

New Jersey Department of Environmental
Protection Science Advisory Board

FINAL REPORT

Peer Review - CHANJ (Connecting Habitat Across New Jersey) Initiative

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and

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**PEER REVIEW: NEW JERSEY DIVISION OF FISH & WILDLIFE'S CONNECTING
HABITAT ACROSS NEW JERSEY (CHANJ) INITIATIVE**

FINAL REPORT

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A Report to the Scientific Advisory Board (SAB)
New Jersey Department of Environmental Protection

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EXECUTIVE SUMMARY

The New Jersey Department of Environmental Protection's (NJDEP's) Division of Fish & Wildlife (DFW) is implementing the **Connecting Habitat Across New Jersey** (CHANJ) program. CHANJ is a strategic plan promoting the long-term viability of terrestrial wildlife populations in New Jersey through a science-based, collaborative approach. The main components of the CHANJ program are:

1. A GIS-based mapping program that identifies and characterizes wildlife habitat core and corridors. This program would be made available to the general public through a NJDEP online interactive mapping application as well as via download. The goal of the online program is to identify and characterize habitat cores and corridors that are critical for the long-term viability of terrestrial wildlife populations; and
2. A guidance document that is linked to the online mapping offers recommendations for protecting, managing, and restoring habitat, including the creation of safe passageways through roads. Additionally, a communications plan for educating end-users and promoting CHANJ was developed.

To assist with the final development of the CHANJ program prior to roll-out, the EPSC was tasked with conducting a Peer-Review of the draft online system and supporting documentation. That task was centered on answering three charge questions posed by the DFW. Those charge questions and summaries of the key findings are:

- What additional tools/resources/analyses could we develop and include to improve CHANJ in future iterations?
 - a) Add a zoning layer;
 - b) Add a watershed layer;
 - c) Connection with NJ GeoWeb; and
 - d) Consider sea level rise.
- How can we prioritize areas within the full statewide mapping to target implementation work that will have the greatest impact? We have three tools/ideas that we can share as a starting point for ideas.
 - a) A central concept is that highest priority should be given to the areas that offer the highest biological value, are under the greatest threat, or constitute the greatest opportunity for preservation.
 - b) How are threats or risks enumerated?

- c) Opportunities for habitat preservation and connectivity between habitat areas may have less to do with biology and more to do with available funding, legislative or grant opportunities on the federal, state, or local level, availability of properties that come onto the market, or legal settlement of damage claims that offer the opportunity to acquire property.
- Assess our planned implementation approach – the elements of it and its organization/structure. Is that a reasonable approach? How could it be improved?
 - a) The Implementation Plan was only a page and a half of bullets that described activities to launch, advertise, and recruit partners to CHANJ. The EPSC therefore made a number of recommendations based on Best Management Practices (BMPs) to be used in developing the final CHANJ Implementation Plan.

This report provides the Peer-Review comments of the EPSC on the CHANJ program.

1. INTRODUCTION

In 2012, Scientific Advisory Board (SAB), Ecological Processes Standing Committee (EPSC) was tasked with addressing the following issue:

Definition of Critical Wildlife Habitat, as it is used to steward the conservation, protection and revitalization of New Jersey's natural resources.

The resulting report to the SAB *Critical Habitat for Flora and Fauna in New Jersey: Revisiting the Definition; Final Report* (May 1, 2013) provided a number of recommendations, including:

"A statewide strategy should be developed for Habitat Restoration, with activities focused on reducing habitat 'fragmentation', and finding/acting on opportunities to improve habitat 'connectivity'. Habitat fragmentation is often a cause of species becoming threatened or endangered, or even driven to extinction. Although it is desirable to expand existing habitat fragments to increase the area of 'interior' habitat, cost constraints/land availability may prevent managers from achieving this desired result. It is equally important to maintain some habitat types, e.g., grasslands, in an early successional state to preserve interior habitat."

Out of that recommendation came the **Connecting Habitat Across New Jersey** (CHANJ) program which will be implemented by the New Jersey Department of Environmental Protection's (NJDEP's) Division of Fish & Wildlife (DFW). CHANJ is a strategic plan promoting the long-term viability of terrestrial wildlife populations in New Jersey through a science-based, collaborative approach. The plan will consist of tools that identify and recommend opportunities and priorities to conserve and restore functional habitat connectivity. The main components of the CHANJ program are:

1. A GIS-based mapping program that identifies and characterizes wildlife habitat core and corridors. This program would be made available to the general public through a NJDEP online interactive mapping application as well as via download. The goal of the online program is to identify and characterize habitat cores and corridors that are critical for the long-term viability of terrestrial wildlife populations; and
2. A guidance document that is linked to the online mapping and offers recommendations for protecting, managing, and restoring habitat, including creating safe passageways through roads. Additionally, a communications plan for educating end-users and promoting CHANJ was developed.

The CHANJ program is in its final stages of development. In information originally presented to the EPSC, the DFW anticipated that it would begin a "soft release" of the mapping program and

supporting documents to its partners in early January 2019. The roll out of the program through social media started in December 2018 and will continue through January 2019. DFW hopes to begin the full roll out to the public in February 2019.

To assist with the final development of the CHANJ program prior to roll out, the EPSC was tasked with conducting a Peer-Review of the draft online system and supporting documentation. That task was centered on answering three charge questions posed by the DFW.

2. PEER REVIEW

Following are the findings of the EPSC with respect to each of the charge questions.

CHARGE QUESTION 1

- **What additional tools/resources/analyses could we develop and include to improve CHANJ in future iterations?**

Charge Question 1 Responses

It is possible that new issues could arise during implementation and use that suggest the need for revisions. However, we believe the GIS tool to be an important one that has implications well beyond the Endangered and Nongame Species Program in terms of its ability not only to help prioritize land acquisition strategies for resource protection but to help integrate permit actions and other state legislative priorities that originate from other programs (e.g. watershed protection, site remediation and environmental restoration, regulation of municipal and industrial discharges). Thus, while the stated purpose of the GIS tool and manual is the long-term viability of terrestrial wildlife population, the ultimate benefits to the NJDEP and public may be much greater and holistic once implemented.

The peer review panel developed the following suggestions to consider for improving CHANJ in future iterations:

1. Additional layer for zoning;
2. Adding a layer for state watershed boundaries and hydrologic unit code (HUC) classification;
3. Potentially linking to NJ-GeoWeb for comparison with other features; and
4. Integrating the approach with modeling future sea-level rise.

2.1 Zoning Layer

Adding a layer for zoning – industry/commercial/residential/agriculture in addition to the open space – would help to better characterize any proposed projects and their potential impacts not only to the property in question but its relationship to potential corridors that are desirable to protect. This would help to prioritize land acquisition as well, including priorities for federal grant proposals by the state. It would also help answer questions regarding the interface between currently zoned land use and the potential use of the area by wildlife as a corridor connecting viable habitats. For example: is agricultural space already considered in the open category, and do farm fields currently qualify as “corridors”? Some apparent agricultural fields are not included

in the demo web page corridor shading, and it seems that animals could move freely across them.

2.2 Watershed Layer

As discussed in Section 4.1, the CHANJ GIS tool has the capability of integrating a variety of NJDEP actions that are currently administered on a watershed basis to ensure that they are acting together to help preserve connectivity between habitats. This is particularly true of aquatic and wetland habitats. These include permit actions administered by NJDEP Division of Land Use Regulation (DLUR) regarding flood hazard area regulations, freshwater and coastal wetlands, New Jersey Pollutant Discharge Elimination System (NJPDDES) permits, mitigation banking approvals, and so forth. It would be extremely helpful to have a watershed layer added sooner than later to facilitate internal roll out of this GIS tool, and ensure its effectiveness beyond just the Endangered Species and Nongame Program.

2.3 Eventual Connection with NJ-GeoWeb

The EPSC members asked whether CHANJ can be linked to the GeoWeb or whether some of the layers in GeoWeb can be included/modified for the CHANJ mapping tool as part of the long-term implementation plan. The “Add Data” button links to some ArcGIS Online maps/data, but a significant amount of habitat-specific data is already included in the GeoWeb tool related to the above comment: wetland boundaries, planning areas (wetland banks, Highlands, Pinelands), and Landscape Project areas (threatened and endangered (T&E) ranked habitat, vernal habitat, natural heritage priority sites) that would be useful for the determination of where corridor mitigation may be best focused. It appears several implemented CHANJ projects involve passages under roads for amphibians and reptiles, so inclusion of wetlands and vernal pools would seem a natural fit.

Moreover, the GeoWeb tool contains a wealth of information that could also prove useful in evaluating connectivity. For example, it includes information on hazardous sites administered by the Site Remediation Program. Some of these sites may include wetland or other Environmentally Sensitive Natural Resources (ESNRs), which may be subject to risk assessments and eventual remedial action decisions. The risk management approach taken to these sites may vary if they are found to represent critical corridors connecting one habitat location to another.

2.4 Sea-Level Rise

Conservation planners worldwide are increasingly looking to the impacts of sea-level rise on wildlife habitats. The GIS tool could eventually be integrated with other mapping

tools showing the future anticipated impacts of sea-level rise to determine the potential impacts on endangered and nongame species. This would help establish acquisition priorities. For example, would it make sense to acquire a critical corridor currently connecting two habitat islands if climate models predict the entire area would be inundated in 40 years? Politically, this type of modeling effort may take a back seat to impacts of sea level rise on coastal protection and infrastructure planning, but the ecological impacts of sea level rise would be an important input into future planning efforts. This includes not only acquisition strategies but potential future regulations within the coastal zone.

CHARGE QUESTION 2

- **How can we prioritize areas within the full statewide mapping to target implementation work that will have the greatest impact? We have three tools/ideas that we can share as a starting point for ideas.**

Charge Question 2 Responses

The DFW Endangered and Nongame Species Program has presented three tools/ideas as a starting point for consideration in how to address this question but has solicited additional ideas from the EPSC. These include prioritizing connectivity based on:

1. Large Habitat Cores/Corridors: a large minimum threshold size (50.27 km²) for cores and the corridors that connect them is established as a primary criterion;
2. Centrality Analysis: how important a link or core area is for keeping the overall network connected is considered the top priority;
3. Linkage Priority Analyses: quantifies relative values of cores and linkages (size, shape, permeability, proximity, expert opinion) as primary drivers of prioritization.

A central concept is that highest priority should be given to the areas that offer the highest biological value, that are under the greatest threat, or constitute the greatest opportunity for preservation. But these concepts quickly become problematic when examined as a basis for establishing both priorities and detailed implementation plans.

For example, how is biological *value* quantified? Species do not carry dollar signs above their heads that enable us to quantify their value. Even keystone species that may be considered critical to an entire ecosystem are dependent on other species for their survival. Moreover, individual species are often within specific habitats and communities. What then is more important, an oak forest in the Highlands, or saltmarsh along the Delaware Bay?

Secondly, how are threats or risks enumerated? Are roads the most important barrier to animal movements, or are they primarily affecting less mobile species? Even mobile species such as neotropical migrant birds and grassland bird species in the State have suffered greatly from habitat fragmentation, which may be just as impacted by suburban development, utility rights of way, railroads, and habitat conversion than roadways.

In some instances, these questions when applied to certain species groups are biological questions (e.g., larger mammals may require larger acreages and connections) and in others they are influenced more by anthropogenic considerations (e.g. the pressure of residential development on those large acreages). For example, the size of habitat areas preserved or connected is a function of the species we are trying to protect/manage for, which in turn is a function of State wildlife management priorities.

Thirdly, opportunities for habitat preservation and connectivity between habitat areas may have less to do with biology and more to do with available funding, legislative or grant opportunities on the federal, state, or local level, availability of properties that come onto the market, or legal settlement of damage claims that offer the opportunity to acquire property, and so on.

As stated in the United Nations Report of the World Commission on Environment and Development (Gro Harlem Brundtland, 1987) *"Prioritization schemes need to consider not only the ecological aspects of the areas being connected, but the legal, regulatory and sociopolitical aspects associated with implementation of the plan. The priorities cannot and should not be set by biology alone. Establishing priorities for connectivity of habitats should consider the potential long-term effectiveness of implementation. Recognition that many areas require active management to maintain their integrity means that any program encouraging connectivity needs to consider the different agency management priorities of the areas being connected."*

2.5 Basic Considerations in Setting Priorities

In this paper we consider and evaluate three prioritization approaches toward connectivity and land preservation in the state and introduce additional ideas for consideration. Prior to embarking on this discussion, there are four major points regarding "prioritization" that warrant consideration:

1. The prioritization approaches presented above by DFW are not mutually exclusive;
2. Any approach must reflect the priorities inherent in the laws and regulations under which the Endangered and Nongame Species Program was developed. It is noted that the CHANJ project does target all native terrestrial wildlife species, not just T&E species. However, T&E species should be elevated in prioritization

given that habitat loss and fragmentation is one of the main issues that many of those species face;

3. Priorities for achieving connectivity objectives should thus reflect management priorities for endangered and nongame species. However, in connecting habitats it is important to realize that they also carry with them benefits to the public beyond that which may warrant further consideration due to their value; and
4. There are other priorities addressed by State government that may be more pressing politically or which may have existing funding to address. There is no reason why Endangered and Nongame Species Program priorities for habitat connectivity cannot piggy-back onto these other priorities (e.g., flood hazard protection, addressing sea-level rise, transportation plans, etc.). The GIS tool would allow that information to feed into decision-making regarding those priorities.

2.6 Ecological Perspectives on Connectivity: Species and Taxa Differences

From a totally ecological perspective, there are several points that warrant consideration before prioritization is discussed. There are profound differences between species and taxa regarding the need for connectivity. Moreover, the ultimate goals of a program encouraging connectivity are not only related to preservation of individual species, but in protecting the long-term *integrity* of existing ecosystems, many of which have already been preserved.

From a species or taxon perspective it should be noted that:

1. Not all species have the same area requirements; some species may require much smaller areas than others. Species with larger home range size requirements (e.g., bobcat) may rely more on physical connectivity to meet those requirements;
2. Not all species require physical connectivity of habitats, particularly more mobile ones; and
3. Species regarded as having an adverse impact on ecosystems (e.g., invasive plants, disease vectors) may benefit from connectivity between habitats as well and caution should be applied in assuming that all connectivity is good.

2.7 Additional Comments

The idea that the highest priority should be given to the areas that offer the highest biological value is a good starting point, but smaller value locations might be able to be mitigated more easily or more cost efficiently. For example, using the GeoWeb's existing mapping layers for habitats of concern or habitats in which T&E species may breed could yield high-value with a tunnel/bridge for large mammals, but mapping

layers for vernal pools may show where a much smaller culvert under a road may protect amphibian populations.

A tiered priority system could be utilized, scoring connectivity needs based on T&E, observed need (e.g., road kill), and the complexity (and cost) of the project necessary to mitigate. If three smaller mitigation projects could be done in the same time for the same cost as a single larger project, a scoring mechanism would allow for an objective selection process.

CHARGE QUESTION 3

- **Assess our planned implementation approach – the elements of it and its organization/structure. Is that a reasonable approach? How could it be improved?**

To address this question, the following documents were provided to the EPSC for review concerning CHANJ implementation. These included the CHANJ “Implementation Phase” Partner Coordination Plan and a Draft Communications Plan (jointly developed with the help of the Conserve Wildlife Foundation of NJ).

Charge Question 3 Responses

CHANJ was launched in 2012 to help make landscape and roadways in New Jersey more permeable to wildlife movement. These products are intended to help land-use managers, conservationists, and transportation planners to work in a more proactive and collaborative way that reduces conflicts, saves time and money, and ultimately improves the long-term prospects for New Jersey’s terrestrial wildlife. It is equally important that implementation of the plan should be maximized, documented, and broadly communicated.

2.8 Review and Recommendations - CHANJ “Implementation Phase” Partner Coordination Plan

It should be noted that what was presented to the SAB as an “Implementation Plan” was only a page-and-a-half bulletized list or outline, which described activities to launch, advertise, and recruit partners to CHANJ, all prior to the full development and release of the “CHANJ Tool Kit” (e.g., GIS, guidance document, etc.). As a result, the following review can only surmise what would go into such a document and make recommendations based on BMPs prior to the development of a final comprehensive CHANJ Implementation Plan.

1. This implementation plan sounds more like an outreach and communications plan, as it does not include guidance or suggestions on what the next steps should be for achieving the preservation/acquisition/management of areas mapped through the project. What more needs to be done to make sure this tool serves to improve habitat and natural resources? Is education and outreach sufficient?
2. This tool has the potential to help integrate a variety of different programs currently administered by different entities with State government. These programs have become compartmentalized and, in some cases, may not currently effectively coordinate with one another to make consistent decisions that favor landscape level priorities within the State. Examples include different elements of the DLUR such as freshwater wetlands (e.g., permitting, mitigation, mitigation banking), coastal wetlands, flood hazard program, Site Remediation, and NJPDES permitting. Implementation should consider using a watershed approach to allow consistency in decisions between these programs. For example, reconnecting former oxbows in the Passaic River basin to the mainstem of the river may be desirable from the perspective of habitat connectivity for nongame species but would also potentially result in major benefits associated with flood storage, water quality improvement, fish and wildlife habitat improvement for game species within the river itself, and local aesthetics.
3. A key point of implementation lies with the counties and the townships, since one of the primary uses of the CHANJ GIS tool would be to identify key properties for acquisition/preservation. Therefore, it would make sense for DFW to reach out to counties, municipalities, and townships directly to educate them on use of the tool as well as the overall program. Open space committees, conservation commissions and others should be greatly interested in this. The Association of New Jersey Environmental Commissions (ANJEC) would be a great forum to help roll this out, for example.
4. A list of NGOs should also be prepared for dissemination of this information, with an eye toward briefing them at their general meetings. Examples would be New Jersey Audubon, Stony Brook-Millstone Watershed Association, Delaware and Raritan Greenway Association, Friends of the Great Swamp, and Ducks Unlimited.
5. The cooperative team structure of the Implementation Plan makes a lot of sense as the success of the CHANJ approach will depend heavily on both communicating the availability of its tools (i.e., GIS and guidance document) to as broad a constituency as possible as well as the means to measuring its successes and possible enhancements.
6. A shortcoming of the Plan is its brevity (two pages) and it could be greatly improved with additional information. For example, more details regarding who is on the Regional Teams, who should be but is not (as of yet); are there competing

regulatory authorities and rules that need to be considered (e.g., Pinelands Commission, Highlands Commission, Meadowlands, Delaware River Basin Commission (DRBC), etc.); are their regional sub-committees dealing with localized issues, and if not, should there be; are there regional-specific impediments or challenges that might affect implementation.

7. An important component of the implementation of any natural resource policy is maintaining, monitoring, and tracking projects. The CHANJ Guidance Document recognizes this in Chapter 4, which recommends BMPs for both “Cores and Corridors Road Practices and Wildlife Passage Systems including maintenance and monitoring. These should also be codified in the Implementation Plan with project schedules and committee timelines for effectiveness review.
8. See Also implementation considerations outlined above in Charge Question 2 above Establishing Connectivity Priorities: Implementation and Management Considerations – “Prioritization schemes need to consider not only the ecological aspects of the areas being connected, but the legal, regulatory and sociopolitical aspects associated with implementation of the plan. The priorities cannot and should not be set by biology alone. Establishing priorities for connectivity of habitats should consider the potential long-term effectiveness of implementation. Recognition that many areas require active management to maintain their integrity means that any program encouraging connectivity needs to consider the different agency management priorities of the areas being connected.”

2.9 Review and Recommendations - CHANJ “Implementation Phase” Partner Coordination Plan

The draft implementation plan benefits from additional guidance or suggestions on what the next steps should be for achieving the preservation/acquisition/management of areas mapped through the project. The EPSC has strived to help address this issue.

2.9.1 Suggested Roll-out Plan

Overall, the following sequence in rolling out the new program would make sense:

1. Internally within NJDEP;
2. Other state agencies;
3. Federal resource agencies;
4. County and municipal governments;
5. Non-governmental organizations (NGOs); and
6. General public information sessions, with targeted audiences.

Many of these entities could be addressed simultaneously but internal roll-out within the State makes sense as a starting point.

NJDEP Roll-Out

The first priority in implementation of the tool should be an internal roll-out within the Department to include any entities that may have a role in environmental compliance and permit issuance, natural resources and flood hazard management, property acquisition, transportation planning, and site remediation/environmental restoration. The success of implementation of this GIS tool rests in awareness and participation of the various state entities that would benefit from it in decision-making. Internal training and presentations are an important means of establishing awareness within the organization and helping to facilitate ultimate implementation.

Other State Agencies

Key state agencies to engage with respect to roll-out include those involving transportation planning, including but not limited to the New Jersey Department of Transportation, Port Authority of New York and New Jersey, North Jersey Transportation Planning Council, South Jersey Transportation Planning Council, and New Jersey Transit. Other state agencies with watershed management and other regional planning responsibilities such as the Delaware River Basin Commission, Delaware River Planning Commission, New Jersey Pinelands Commission, Highlands Council, and the Hackensack Meadowlands Commission would also warrant a direct presentation/demonstration of the tool. The State Planning Commission should be contacted directly to make them aware of overall efforts and to help facilitate roll-out.

In addition, the New Jersey State Parks and New Jersey Forestry Services are responsible for natural resource management on state lands.

Federal Resource Agencies

While it may not be part of their charter to address habitat connectivity issues for state T&E or non-game species, many Federal agencies have resource management responsibilities for related programs with similar goals. Therefore, rolling out the tool should enable collaboration at achieving mutual goals. Examples of Federal and interagency entities that should be interested in the program include the New York/New Jersey Harbor Estuary Program, the U.S. Environmental Protection Agency (administers grants to states for habitat acquisition as well as local Superfund sites), U.S. Army Corps of Engineers (New York and Philadelphia Districts) Regulatory Branches issue wetland permits and engage in wetland restoration activities as well as water resources projects under their Civil Works program. The Natural Resources Conservation Service

administers the Swamp Buster program assisting farmers in prioritization wetland restoration efforts in non-productive agricultural areas, as well as stream restoration projects. The National Park Service is charged with maintaining the integrity of natural resources at several key locations within the state, including the Delaware Water Gap and Gateway National Recreation Area. The U.S. Fish and Wildlife Service is another key player who administers federal T&E species issues, manages several national wildlife refuges in New Jersey, including Wallkill River, Great Swamp, Cape May and Forsythe. They should be considered collaborative partners in maintaining the long-term connectivity and integrity of the refuges.

Non-governmental Organizations (NGOs)

NGOs may provide a critical interface with the general public in helping to increase awareness of the program at the local level. Coordination with NGOs may help align their objectives with the proposed program and help ensure its effective implementation. These entities may work at different levels (through input to federal, state and local governments) further increasing awareness of the tool and program and helping to focus attention on individual issues and properties requiring attention.

General Public

We believe roll-out to the general public is best achieved through the NGOs and focused groups described above. However, availability on the web would be a key component as well. In addition, awareness could be increased by allowing interested parties (e.g. applicants for hunting and fishing licenses, county or state park users) access to brochures or a web page reference when they obtain a license or trail map, informing them of the program.

2.10 Review and Recommendations - CHANJ Communications Plan

The CHANJ Communications Plan is well thought out, detailed, and yet open to changes and involvement with partners as the need arises. As the release date for CHANJ approaches a timeline for activities might help. The following suggestions should be followed upon:

1. Endangered and Nongame Species Program should create CHANJ Communications Calendar with dates for tasks and posts.
2. Launch daily social media campaign.
3. Unveil CHANJ video.
4. Consider mainstream media outreach.
5. Finish materials (postcard and/or Story Map).
6. Utilize amphibian crossings as timely centerpiece.

7. Decide on full public meeting date(s).
8. Run major CWF blog story.
9. Update webpages.
10. Begin sending monthly e-updates.

A public meeting is recommended to launch the CHANJ initiative and its recommended that additional annual partner meetings be held to bring partners together to discuss successes, goals, challenges, etc. This will allow ENSP-CWF to develop and update communication materials, the social media posts, and any other mainstream media engagements indicated.

OTHER COMMENTS

On the Demo web page, in the “Wildlife Mitigation Project” text boxes:

1. The attachments open, but pictures should be sized and oriented consistently. All completed projects should have photos, if available. Some attachments are documents that have been split into multiple links which should be combined to a single link.
2. “Related Tables” links just loop to a series of links that lead back to the original link. There doesn’t appear to be any information attached to them.

3. CONCLUSIONS

The CHANJ program (GIS tool and manual) appears to be a highly promising means of evaluating connectivity between remaining habitats in the state affecting NJ native terrestrial wildlife species. The EPSC lauds the Department on development of this tool and has several recommendations regarding future implementation.

The following conclusions may be drawn from our review:

1. The GIS tool itself looks effective as is, with only minor suggestions for improvement.
2. The effectiveness of the program will rely on its implementation; the EPSC has made several suggestions for ensuring effective implementation.
3. Regarding priorities in establishing habitat connectivity, several alternatives have been discussed, depending on wildlife management priorities and specific taxa. Recognizing that these are policy issues and not entirely based on biology, it is recommended that the tool and its implementation remain flexible to allow querying and use for multiple objectives.
4. Management priorities should first consider wildlife resources that may be endangered and threatened on a global scale (e.g. red knot) but with an eye open to entire ecosystem conservation (nearshore and beach habitat) and not just a single species.
5. One of the greatest potential benefits of this tool is the ability to allow decisionmakers within different elements of the Department the ability to work in a more integrated fashion to ensure protection of T&E and nongame species by preserving entire ecosystems through connectivity. Decision makers may be tasked with other priorities (e.g. flood hazard area management, site remediation, wetlands permitting, or industrial discharge regulation) but can achieve common goals by understanding visually the connection between decisions and regional resource planning needs for wildlife conservation.
6. In light of this, it makes sense for the GIS tool to reflect watershed management boundaries since much of the Department already makes resource management decisions on that basis.

4. NEXT STEPS

The EPSC would suggest that the NJDEP consider the following points as Next Steps for the CHANJ program.

1. Begin roll-out by meeting internally within NJDEP Bureaus, showing a demonstration and soliciting comments.
2. Work in parallel to add a watershed layer to the GIS tool.
3. Finalize the program implementation plan and begin roll-out to other state agencies, then other entities as described in the suggested sequence in Section 2.9.1.
4. Monitor effectiveness by soliciting feedback one year out with various entities to see if they are using the tool.
5. Work concurrently in expanding the tool to eventually allow interface with NJ-GeoWeb.

Additionally, the following comments provided by the full SAB should be considered.

1. It is recommended that the next version of the tool include spatial analysis capabilities. For example, consider making it useful for detecting potential conflicts between wildlife corridors and residential areas (bears in garbage, cats eating songbirds, foxes eating cats) via buffer analysis.
2. Perform outreach to the land trusts that have their own good data sets, GIS interfaces, and models, and benchmark the tool against their findings.
3. Think of ways to ensure the tool's use within NJDEP and beyond. Pursue incentives for NGOs or municipal governments to use this tool moving forward.
4. Consider timing and approaches to periodic tool updates and revisions.