Land Use Capability Map. Applicable Resource Protection and Smart Design standards can then be assigned to the extent they are appropriate and necessary to maintain ecological value.

10) The following standards shall be incorporated into the **Regional Development Zone** of the Land Use Capability Map in furtherance of the goals and requirements of the Highlands Act within areas of existing developed land that may serve to support additional development, redevelopment and voluntary TDR Receiving Zones based on infrastructure and land use conditions and local desire, as follows:

- Discourage adjustments and revisions to Critical Habitat that may impair the ecological integrity of the habitat.
- Require Critical Habitat Protection and Restoration Plans and Low Impact Development (LID) Best Management Practices (BMPs).

Rationale: The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12. An evaluation of the condition and ecological integrity of Critical Habitat within a subwatershed facilitates an assessment of its regional significance to ensure that the level of protection afforded is adequate and appropriate. The integrity of the Critical Habitat supports the goals of the Act with consideration of the impacts of the dominant land use (e.g., open space, agriculture, low density development, higher density development) within the HUC 14. The results are used as one input to the Land Use Capability Map. Applicable Resource Protection and Smart Design standards can then be assigned to the extent they are appropriate and necessary to maintain ecological value.

11) The following **Resource Protection Standards** are recommended for the RMP, including:

- Prohibit clearing of vegetation or disturbance of soils within an area designated as a Critical Habitat that would alter or be detrimental to the survival of a species of concern.
- Prohibit adjustments and revisions to Critical Habitat protection requirements except as necessary to protect public health and safety, or to provide for minimum practical use in the absence of any alternative.

Rationale: The RMP Standards support the necessity to determine the amount and type of human development and activity the Highlands Region can sustain while still maintaining the ecological value of the Highlands Region. Section 11.a.(1)(a). The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12.

12) The following **Smart Design Standards** are recommended for the RMP, including:

- Limit development activities within Critical Habitat to maintenance of pre-existing uses. No increase in clearing of vegetation or disturbance of soils shall be permitted. Prioritization for restoration of impaired areas shall be required wherever practical. Relief from strict adherence to Resource Protection Standards shall be permitted only within areas approved by the Highlands Council as a Specially Planned Area. Acquisition and restoration of impaired areas within the Critical Habitat Resource Area shall be encouraged wherever practical.
- Establish minimum requirements for development and approval of Low Impact Development (LID) BMPs.

- Require preparation and inclusion of Critical Habitat Protection and Restoration Plans within municipal zoning and land use ordinances.
- Establish minimum requirements for incorporation of Critical Habitat Stewardship and Management plans within municipal and County Open Space Plans.
- Require inventory for rare, threatened or endangered species within a Critical Habitat area for any site or portion thereof as a mandatory requirement for any site plan application.

Rationale: The RMP Standards support the necessity to determine the amount and type of human development and activity the Highlands Region can sustain while still maintaining the ecological value of the Highlands Region. Section 11.a.(1)(a). The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12.

13) The following **Regional Growth Standards** are recommended for the RMP, including:

- Require participation in Regional Critical Habitat Conservation and Management Plans, where applicable, as a mandatory requirement for any site plan application.

Rationale: The RMP Standards support the necessity to determine the amount and type of human development and activity the Highlands Region can sustain while still maintaining the ecological value of the Highlands Region. Section 11.a.(1)(a). The Highlands Act requires the development of Land Use Capability Map and minimum standards based upon the Resource Assessment and Smart Growth Component. Sections 11.a.(1) , 11.a.(6) and 12.

(*) POST ADOPTION, COORDINATION AND PARTICIPATION STRATEGIES

[Following each bullet is language that is proposed for inclusion in the Policy Guidance Element of the Plan. Though Members will have the opportunity to review that language when you review the Policy Guidance Element, your input at this juncture would be very beneficial.]

14) The following **Pre-Conformance Strategies** are recommended to promote successful implementation of the RMP prior to the conformance period, including:

- Develop technical guidelines and procedures for development of Critical Habitat Stewardship Plans as part of municipal and county Open Space Plans
- Develop technical guidelines for development of Critical Habitat Protection and Restoration plans for inclusion in municipal Master Plans, Zoning and Land Use Ordinances, as appropriate.
- Develop technical guidelines and procedures for development and implementation of Low Impact Development (LID) Best Management Practices to protect, enhance and restore Critical Habitat within the Highlands.

Rationale: RMP Implementation Strategies support the necessity to determine what activities, data and programs will be required of both the Highlands Council and municipal and county stakeholders during the Plan Conformance process as well as what initiatives will

require longer term planning goals. Sections 11.a.(3), 14 and 15. The RMP is a “living document” and will continue to be refined and developed in support of regional planning goals. In order to facilitate regional planning goals it is imperative that the RMP have State, County, and local support from all levels of government and the support of the stakeholders of the Highlands Region.

15) The following **Conformance Strategies** are recommended to promote successful implementation of the RMP during the conformance period, including:

- Require inclusion of Critical Habitat Protection Element, Critical Habitat Protection and Restoration Plans, and Critical Habitat Stewardship and Management plans into Municipal and/or County conformance documents, Master Plans, Zoning and Land Use Ordinances and Open Space Plans, as appropriate.

Rationale: RMP Implementation Strategies support the necessity to determine what activities, data and programs will be required of both the Council and municipal and county stakeholders during the Plan Conformance process as well as what initiatives will require longer term planning goals. Sections 11.a.(3), 14 and 15. The RMP is a “living document” and will continue to be refined and developed in support of regional planning goals. In order to facilitate regional planning goals it is imperative that the RMP have State, County, and local support from all levels of government and the support of the stakeholders of the Highlands Region.

16) The following **5-year Resource Protection and Planning Goals** are recommended to promote continued refinement and development of the RMP, including:

- Develop Regional Critical Habitat Conservation and Management plans for rare, threatened and endangered species of the Highlands Region to promote their continued survival.

Rationale: The Highlands Act includes specific goals to protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and critical habitat for fauna and flora (Section 10.b.3). The evaluation of a refined Critical Habitat integrity provides guidance for the status of the Region’s Critical Habitat and provides direction toward sustainable use of that resource. The Highlands Act requires the Highlands Council to periodically revise and update the RMP at least once every six years. Section 8.a. RMP Implementation Strategies support the necessity to determine what activities, data and programs will be required of both the Council and municipal and county stakeholders during the Plan Conformance process as well as what initiatives will require longer term planning goals. The RMP is a “living document” and will continue to be refined and developed in support of regional planning goals. In order to facilitate regional planning goals it is imperative that the RMP have State, County, and local support from all levels of government and the support of the stakeholders of the Highlands Region. Sections 11.a.(3), 14 and 15.

17) The following **Coordination and Consistency Considerations** are recommended to promote active participation in the implementation of the RMP among state and federal agencies:

- Develop a coordinated regulatory review program with the NJDEP to ensure consistency of permit actions, open space acquisition priorities and public lands management strategies consistent with the resource protection goals of the RMP.
- Develop a coordinated program with the US Fish and Wildlife Service, NJDEP Endangered and Non-Game Species Program and Natural Heritage Program to inventory and develop management plans for species of concern.

Rationale: RMP Implementation Strategies support the necessity to determine what local, State, and federal programs and policies may best be coordinated to promote the goals, purposes, policies, and provisions of the RMP. Sections 11.a.(4). The RMP is a “living document” and will continue to be refined and developed in support of regional planning goals. In order to facilitate regional planning goals it is imperative that the RMP have State, County, and local support from all levels of government and the support of the stakeholders of the Highlands Region.

18) The following **Local Participation Considerations** are recommended to promote the understanding and support for the RMP resource protection goals at the local level:

- Develop educational program for municipal officials on methods to develop a Critical Habitat Protection and Restoration Plan.
- Develop educational programs for municipal officials and land owners on Critical Habitat stewardship methods.

Rationale: RMP Implementation Strategies support the necessity to provide for the maximum feasible local government and public input into the Highlands Council's operations. Section 11.a.(3). The RMP is a “living document” and will continue to be refined and developed in support of regional planning goals. In order to facilitate regional planning goals it is imperative that the RMP have State, County, and local support from all levels of government and the support of the stakeholders of the Highlands Region.

II. REQUIREMENTS OF THE HIGHLANDS ACT AND RMP GOALS RELATED TO CRITICAL HABITAT PROTECTION REQUIREMENTS:

Goals of the Highlands Act:

In accordance with Section 10 of the Highlands Act, the overarching goal of the Regional Master Plan “with respect to the entire Highlands Region shall be to protect and enhance the significant values of the resources thereof in a manner which is consistent with the purposes and provisions of this act.” Section 10.a.

The Highlands Act establishes specific goals relating to protection of critical habitat. Those goals with respect to the Preservation Area shall be to:

- preserve extensive and, to the maximum extent possible, contiguous areas of land in its natural state, thereby ensuring the continuation of a Highlands environment which contains the unique and **significant natural, scenic, and other resources representative of the Highlands Region**. Section 10.b.(2). (emphasis added).

- protect the natural, scenic, and other resources of the Highlands Region, including but not limited to contiguous forests, wetlands, vegetated stream corridors, steep slopes, and **critical habitat for fauna and flora**. Section 10.b.(3). (emphasis added).
- prohibit or limit to the maximum extent possible construction or development which is incompatible with preservation of this unique area. Section 10.b.(9).

In addition, the goals with relating to protection of critical habitat areas with respect to the Planning Area shall be to:

- preserve to the maximum extent possible any **environmentally sensitive lands** and other lands needed for recreation and **conservation purposes**. Section 10.c.(2). (emphasis added).
- protect and maintain the **essential character of the Highlands environment**. Section 10.c.(3). (emphasis added).

Requirements of the Highlands Act:

Resource Assessment

The Highlands Act includes specific requirements relating to protection of critical habitat requiring the development of a Resource Assessment for the Highlands Region which “(a) determines the amount and type of human development and activity which the ecosystem of the Highlands Region can sustain while still maintaining the overall ecological values thereof, with special reference to surface and ground water quality and supply; contiguous forests and woodlands; **endangered and threatened animals, plants, and biotic communities**; ecological factors relating to the protection and enhancement of agricultural or horticultural production or activity; air quality; and other appropriate considerations affecting the ecological integrity of the Highlands Region; and (b) includes an assessment of scenic, aesthetic, cultural, historic, open space, farmland, and outdoor recreation resources of the region, together with a determination of overall policies required to maintain and enhance such resources;” Section 11.a.(1)(a) and (b)(emphasis added).

Smart Growth Component

The Highlands Act also includes specific requirements relating to protection of critical habitat requiring the development of a Smart Growth component that includes “an assessment, based upon the resource assessment prepared pursuant to paragraph (1) of subsection a. of this section, of opportunities for appropriate development, redevelopment, and economic growth, and a transfer of development rights program In preparing this component, the council shall:

- (a) prepare a **land use capability map**;
- (b) identify **existing developed areas** capable of sustaining redevelopment activities and investment;
- (c) identify **undeveloped areas** in the planning area, which are **not significantly constrained by environmental limitations** such as steep slopes, wetlands, or dense forests, are not prime agricultural areas, and are located near or adjacent to existing development and infrastructure, that could be developed;
- (g) identify **special critical environmental areas and other critical natural resource lands** where development should be limited. Section 11.a.(6)(emphasis added).

Preservation Area Assessment

For the Preservation Area, Section 12 of the Highlands Act requires “a **land use capability map** and a comprehensive statement of policies for planning and managing the development and use of land in the preservation area, which shall be based upon, comply with, and implement the **environmental standards” adopted by NJDEP and the Resource Assessment prepared the Highlands Council** under Section 11. Section 12.(emphasis added).

Section 12 specifically requires implementation “that will ensure the continued, uniform, and consistent protection of the Highlands Region in accordance with the goals, purposes, policies, and provisions of this act, and shall include:

- a. a preservation zone element that **identifies zones within the preservation area where development shall not occur** in order to protect water resources and environmentally sensitive lands and which shall be permanently preserved through use of a variety of tools, including but not limited to land acquisition and the transfer of development rights; and
- b. minimum standards governing municipal and county master planning, development regulations, and other regulations concerning the development and use of land in the preservation area, including, but not limited to, standards for minimum lot sizes and stream setbacks, construction on steep slopes, maximum appropriate population densities, and **regulated or prohibited uses** for specific portions of the preservation area. Section 12.(emphasis added).

In addition, Section 36 of the Highlands Act requires that NJDEP’s permitting review approval without a waiver may be issued only upon a finding that the proposed major Highlands development:

- (1) would have a de minimis impact on water resources and would not cause or contribute to a significant degradation of surface or ground waters. In making this determination, the commissioner shall consider the extent of any impacts on water resources resulting from the proposed major Highlands development, including, but not limited to, the regenerative capacity of aquifers or other surface or ground water supplies, increases in stormwater generated, increases in impervious surface, increases in stormwater pollutant loading, changes in land use, and changes in vegetative cover;
- (2) would cause **minimal feasible interference with the natural functioning of animal, plant, and other natural resources** at the site and within the surrounding area, and **minimal feasible individual and cumulative adverse impacts to the environment** both onsite and offsite of the major Highlands development;
- (3) will result in minimum feasible alteration or impairment of the aquatic ecosystem including existing contour, vegetation, fish and wildlife resources, and aquatic circulation of a freshwater wetland;
- (4) **will not jeopardize the continued existence of species** listed pursuant to "The Endangered and Nongame Species Conservation Act," P.L.1973, c. 309 (C.23:2A-1 et seq.) or the "Endangered Plant Species List Act," P.L.1989, c. 56 (C.13:1B-15.151 et seq.), or which appear on the federal endangered or threatened species list, and **will not result in the likelihood of the destruction or adverse modification of habitat for any rare, threatened, or endangered species of animal or plant;**
- (5) is located or constructed so as to neither endanger human life or property nor otherwise impair the public health, safety, and welfare;
- (6) would result in minimal practicable degradation of unique or irreplaceable land types, historical or archeological areas, and existing public scenic attributes at the site and within the

surrounding area; and

(7) meets all other applicable department standards, rules, and regulations and State laws.”
Section 36 (emphasis added)

Preservation Area Requirements

The NJDEP’s rules at N.J.A.C. 7:38-3.11 prohibits development or activity if it will jeopardize the continued existence of species listed pursuant to "The Endangered and Nongame Species Conservation Act," P.L.1973, c. 309 (C.23:2A-1 et seq.) or the "Endangered Plant Species List Act," P.L.1989, c. 56 (C.13:1B-15.151 et seq.), or which appear on the federal endangered or threatened species list, and will not result in the likelihood of the destruction or adverse modification of habitat for any rare, threatened, or endangered species of animal or plant. This rule implements the species protection requirements in the Preservation Area pursuant to Section 36.a(4).

The NJDEP’s rules at N.J.A.C. 7:38-3.12(a) provides that unique or irreplaceable land types include vernal habitats. This rule implements the Highlands Act’s protection requirements in the Preservation Area pursuant to Section 36.a(6) to ensure “minimal practicable degradation of unique or irreplaceable land types, historical or archaeological areas, and existing public scenic attributes at the site and within the surrounding area.” In accordance with N.J.A.C. 7:38-3.12(d), NJDEP may not issue a “HPAA unless the proposed activity would result in the minimum practicable degradation to a unique or irreplaceable land type or existing scenic attributes on the site or within the immediate area of the proposed project.”

Local Participation Component

A component to provide for the maximum feasible local government and public input into the council's operations, which shall include a framework for developing policies for the planning area in conjunction with those local government units in the planning area who choose to conform to the regional master plan. Section 11.a.(3).

Coordination and Consistency Component

A coordination and consistency component which details the ways in which local, State, and federal programs and policies may best be coordinated to promote the goals, purposes, policies, and provisions of the regional master plan, and which details how land, water, and structures managed by governmental or nongovernmental entities in the public interest within the Highlands Region may be integrated into the regional master plan. Section 11.a.(4).

III. TECHNICAL BASIS AND JUSTIFICATION FOR STAFF RECOMMENDATIONS

In furtherance of the requirements and goals of the Highlands Act as summarized above, the Critical Habitat Area Protection Requirements of Ecosystem Management element of the RMP are intended to protect the natural resources of the Highlands Region, including the protection needs of rare, threatened and endangered species of plants and animals.

The Highlands Council has been charged with recommending policy to lay the groundwork for scientific management and long term sustainability of Critical Habitat in the Highlands. The protection of critical habitat for fauna contributes to the protection of the Region’s biodiversity. Biodiversity is the variety of species, both plant and animal, that is important to maintaining the ecological viability of natural systems.

The purpose of this element is to recommend protection requirements of the Highlands Critical Habitat for inclusion in the RMP and Land Use Capability Map based on the following actions in furtherance of the requirements and goals of the Act:

- identify Critical Habitat and provide the framework for incorporation of these areas into the RMP and Land Use Capability Map.
- identify appropriate land use planning and management strategies that can help preserve these areas.

These approaches are based on the best available science and the results of the Resource Assessment performed in support of the RMP, and reinforced through the scientific literature and existing state or federal regulatory programs, where applicable. In addition, as required by Section 12 of the Highlands Act for the Preservation Area, these approaches are based upon, comply with, and implement the environmental standards adopted by NJDEP and the Resource Assessment performed by the Highlands Council. This requirement of the Highlands Act authorizes the Highlands Council to integrate results of these two elements of the Act into a unified approach for the protection of Highlands resources.

IV. GLOSSARY

This section defines the terms that are used to develop the approach and methods that informed the proposed policy actions for this RMP element. Topic specific glossaries will contribute to the general RMP glossary of terms.

Critical Habitat – Habitat featuring ecological characteristics that are important to provide for the breeding, feeding, resting or sheltering of any rare, threatened and/or endangered species and are necessary to the survival and protection of the Highlands Region’s plant and animal species listed as rare, threatened or endangered.

Critical Habitat Conservation and Management Plan – A regional plan which prescribes needed land treatment and related conservation and natural resource management measures deemed to be practical and reasonable for the conservation and protection of critical habitat.

Critical Habitat Protection and Restoration Plan – A planning document developed at the site, municipal or county level that identifies critical habitat appropriate for management and restoration, including strategies for its successful implementation.

Critical Habitat Resource Area- A Critical Habitat Resource Area includes contiguous lands that support rare, threatened and endangered species of conservation concern in the Highlands Region.

Critical Habitat Stewardship Plan – A land management plan developed to for a particular property that identifies the management strategies necessary to monitor, protect and restore habitat for a species of concern.

Endangered Species - Endangered species are species included on the list of endangered species that the Department promulgates pursuant to the Endangered and Nongame Species Conservation Act, N.J.S.A. 23:2A-13 et seq., and the Endangered Plant Species List Act, N.J.S.A. 13:1B-15.151 et seq., and any species or subspecies of wildlife appearing on any Federal endangered species list or any species or subspecies of plant designated as listed, proposed, or under review by the Federal government pursuant to the Endangered Species Act of 1973, 16 U.S.C. §§ 1531 et seq. *N.J.A.C. 7:38-1.4.*

Highlands Conservation Vulnerability Rank – used to assign a rank for species based upon how critical the Highlands Region is to the continued survival of the species within the state.

- Critically Significant – loss of habitat in the Highlands Region represents a great threat to the continued survival of the species in the state.
- Significant – Highlands Region habitats play a significant role for that species' continued survival in the state.
- Low Significance – Highland Region habitats do not play an important role for that species' continued survival in the state.

Hydrologic Unit Code – Hydrologic Unit Code (HUC) means an area within which water drains to a particular receiving surface-water body, which is identified by a specific digit number, or “hydrologic unit code.” The HUC codes were developed by the U.S. Geological Survey. *N.J.A.C. 7:38-1.4.*

HUC14 - An area within which water drains to a particular receiving surface-water body, which is identified by a fourteen-digit number, or “hydrologic unit code.” In New Jersey, a HUC14 correlates to a subwatershed. *N.J.A.C. 7:38-1.4.*

Landscape Project - Maps prepared by NJDEP Endangered and Non-Game Program delineating areas used by or necessary for rare, endangered and threatened species to sustain themselves successfully. The maps depict areas of contiguous habitat that are ranked based upon the presence or association with a documented occurrence of an animal species of concern.

Landscape Rank – used to assign a protection rank according to the results of the Landscape Project.

- Federally Listed (Rank 5) – a species listed by USFWS as threatened or endangered
- State Endangered (Rank 4) - a species listed as Endangered species in New Jersey in accordance with the Endangered and Non-game Species Conservation Act of 1973.
- State Threatened (Rank 3) - a species designated as Threatened under the Endangered and Non-game Species Conservation Act of 1973.
- Special Concern (Rank 2) – wildlife that are considered to be a rare species in the Highlands region

Low Impact Development (LID) Best Management Practices – Low Impact Development is an environmentally sensitive approach to storm water management that emphasizes conservation and the use of existing natural site features integrated with distributed, small scale storm water controls to more closely mimic natural hydrologic patterns in residential, commercial and industrial settings. Low Impact Development (LID) best management practices involve comprehensive land planning and engineering design to maintain and enhance the hydrologic regime of urban lands and

development within watersheds. Low Impact Development (LID) standards and best management practices are supported by the New Jersey Stormwater Management Rules, N.J.A.C. 7:8 and the “New Jersey Stormwater Best Management Practices Manual” developed by the New Jersey Department of Environmental Protection, in coordination with the New Jersey Department of Agriculture, the New Jersey Department of Community Affairs, the New Jersey Department of Transportation, municipal engineers, county engineers, consulting firms, contractors, and environmental organizations.

Rare Species – Those species that are not endangered or threatened wildlife species and considered by the Department to be species of special concern as determined by a panel of experts or that are ranked S1 (critically imperiled in New Jersey because of extreme rarity), S2 (imperiled in New Jersey because of rarity), S3 (rare in New Jersey), G1(critically imperiled globally), G2 (imperiled globally because of rarity) or G3 (globally very rare and local throughout its range or found locally in a restricted range) in the Natural Heritage Database, and Plant Species of Concern listed pursuant to N.J.A.C. 7:5C-3.1. "Species of special concern" means wildlife species that warrant special attention because of evidence of population decline or inherent vulnerability to environmental deterioration or habitat modification that would result in the species becoming threatened if conditions surrounding the species begin or continue to deteriorate. The term includes species for which there is little knowledge of current population status in the State. *N.J.A.C. 7:38-1.4.*

Riparian Area – Areas adjacent to and hydrologically interconnected with rivers and streams that exhibit period inundation or saturation of soils, are subject to periodic flooding and include wildlife corridors within 300 feet of a surface water feature.

Specially Planned Area - Previously developed lands that provide opportunities for redevelopment, including infill and adaptive reuse, based on limited resource constraints due to past development patterns. Within the Preservation Area a Specially Planned Area is limited to an area or site that contains at least 70% impervious area or is a Brownfield site determined to be Specially Planned Area by the Highlands Council and NJDEP.

Threatened species - An indigenous nongame wildlife species of New Jersey designated pursuant to the Endangered and Nongame Species Conservation Act, N.J.S.A. 23:2A-13 et seq., and its implementing rules, N.J.A.C. 7:25- 4.17, as most recently amended. *N.J.A.C. 7:38-1.4.*

Vernal Pool - an ephemeral Highlands Open Water that consists of a confined basin depression without a permanent flowing outlet, that maintains ponded water for at least two continuous months between March and September of a normal rainfall year, and supports evidence of breeding by one or more species of fauna adapted to reproduce in ephemeral aquatic conditions. Criteria for identifying vernal pools are consistent with NJDEP’s methodology at N.J.A.C A-1.4.

APPENDIX A

List of Rare, Threatened and Endangered Animal Species

	SPECIES	COMMON NAME	Federal Listed	State Listed	Heritage Rank
AMPHIBIANS					
1	<i>Ambystoma jeffersonianum</i>	Jefferson Salamander		SC	S3
2	<i>Ambystoma opacum</i>	Marbled Salamander		SC	S3
3	<i>Ambystoma maculatum</i>	Spotted Salamander		SC	S3
4	<i>Ambystoma laterale</i>	Blue-spotted Salamander		E	
5	<i>Eurycea longicauda longicauda</i>	Longtail Salamander		T	
BIRDS					
6	<i>Haliaeetus leucocephalus</i>	Bald Eagle	YES		
7	<i>Falco sparverius</i>	American Kestrel		SC	S3
8	<i>Dendroica virens</i>	Black-throated Green Warbler		SC	S3
9	<i>Wilsonia canadensis</i>	Canada Warbler		SC	S3
10	<i>Dendroica cerulea</i>	Cerulean Warbler		SC	S3
11	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow		SC	S3
12	<i>Sturnella magna</i>	Eastern Meadowlark		SC	S3
13	<i>Vermivora chrysoptera</i>	Golden-winged Warbler		SC	S3
14	<i>Ardea herodias</i>	Great Blue Heron		SC	S3
15	<i>Rallus elegans</i>	King Rail		SC	S3
16	<i>Ixobrychus exilis</i>	Least Bittern		SC	S3
17	<i>Catharus fuscescens</i>	Veery		SC	S3
18	<i>Troglodytes troglodytes</i>	Winter Wren		SC	S3
19	<i>Helmitheros vermivorus</i>	Worm-eating Warbler		SC	S3
20	<i>Botaurus lentiginosus</i>	American Bittern		E	
21	<i>Ammodramus henslowii</i>	Henslow's Sparrow		E	
22	<i>Lanius ludovicianus migrans</i>	Migrant Loggerhead Shrike		E	
23	<i>Accipiter gentilis</i>	Northern Goshawk		E	
24	<i>Circus cyaneus</i>	Northern Harrier		E	
25	<i>Podilymbus podiceps</i>	Pied-billed Grebe		E	
26	<i>Buteo lineatus</i>	Red-shouldered Hawk		E	
27	<i>Cistothorus platensis</i>	Sedge Wren		E	
28	<i>Bartramia longicauda</i>	Upland Sandpiper		E	
29	<i>Poocetes gramineus</i>	Vesper Sparrow		E	
30	<i>Strix varia</i>	Barred Owl		T	
31	<i>Laterallus jamaicensis</i>	Black Rail		T	
32	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron		T	
33	<i>Dolichonyx oryzivorus</i>	Bobolink		T	
34	<i>Accipiter cooperii</i>	Cooper's Hawk		T	
35	<i>Ammodramus savannarum</i>	Grasshopper Sparrow		T	
36	<i>Asio otus</i>	Long-eared Owl		T	
37	<i>Pandion haliaetus</i>	Osprey		T	
38	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker		T	
39	<i>Passerculus sandwichensis</i>	Savannah Sparrow		T	
40	<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron		T	

APPENDIX A continued

List of Rare, Threatened and Endangered Animal Species in the Highlands Region

	SPECIES	COMMON NAME	Federal Listed	State Listed	Heritage Rank
BUTTERFLIES (Lepidoptera)					
41	<i>Atrytone arogos arogos</i>	Arogos Skipper		E	
42	<i>Boloria selene myrina</i>	A Silver-bordered Fritillary		T	
MAMMALS					
43	<i>Myotis sodalis</i>	Indiana Bat	YES		
44	<i>Myotis leibii</i>	Eastern Small-footed Myotis		SC	S3
45	<i>Lynx rufus</i>	Bobcat		E	
MUSSELS					
46	<i>Alasmidonta heterodon</i>	Dwarf Wedgemussel	YES		
47	<i>Strophitus undulatus</i>	Creeper		SC	S3
48	<i>Alasmidonta varicosa</i>	Brook Floater		E	
49	<i>Lampsilis radiata</i>	Eastern Lampmussel		T	
50	<i>Ligumia nasuta</i>	Eastern Pondmussel		T	
51	<i>Alasmidonta undulata</i>	Triangle Floater		T	
52	<i>Lampsilis cariosa</i>	Yellow Lampmussel		T	
DRAGONFLIES AND DAMSELFLIES (Odonate)					
53	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail		SC	S3
54	<i>Ophiogomphus aspersus</i>	Brook Snaketail		SC	S3
55	<i>Somatochlora walshii</i>	Brush-tipped Emerald		SC	S3
56	<i>Gomphus descriptus</i>	Harpoon Clubtail		SC	S3
57	<i>Somatochlora kennedyi</i>	Kennedy's Emerald		SC	S3
58	<i>Ophiogomphus mainensis</i>	Maine Snaketail		SC	S3
59	<i>Gomphus fraternus</i>	Midland Clubtail		SC	S3
60	<i>Enallagma laterale</i>	New England Bluet		SC	S3
61	<i>Gomphus quadricolor</i>	Rapids Clubtail		SC	S3
62	<i>Gomphus rogersi</i>	Sable Clubtail		SC	S3
63	<i>Somatochlora elongata</i>	Ski-tailed Emerald		SC	S3
64	<i>Rhionaeschna mutata</i>	Spatterdock Darner		SC	S3
65	<i>Cordulegaster erronea</i>	Tiger Spiketail		SC	S3
66	<i>Somatochlora williamsoni</i>	Williamson's Emerald		SC	S3
67	<i>Stylurus scudderi</i>	Zebra Clubtail		SC	S3
REPTILES					
68	<i>Clemmys muhlenbergii</i>	Bog Turtle	YES		
69	<i>Terrapene carolina carolina</i>	Eastern Box Turtle		SC	S3
70	<i>Agkistrodon contortrix mokasen</i>	Northern Copperhead Snake		SC	S3
71	<i>Crotalus horridus horridus</i>	Timber Rattlesnake		E	
72	<i>Glyptemys insculpta</i>	Wood Turtle		T	

E = Endangered

T = Threatened

SC = Special Concern

S1 = Critically imperiled in New Jersey because of extreme rarity

S2 = Imperiled in New Jersey because of rarity

S3 = Rare in New Jersey

APPENDIX B

List of Rare and Endangered Plant Species in the NJ Highlands

	SPECIES	COMMON NAME	State Listed	Heritage Rank
1	<i>Sphagnum contortum</i>	Sphagnum	E	S1
2	<i>Alisma triviale</i>	Large Water-plantain	E	S1
3	<i>Andromeda glaucophylla</i>	Bog Rosemary	E	S1
4	<i>Aster borealis</i>	Rush Aster	E	S1
5	<i>Bidens beckii</i>	Water-marigold	E	S1
6	<i>Bouteloua curtipendula</i>	Side-oats Grama Grass	E	S1
7	<i>Carex brunnescens</i>	Round-spike Brownish Sedge	E	S1
8	<i>Carex bushii</i>	Bush's Sedge	E	S1
9	<i>Carex deweyana</i>	Dewey's Sedge	E	S1
10	<i>Carex haydenii</i>	Cloud Sedge	E	S1
11	<i>Carex leptonevia</i>	Fine-nerve Sedge	E	S1
12	<i>Carex lupuliformis</i>	Hop-like Sedge	E	S1
13	<i>Carex oligocarpa</i>	Few-fruit Sedge	E	S1
14	<i>Carex pseudocyperus</i>	Cyperus-like Sedge	E	S1
15	<i>Conioselinum chinense</i>	Hemlock-parsley	E	S1
16	<i>Cornus amomum</i> var. <i>schuetzeana</i>	Pale Dogwood	E	S1
17	<i>Crataegus calpodendron</i>	Pear Hawthorn	E	S1
18	<i>Crataegus succulenta</i>	Fleshy Hawthorn	E	S1
19	<i>Cuscuta cephalanthi</i>	Buttonbush Dodder	E	S1
20	<i>Eleocharis pauciflora</i>	Few-flower Spike-rush	E	S1
21	<i>Elymus trachycaulus</i>	Slender Wheatgrass	E	S1
22	<i>Equisetum variegatum</i>	Variegated Horsetail	E	S1
23	<i>Galium labradoricum</i>	Labrador Marsh Bedstraw	E	S1
24	<i>Galium trifidum</i>	Small Bedstraw	E	S1
25	<i>Gaultheria hispida</i>	Creeping-snowberry	E	S1
26	<i>Hemicarpha micrantha</i>	Small-flower Halfchaff Sedge	E	S1
27	<i>Hieracium kalmii</i>	Canada Hawkweed	E	S1
28	<i>Hottonia inflata</i>	Featherfoil	E	S1
29	<i>Hybanthus concolor</i>	Green Violet	E	S1
30	<i>Hydrophyllum canadense</i>	Broad-leaf Waterleaf	E	S1
31	<i>Ilex montana</i>	Large-leaf Holly	E	S1
32	<i>Isanthus brachiatus</i>	False Pennyroyal	E	S1
33	<i>Kalmia polifolia</i>	Pale-laurel	E	S1
34	<i>Lechea tenuifolia</i>	Narrow-leaf Pinweed	E	S1
35	<i>Lonicera canadensis</i>	American Fly-honeysuckle	E	S1
36	<i>Melanthium virginicum</i>	Virginia Bunchflower	E	S1
37	<i>Muhlenbergia capillaries</i>	Long-awn Smoke Grass	E	S1
38	<i>Oryzopsis asperifolia</i>	White-grained Mountain-rice Grass	E	S1
39	<i>Panicum flexile</i>	Wiry Panic Grass	E	S1
40	<i>Potamogeton obtusifolius</i>	Blunt-leaf Pondweed	E	S1
41	<i>Potamogeton praelongus</i>	White-stem Pondweed	E	S1
42	<i>Pycnanthemum clinopodioides</i>	Basil Mountain-mint	E	S1
43	<i>Pycnanthemum torrei</i>	Torrey's Mountain-mint	E	S1
44	<i>Ranunculus fascicularis</i>	Early Buttercup	E	S1
45	<i>Rhynchospora capillacea</i>	Capillary Beaked-rush	E	S1

APPENDIX B continued

List of Rare and Endangered Plant Species in the NJ Highlands

	SPECIES	COMMON NAME	State	Heritage
			Listed	Rank
46	<i>Sagittaria cuneata</i>	Arum-leaf Arrowhead	E	S1
47	<i>Salix pedicellaris</i>	Bog Willow	E	S1
48	<i>Smilacina trifolia</i>	Three-leaf False Solomon's-seal	E	S1
49	<i>Sparganium minimum</i>	Small Burr-reed	E	S1
50	<i>Sporobolus neglectus</i>	Small Rush-grass	E	S1
51	<i>Stellaria borealis</i>	Boreal Starwort	E	S1
52	<i>Streptopus roseus</i>	Rosy Twisted-stalk	E	S1
53	<i>Tiarella cordifolia</i>	Foamflower	E	S1
54	<i>Utricularia minor</i>	Lesser Bladderwort	E	S1
55	<i>Viburnum alnifolium</i>	Witch-hobble	E	S1
56	<i>Viola septentrionalis</i>	Northern Blue Violet	E	S1
57	<i>Potamogeton robbinsii</i>	Robbin's Pondweed	E	S2
58	<i>Helonias bullata</i>	Swamp-pink	E	S3
59	<i>Carex disperma</i>	Soft-leaf Sedge		S1
60	<i>Torreyochloa pallida</i> var. <i>fernaldii</i>	Fernald's False Manna Grass		S1
61	<i>Adlumia fungosa</i>	Climbing Fumitory		S2
62	<i>Agastache nepetoides</i>	Yellow Giant-hyssop		S2
63	<i>Agrimonia microcarpa</i>	Small-fruit Grooveburr		S2
64	<i>Alopecurus aequalis</i> var. <i>aequalis</i>	Short-awn Meadow-foxtail		S2
65	<i>Angelica venenosa</i>	Hairy Angelica		S2
66	<i>Arabis hirsuta</i> var. <i>pycnocarpa</i>	Western Hairy Rockcress		S2
67	<i>Asclepias verticillata</i>	Whorled Milkweed		S2
68	<i>Asplenium montanum</i>	Mountain Spleenwort		S2
69	<i>Betula pumila</i> var. <i>pumila</i>	Swamp Birch		S2
70	<i>Boltonia asteroides</i> var. <i>asteroides</i>	Aster-like Boltonia		S2
71	<i>Botrychium oneidense</i>	Blunt-lobe Grape Fern		S2
72	<i>Bromus kalmii</i>	Kalm's Brome		S2
73	<i>Cardamine douglassii</i>	Purple Bittercress		S2
74	<i>Carex bicknellii</i> var. <i>bicknellii</i>	Bicknell's Sedge		S2
75	<i>Carex diandra</i>	Lesser Panicked Sedge		S2
76	<i>Carex eburnea</i>	Ebony Sedge		S2
77	<i>Carex hitchcockiana</i>	Hitchcock's Sedge		S2
78	<i>Carex prairea</i>	Prairie Sedge		S2
79	<i>Carex retrorsa</i>	Retrorse Sedge		S2
80	<i>Carex sterilis</i>	Dioecious Sedge		S2
81	<i>Carex viridula</i> ssp. <i>viridula</i>	Green Sedge		S2
82	<i>Castilleja coccinea</i>	Scarlet Indian-paintbrush		S2
83	<i>Celtis tenuifolia</i>	Dwarf Hackberry		S2
84	<i>Cheilanthes lanosa</i>	Hairy Lipfern		S2
85	<i>Chenopodium simplex</i>	Maple-leaf Goosefoot		S2
86	<i>Clematis occidentalis</i> var. <i>occidentalis</i>	Purple Clematis		S2
87	<i>Cuscuta polygonorum</i>	Smartweed Dodder		S2
88	<i>Dirca palustris</i>	Leatherwood		S2
89	<i>Doellingeria infirma</i>	Cornel-leaf Aster		S2
90	<i>Elatine minima</i>	Small Waterwort		S2

APPENDIX B continued

List of Rare and Endangered Plant Species in the NJ Highlands

	SPECIES	COMMON NAME	State Heritage Listed Rank
91	<i>Eleocharis quadrangulata</i>	Angled Spike-rush	S2
92	<i>Epilobium leptophyllum</i>	Bog Willowherb	S2
93	<i>Epilobium strictum</i>	Downy Willowherb	S2
94	<i>Gentianella quinquefolia</i> var. <i>quinquefolia</i>	Stiff Gentian	S2
95	<i>Geum vernum</i>	Spring Avens	S2
96	<i>Gymnocarpium dryopteris</i>	Oak Fern	S2
97	<i>Lechea intermedia</i> var. <i>intermedia</i>	Large-pod Pinweed	S2
98	<i>Lycopodiella inundata</i>	Northern Bog Club-moss	S2
99	<i>Mimulus moschatus</i> var. <i>moschatus</i>	Muskflower	S2
100	<i>Muhlenbergia glomerata</i>	Eastern Smoke Grass	S2
101	<i>Obolaria virginica</i>	Virginia Pennywort	S2
102	<i>Phegopteris connectilis</i>	Northern Beech Fern	S2
103	<i>Porteranthus trifoliatus</i>	Indian Physic	S2
104	<i>Ranunculus longirostris</i>	Long-beak Water Buttercup	S2
105	<i>Ranunculus micranthus</i>	Rock Buttercup	S2
106	<i>Ranunculus trichophyllus</i> var. <i>trichophyllus</i>	Thread-leaf Water Buttercup	S2
107	<i>Salix candida</i>	Hoary Willow	S2
108	<i>Salix serissima</i>	Autumn Willow	S2
109	<i>Scutellaria nervosa</i>	Veined Skullcap	S2
110	<i>Selaginella rupestris</i>	Rock Spike-moss	S2
111	<i>Sporobolus compositus</i> var. <i>compositus</i>	Long-leaf Rush-grass	S2
112	<i>Vaccinium oxycoccos</i>	Small Cranberry	S2
113	<i>Aristolochia serpentaria</i>	Virginia Snakeroot	S3
114	<i>Cardamine pratensis</i> var. <i>palustris</i>	Meadow Cuckoo-flower	S3
115	<i>Carex buxbaumii</i>	Brown Sedge	S3
116	<i>Carex frankii</i>	Frank's Sedge	S3
117	<i>Carex typhina</i>	Cat-tail Sedge	S3
118	<i>Chamaelirium luteum</i>	Devil's-bit	S3
119	<i>Hypericum pyramidatum</i>	Great St. John's-wort	S3
120	<i>Juncus brachycephalus</i>	Fen Rush	S3
121	<i>Lemna trisulca</i>	Star Duckweed	S3
122	<i>Lilium philadelphicum</i> var. <i>philadelphicum</i>	Wood Lily	S3
123	<i>Lysimachia thyrsiflora</i>	Tufted Loosestrife	S3
124	<i>Mimulus alatus</i>	Winged Monkey-flower	S3
125	<i>Nymphoides cordata</i>	Floatingheart	S3
126	<i>Pedicularis lanceolata</i>	Swamp Lousewort	S3
127	<i>Potentilla arguta</i> var. <i>arguta</i>	Tall Cinquefoil	S3
128	<i>Quercus muehlenbergii</i>	Yellow Oak	S3
129	<i>Ranunculus flabellaris</i>	Yellow Water Buttercup	S3
130	<i>Schoenoplectus acutus</i> var. <i>acutus</i>	Hard-stem Bulrush	S3
131	<i>Silene caroliniana</i> var. <i>pensylvanica</i>	Wild-pink	S3
132	<i>Sparganium chlorocarpum</i>	Green-fruited Bur-reed	S3
133	<i>Triadenum fraseri</i>	Fraser's St. John's-wort	S3
134	<i>Utricularia gibba</i>	Humped Bladderwort	S3
135	<i>Utricularia intermedia</i>	Flat-leaf Bladderwort	S3

APPENDIX B continued

List of Rare and Endangered Plant Species in the NJ Highlands

	SPECIES	COMMON NAME	State Heritage Listed Rank
136	<i>Utricularia purpurea</i>	Purple Bladderwort	S3
137	<i>Viburnum opulus</i> var. <i>americanum</i>	Highbush-cranberry	S3

E = Endangered

S1 = Critically imperiled in New Jersey because of extreme rarity

S2 = Imperiled in New Jersey because of rarity

S3 = Rare in New Jersey