

*Flora and Fauna Subcommittee Report
Open Space and Recreation Task Force*

Final Draft: May 2, 2002

Purpose

The purpose of the Flora and Fauna Subcommittee's efforts is to

- 1) characterize the existing conditions of Brunswick's natural landscape using a broad brush approach that includes the identification of unfragmented areas and potential for significant plant and animal occurrences throughout our community;
- 2) identify gaps in current levels of local resource knowledge and gaps in existing levels of resource protection
- 3) propose a mixed toolbox that if implemented could help accomplish habitat preservation, protection, and enhancement; and
- 4) set clear priorities that will aid in the continued ecological functioning of open spaces in the different regions of Brunswick.

Goals

The overarching long-term goal of this plan is:

To provide habitat opportunities in the Town of Brunswick for all species of plants and animals native within our ecological region through the protection of open space.

Setting specific prioritized goals for habitat protection town-wide is difficult at this point given the present lack of ecological inventory data for many portions of the town. This subcommittee was limited to reviewing best available data and local knowledge in developing the following recommendations. The long-range goal will require a broad vision and short-term actions that will lay the foundation for future ecological planning efforts.

Given the breadth of our goal, and need for short-term prioritization in order to discuss the approach for accomplishing long-term objectives, we have considered the following as immediate objectives:

- 1) *Protect large blocks of unfragmented habitat in the western portion of Town where intact natural communities and associated species are still represented.*
- 2) ~~*Protect urban green spaces within developed portions of Brunswick that support high value representative natural communities and connect neighborhoods to the natural world.*~~

3) *Develop habitat connections by prioritizing future acquisitions around existing Town land-holdings and conservation easements to maximize habitat potential with the goal of creating interconnected 'green belts' and large blocks of open space around existing core areas.*

4) *Expand our knowledge of Brunswick's landscape through inventory efforts that will serve as a basis for future prioritization and planning efforts.*

The Process We Used to Develop Recommendations:

1. The Flora and Fauna Subcommittee relied on guidelines detailed in *Habitat Protection Planning: Where the Wild Things Are* by Christopher Duerksen et al, (PAS Report 470/471) and adapted a set of principles used in this publication to address habitat protection at both the landscape scale and site scale. A discussion of these principles and the approach the subcommittee used in adapting them to Brunswick's landscape has been included in Appendix A.
2. Subcontracted with Woodlot Alternatives for an inventory of significant natural communities not currently protected under existing Town ordinances and likely notable species occurrences throughout town. This inventory included a discussion of habitat features that warrant conservation efforts beyond what is currently specified in existing ordinances assuming overall species diversity is identified as a goal of the plan.

Landscape features identified and discussed in this inventory include 1) existing unfragmented blocks of habitat; 2) potential high-use wildlife travel corridors including riparian corridors; 3) known and potential rare natural community occurrences; 4) known and potential rare, threatened and endangered plant occurrences; 5) old field habitat; and 6) potentially high value forested wetland complexes. Woodlot Alternatives' work has been included as Appendix B of this subcommittee report.

3. Attended Maine Audubon program on wildlife habitat protection (3/00).
4. Held a local informational event at Curtis Memorial Library with Stewart Fefer and Ken Elowe for information regarding habitat protection and the roles of the US Fish and Wildlife Service and the Maine Department of Inland Fisheries and Wildlife (4/00).
5. Arranged presentation by Ken Elowe as part of our series of community talks (5/00).

Note: These steps above completed as a precursor to the formal BwH program.

6. Held a community workshop at the Municipal Meeting Facility with interested experts, community members, and task force members to discuss progress to date and the work ahead of the subcommittee (3/01)

Findings:

ORGANIZATION

1. Although many people and organizations in Brunswick have an interest in flora/fauna issues, it is not clear which person/entity should take the lead on developing a flora/fauna policy. The Conservation Commission has coordinated conservation easement review and negotiated easement specifics for proposed Open Space Developments prior to Town Council approval. Additionally, the Commission has provided comment during Town land acquisition projects. However, to date the Commission has not taken the lead in identifying priority acquisition parcels and willing sellers.
2. Few formal partnerships with neighboring towns or interested organizations exist, yet there is the sense that these may have great potential for cooperative future endeavors.

INVENTORY

3. A complete inventory of already mapped flora/fauna information by various parties has just begun to be compiled as part of this Open Space Plan.
4. The quality of this mapped information is generally good, but still requires additional aerial photo interpretation and field confirmation.
5. The Town has begun to do a comprehensive inventory of its streams. For this to be successful will require sufficient knowledge, funding, citizen volunteers, and staff time. An inventory program or schedule does not exist.

ACQUISITION

6. Acquisitions by the Town have been done on an ad hoc basis, as opportunities have presented themselves.
7. Funding of these improvements has been done through the Town's surplus account aided by community/citizen contributions and grants. While this has been quite successful in recent time, it is acknowledged that there is not sufficient funding available to protect all land that the community may feel is required to be protected. A more consistently available funding source may allow the Town to respond more evenly over a longer period of time.
8. The Town has acquired 8 conservation easements since 1980, yet a written protocol for management of these lands has not yet been established.

9. Several landowners (Farmland=36, Open Space=65, Tree Growth=19) have used the current use tax programs that are available from the state, but the Town has not promoted them as an active land protection tool.

LAND USE REGULATION

10. The Town does not have established priorities for the protection of the already mapped resources.
11. The Town has to date no articulated, comprehensive policy on how to deal with flora and fauna habitats, and determine which ones are most important and deserving of protection. In its absence most of the protection of these resources may well come through state and federal regulations.
12. The residential growth in Brunswick of the last 10 years has been largely focused on the designated rural areas (which have the majority of the sensitive flora/fauna habitats), not the Town's growth areas. This has happened despite the policies laid out in the Comprehensive Plan and the density differentials between growth and rural areas laid out in the Zoning Ordinance.
13. Even though updates to the Zoning Ordinance have been made regularly, the sense exists that (a) the ordinance is still not quite effective in protecting flora/fauna habitats in that it lags behind efforts in surrounding communities and State and Federal efforts, and that (b) developing community consensus on the best methods for increasing protection is extremely difficult.
14. Occasional educational programs have been presented by Town staff as well as the Conservation Commission, but the sense is that more can be accomplished in this area particularly in the areas of habitat improvement.
15. To date, the Town has been largely reactive in its approach to solving ecological problems. Our success at addressing issues such as overboard discharges is one example. It now seems that the Town has an opportunity to be more pro-active. A parallel example of this approach may be encouraging open space protection and buffer zones along streams as means of addressing non-point source pollution within specific watersheds.

Next Steps:

1. Complete the digital mapping portion of the project.
2. Complete a written description of wildlife habitat and natural communities represented in Brunswick to accompany these maps
3. Identify areas for future inventory efforts and habitat quality evaluations to complete our knowledge of existing resources and limiting factors dictating species presence in various regions of Town.

Recommendations:

ORGANIZATION

1. Designate the Conservation Commission to advise the Town Council of wildlife habitat and natural community protection issues in Brunswick. The Commission's powers and duties already include provisions for future inventory work (Brunswick Town Code § 2-81 (3) Index of open areas) "*for the purpose of obtaining information pertinent to proper utilization, protection, development, or use of these open areas*" and open space acquisition (§ 2-81 (4) Land acquisition) "*with the approval of the Town Council*". As the Conservation Commission's responsibilities increase, it may be necessary to form subcommittees in order to coordinate efforts.

PARTNERSHIPS

2. Encourage the continuation of town/private partnerships such as the Friends of Cox Pinnacle and the Friends of the Commons to aid in management activities and to help generate support for future acquisition efforts.
3. Coordinate the Town's prioritization and acquisition efforts with additional groups including the Brunswick Topsham Land Trust, Merrymeeting Audubon, Ducks Unlimited, Maine Coast Heritage Trust, The Nature Conservancy's Kennebec Estuary Project Site Conservation Plan, local sportsman's groups, and other groups to benefit from mutual expertise and resources.
4. Arrange formal liaison with Bath, Durham, Freeport, Harpswell, Topsham, and/or West Bath to coordinate habitat protection efforts and priorities for acquisition along common borders. Sharing of technical abilities and landscape data between municipalities is vital for planning local resource protection efforts that have regional significance.

INVENTORY*

5. Develop greater understanding of existing conditions, especially within the large undeveloped tracts of land, to aid in the prioritization of future protection efforts. Some of this information can be collected through remote sensing techniques including aerial photo interpretation, but evaluation of habitat condition will require on-the-ground surveys. Future inventory work to be undertaken by the Planning Department should include:
 - a. Completion of stream survey work initiated in 1999.
 - b. Initiate vernal pool survey and assign value ranking criteria.
 - c. Identify high value forested wetlands and peatlands not currently included under shoreland zoning.
 - d. Map rare and unusual natural communities (e.g. Pitch Pine Heath Barrens, Sandplain Grasslands, etc.) and rare, threatened and endangered plant species occurrences.
 - e. Evaluate mapped deer wintering areas and locate additional occurrences.
 - f. Identify existing old field habitat that supports grassland breeding bird species.
 - g. Investigate the potential for conflicts between passive recreational use and flora/fauna sensitivity in Town owned parcels and future acquisitions.
6. Incorporate the mapped data into the Town's GIS database for use in planning studies, habitat protection strategies, and public education programs. Care should be taken in making sensitive information available to the general public.
7. Coordinate the mapping efforts with the Maine Office of GIS to make the pertinent data available to a wider audience.

ACQUISITION*

8. Create a "Land for Brunswick's Future" program to purchase priority habitats from willing landowners. Recommendations should be made by the Conservation Commission, or Town Council appointed board. These recommendations would then require approval by Town Council action.
9. Develop an objective methodology to evaluate habitats and determine priorities for protection / acquisition. Factors should include regional significance, overall habitat quality, open space values, development pressure, and future potential for linkage to other open space opportunities.

* Denotes item considered a priority by subcommittee members

10. Capitalize the “Land for Brunswick’s Future” program through bond funding for an ongoing appropriation of funds over a ten to twenty year period. A \$2 million initial appropriation is proposed to be used to expand existing open space areas and acquire additional areas with ecological significance. Furthermore, monetary allocation from the fund should promote partnerships and that will help to leverage additional project funding in the form of outside matches from public and private sources.

VOLUNTARY PROTECTION

11. Actively promote existing property tax incentives to encourage wildlife habitat protection and proper stewardship by local landowners who possess significant natural areas and those who own lands adjacent to significant natural areas.

LAND USE REGULATION*

Although not proposed as the primary means by which flora and fauna habitat should be protected for open space values, land use regulation offers an important tool that assures consistent protection of resources throughout the entire town that can be used to direct development away from sensitive areas in specific regions. Perhaps the major source of frustration among landowners, planners, and developers alike is the perceived disconnect between local, state, and federal regulations and jurisdiction.

The following measures have been proposed to 1) develop a mechanism by which the goals of this report can be better represented in existing Town ordinances; 2) update Town requirements to better reflect current State and Federal priorities; and 3) improve the efficiency by which responsible development projects are reviewed. It is the goal of these measures to develop an understandable, scientifically based ordinance that promotes ecologically sound development.

12. Establish a “Wildlife Habitat Protection Task Force” consisting of large landowners, municipal officials, and private conservation groups to review existing ordinances with the goal of improving habitat protection. As part of its duties, the task force will consider resource jurisdiction, current use standards, and potential for requiring open space subdivisions as the primary means of future residential development in certain zoning districts.
13. Evaluate current Town of Brunswick jurisdictional freshwater wetland and stream definitions, Natural Resources Protection Zone criteria, and associated setback requirements. Recommend amendments to the current ordinances that more closely reflect habitat requirements and current Federal and State regulations. The purpose of this recommendation is to both ease the project review process and to better address sensitive resources often overlooked during the current project review process.

* Denotes item considered a priority by subcommittee members

14. Evaluate existing mechanisms for conservation easement acquisition, and potential for improving the open space development process (Section 308 Town of Brunswick Zoning Ordinance) to fit specific Open Space Plan objectives. The current process often discourages participation despite efforts to promote the program. The perception of extra steps in the process such as pre-application meetings, conservation easement negotiation with the Conservation Commission and conservation easement approval by the Town Council is likely the major detractor from greater participation.
15. Work with any future task force established by the Department of Parks and Recreation to research the usefulness and feasibility of applying impact fees on a per unit basis. The purpose of this collaborative effort will be to assess potential for future open space acquisition funding and to identify an approach that would be mutually beneficial to open space and recreation interests.

HABITAT IMPROVEMENT

Ecological restoration and enhancement is often a cost-effective approach for improving habitat value and species opportunity. The following recommendations are intended as low-cost tools that, when considered with habitat protection measures discussed above, extend our ability to influence the continuance of flora and fauna populations in Brunswick. Coordinating such measures could be the responsibility of the Planning Department and Recreation Department. Actual work could be implemented by Town staff, student volunteers, or outside partnerships with organizations such as the Maine Conservation Corps, Boy Scouts, etc.

16. Identify potential wetland and ecological restoration opportunities (i.e., removal of old fill material, improving tidal flow constrictions, or prescribing vegetation management techniques) throughout Brunswick that could satisfy Maine Department of Environmental Protection and US Army Corps of Engineers permitting requirements for developments proposed in the region. Mitigation for wetland impacts is currently required by both agencies. However, few areas in this region have been located that could support large-scale wetland restoration efforts. If the Town can identify potential restoration sites, we would have the ability to attract outside funds for project completion. The Maine Department of Transportation's Bay Bridge Landing project is a prime example of what State and Federal mitigation requirements could offer the Town.
17. Promote habitat enhancement techniques for landowners, and where appropriate, provide on-site technical assistance by the Planning Department
18. Initiate an invasive species identification and control program throughout the Town. Any such program should disseminate educational information regarding invasive plant identification and control techniques. Existing Town open space areas could serve as demonstration sites for effective invasive species management. Currently, the spread of invasive plant species is second only to direct loss of habitat as the cause of species decline in the Northeast.

19. Review existing conditions within Brunswick's land holdings and easement areas in order to identify potential habitat improvements including selective cutting, old field restoration, buffer enhancements, etc. Develop a list of manageable projects that could be accomplished by individuals (e.g., scouts in need of community service projects) or civic-minded community groups. Post the list on the Town's website with an invitation to participate.
20. Where possible assist the Brunswick Naval Air Station's Natural Resource Manager in implementing base resource management activities such as those described in the 2001 Integrated Natural Resources Management Plan which addresses occurrences of Brunswick's rare natural communities that are of State-wide significance including pitch pine heath barrens and sandplain grasslands.

EDUCATION / PUBLIC OUTREACH

The success of any of the recommendations discussed above will require a broad understanding and acceptance by the residents of Brunswick. Public support for open space protection increases with ecological awareness and understanding of the values associated with neighborhood 'green spaces' and accessible preserves for public enjoyment.

21. Promote educational programs to increase public awareness of ecological issues through program development with Brunswick cable channel and the Conservation Commission. Initial programs should introduce general topics including the affects of fragmentation on wildlife. Future programs should focus on specific topics including introductions to Brunswick's flora and fauna; best management practices for landowners; landscaping for wildlife; existing open space facilities in Brunswick; and the problem of invasive species.
22. Develop a web-based information resource on flora/fauna issues. Included in this initiative should be access to the GIS mapping, photo inventory of the town's resources, descriptions of opportunities for citizen involvement, links to related topics, etc.
23. Arrange formal liaison with teaching programs at the elementary, middle, high school and college levels to initiate additional inventory efforts and further involve participation of the general public. Any such efforts could be modeled after existing "citizen science" programs which work effectively in providing baseline scientific data while creating a sense of project ownership among participants.
24. Incorporate 'Watchable Wildlife' www.watchablewildlife.org principles into future trails planning. This effort may be accompanied by future publications and interpretive guides for Brunswick's open spaces.

APPENDIX A

Biological Principles for Habitat Protection

Scale, Human Impacts, and Wildlife Protection

We begin with the idea that residential development influences wildlife at two fundamentally different scales—the broad "landscape" scale and the more focused "site" scale. At the landscape scale, development influences the distribution, survival, and persistence of wildlife populations and natural communities. At the site scale, development influences the behavior, survival, and reproduction of individual animals. Effects at the landscape scale can be mitigated by landscape management; effects of development at the site scale can be mitigated using site management. The requirements of an effective habitat protection plan differ somewhat depending on the scale involved.

Seven Biological Principles for Habitat Protection at the Landscape Scale

Principle 1 Maintain large blocks of unfragmented habitat by preventing unplanned development within key natural communities, forest stands, and other landscape features that provide opportunity for a diverse array of species.

Natural areas should be mapped across the landscape to identify those habitat blocks that are not currently fragmented by roads or residential development and provide diverse habitat opportunities. Large patches of habitat typically harbor the most diverse wildlife populations, and provide for intact plant communities. Where possible, efforts should be taken to maintain existing habitat opportunities within these blocks. These efforts may include future easement coordination, additional land preservation tax incentives, acquisition of development rights, open space zoning that favors conservation subdivisions, and direct fee acquisition from willing landowners.

Principle 2 Establish priorities for natural community protection and regionally significant habitat features. Focus should be maintained at the community or habitat level rather than on individual species in order to effectively plan for long-term diversity throughout the Town of Brunswick

Proper application of this principle requires a regional perspective. Priority habitats should be identified based on current understanding of regional species decline as well as perceived public valuation of those species. Protection efforts should focus on habitat requirements of targeted species where they are known to occur within the Town as well as existing land use practices that maybe limiting species occurrences in other areas of Town where habitat potential exists. Efforts should include discussions with adjacent communities where habitats cross municipal boundaries.

Principle 3 Protect rare landscape elements. Identify natural community “patches” that harbor rare, threatened, and endangered species. Utilize these areas as urban open spaces, or incorporate into larger open space blocks and corridor areas. Additionally,

consider element occurrences from a broader landscape perspective and identify potential options that encourage increases in rare element populations within the Town.

Brunswick has few known threatened and endangered vertebrate and invertebrate occurrences. Most of these are found on the Brunswick Naval Air Station or on protected lands such as the Town Commons. Several rare natural communities occur throughout the Town, and many individual rare plant occurrences are known or have historically been identified. Perhaps the most efficient approach to implementing Principle 3 is to comprehensively inventory rare natural community occurrences throughout the Town. Additionally, development interests should be required to perform an inventory on their property as part of the initial inventory of site resources, especially in areas that have been identified as having potential for important habitats.

Protection efforts focused on these features will provide the secondary benefit of securing rare plant habitat. Natural community restoration and enhancement measures could also be addressed as a component of this principle (i.e., invasive species control, forestry practices to restore pitch pine (*Pinus rigida*) / scrub oak (*Quercus ilicifolia*) stands, and mowing regimes to restore sand plain grasslands).

Principle 4 Maintain connections among wildlife habitats by identifying and protecting corridors for movement.

The first three principles discussed above consider protection efforts that target priority natural community types or favored habitat patches for priority species. Principle 4 does not specifically conform to any one cover type, but rather focuses on landscape level functioning. Species flow (immigration and emigration), seed dispersal, and migration patterns are all necessary landscape level processes that dictate regional ecological functioning. Effective corridor protection may not require direct acquisition of lands along an identified travel route, but may require creative solutions for coordinating among multiple landowners. In developed landscapes such as the Town of Brunswick, corridors seldom consist of ideal habitat, and are often fully functional when made up of a patchwork of secondary and marginal habitat types. The critical element is whether or not physical barriers to species movement are present.

Wildlife travel routes often occur along riparian zones and topographic valleys or ridge lines. Barriers to movement vary with species considered, but include large developments, multiple lane roads, parking lots, and fences. Wildlife corridor protection can generally be coupled with trail planning efforts and the creation of a network of green spaces throughout the community.

Open space subdivisions can be effective in maintaining travel corridors by pre-identifying the most significant habitats for preservation. The planning process should also involve a preliminary investigation of abutting properties to identify likely areas of habitat sensitivity. Wherever possible, open space systems within subdivisions should be laid out in a way that facilitates landscape-scale open space preservation.

Principle 5 Maintain significant ecological processes in protected areas.

Natural ecological processes are necessary to maintain plant and animal communities within the landscape. Examples of ecological processes include periodic fires, floods, wind throw, beaver activity, etc. In New England, several of these processes have been purposely prevented, or have been replaced by cultural practices as a result of land use practices. Currently, wildlife species associated with old fields and early successional scrub are declining rapidly in the region. These habitat types were originally maintained by fire and later by agriculture. However, locally both disturbance regimes have declined, resulting in a loss of this habitat type.

Invasive plant species present an entirely different threat to ecological processes. Aside from direct habitat loss resulting from land conversion, the spread of invasive plant species is the greatest threat to Maine's natural communities. Invasive species control should be a priority for all Brunswick's protected areas.

On a landscape level, ecological processes can best be maintained by planning for connectedness between open space areas that allows for continued species flow and nutrient transfer. Landscape features, such as wetlands within a single watershed, should be viewed as interconnected systems and not isolated entities. The physical functions performed by upper-watershed systems directly influence the quality of functions performed downstream.

Principle 6 Contribute to regional species diversity and ecological awareness by protecting habitat locally.

Efforts completed by Brunswick have the potential to serve as a blueprint for open space protection efforts throughout Maine. In crafting future open space planning efforts, Brunswick should include measures that will aid in sustaining local diversity, increase species productivity through proper habitat management in protected areas, and offer potential for outdoor education and recreational nature observation.

Principle 7 Balance the opportunity for recreation by the public with the habitat needs of wildlife.

Certain elements of diversity are susceptible to disturbance that results from recreational use of open space areas. In Brunswick, these are mostly seasonal in nature. Care should be taken to avoid situations where recreational activity could have a negative effect on wildlife populations. Examples include the avoidance of deer wintering areas during periods of deep snow, avoiding regular flushing of raptors during the nesting season, and avoiding disturbances to bat hibernaculum. For the most part these concerns can be addressed through proper identification of sensitive areas, detailed trail planning, seasonal limitations on use, and setting key habitat areas aside in the development of formal recreational facilities.

Five Biological Principles for Habitat Protection at the Site Scale

Principle 1. Maintain Buffers Between Areas Dominated by Human Activities and Core Areas of Wildlife Habitat.

Designate habitat patches as core areas on the basis of their importance to wildlife. Relegate human activities to one or more buffer zones surrounding a core area, with more intense activities restricted to zones that are more distant. Visual buffers, such as a preserved or planted area of trees and shrubs, may also prove effective in mitigating human disturbance. If people must pass through the core area on foot or bicycle, limit them to a well-defined trail.

Principle 2. Facilitate Wildlife Movement Across Areas Dominated by Human Activities.

Provide for parcels of open space that are as large and continuous as possible within the constraints of site-scale planning. Maintain connectivity between these parcels. Locate roads and recreational trails away from natural travel corridors used by wildlife, such as riparian areas. Where trails exist, or are planned, require that best management practices be used during construction to prevent soil erosion and introduction of potentially invasive species. Employ measures such as amphibian and reptile wall-and-culvert crossings to minimize road kill at known travel routes. Minimize fencing types that inhibit the movement of wildlife species that are likely to occur in the area. Minimize the visual contrast between human-dominated areas, including individual lots, and less disturbed terrain in the surrounding area with suggested wildlife friendly landscaping guidelines.

Principle 3. Minimize Human Contact with Nuisance Animals.

Prevent wildlife from associating humans with food by promoting proper trash disposal measures, and discouraging domestic pet feeding outdoors. Encourage wildlife friendly landscaping practices that increase cover and limit ornamental plantings that attract deer.

Principle 4. Control Numbers of Nuisance Animals, such as Pets and Other Species Associated with Human-Dominated Areas.

Prevent domestic pets, especially dogs and cats, from roaming freely. As an alternative, provide designated areas where people can exercise or "run" their pets. Encourage cat owners to keep their cats indoors by providing information regarding the extent of wildlife mortality attributed to free-roaming cats, and the health benefits associated with a life indoors. Control potential food sources available small to midsize predators such as raccoons and skunks that thrive in human dominated environments.

Principle 5. Mimic Features of the Local Natural Landscape in Developed Areas.

Retain as much predevelopment, high-quality habitat as possible, including some large patches. Keep levels of disturbance to trees, the understory, and other structural features to a minimum during construction. Design house lots in a fashion consistent with local natural habitats (e.g., by using native vegetation). Enhance the habitat value of degraded predevelopment landscapes with selective plantings and other ecological restoration practices.

Goals:

Among the overall goals agreed to by the task force was that the “wildlife habitat we now have is largely preserved.” That such a goal has broad public support is quite evident from our community survey. However, this is a deceptively ambitious goal in the face of the pressures on wildlife habitat from development and the need to balance protected open space areas with the growing recreational needs of the community. A vision that includes multiple preserves with limited public access is impractical, and irresponsible, given the importance of reconnecting our citizens with the outdoors and promoting ecological awareness throughout the community.

Simply reviewing the principles above highlights the importance of protecting large habitat blocks. However, not all undeveloped areas function similarly on an acre per acre basis. Much work is left to be completed in terms of identifying key habitat areas. Creative solutions need to be developed for protection of the key areas as well as buffer zones surrounding those areas. Given that any such measures will restrict potential land uses, meeting our goals will require continued public outreach efforts, coordination with willing landowners, and updates to existing ordinances to reflect current understanding of ecological landscape functioning.

APPENDIX B

Sketch Map Overlay Description

Introduction

In January of 2001, Woodlot Alternatives presented the Town Flora & Fauna Sub-Committee with a draft list of flora and fauna features that are commonly thought of as being of regional significance within Brunswick area (draft list attached). These features include threatened and endangered species occurrences known within the Town limits, rare natural community types, significant habitat areas as tracked by the Maine Department of Inland Fisheries and Wildlife (IF&W), and other natural features and communities that currently receive little formal protection, but are nonetheless considered important for the overall conservation of town wide biodiversity. The purpose of this list was to initiate discussions between the Flora & Fauna Sub-Committee members, and to help identify those features deemed important for setting open space planning goals.

The Sketch Map Overlay presented during this workshop is the next logical step in the open space planning process. This is considered an initial brainstorming phase of the process, and meant to provide sub-committee members with a visual depiction of ecological connections within town limits without getting bogged down in the technical aspects of GIS analyses. This sketch map is not intended to serve as a final recommendation for open space prioritization, but should be utilized as a broad brush inventory of existing landscape conditions effecting local ecological communities. Creation of this map was primarily dependent on aerial photo interpretation, but utilized a variety of GIS map products as guides. At this point, no single source of GIS data can be relied upon to adequately capture each of the regionally significant features. At this stage we have also consciously avoided “re-inventing the wheel” and have chosen not to show all freshwater wetlands, streams, salt marshes, etc. as these resources have been adequately captured on other existing GIS databases.

Primary Landscape Features Considered

The following is a descriptive key to features included on the sketch map. We have also attempted to discuss the limitations of this initial mapping effort, and the logic used for selecting resources to depict.

Large Unfragmented Blocks

Several existing GIS analyses have focused on the identification of unfragmented blocks of forest land in Brunswick. Primary among this former work is the ME-GAP analysis which identifies unfragmented blocks based on proximity to roads as depicted on USGS quads. Blocks illustrated on the sketch plan represent those of at least 350-acres that maintain functional connections to other large blocks, or significant habitat features. Our

attempt was to limit habitat block mapping to those areas capable of providing landscape level ecological functioning based on size and location. To date, no value determinations have been assigned to any of the blocks. Such a determination would require more detailed characterization work involving field surveys. Given that Flora and Fauna Committee is working on a municipal open space plan, value judgments would also need to consider proximity to neighborhoods, allocating space for future growth requirements, and public priorities concerning conservation lands.



Photo 1: Unfragmented Forest Community in West Brunswick

For the purpose of this sketch, the depiction of unfragmented blocks is not intended to identify all areas of significance for wildlife, but rather to identify those areas that likely support the greatest species richness and diversity within Town boundaries. These areas could provide future focus areas for the creation of open space districts, or similar measure.

Riparian Corridors

For the purposes of this sketch map, we have outlined only the major riparian corridors that appear to connect, or lead into and out of, sizeable open spaces especially the large blocks. Urban corridors are important for species moving between developed areas. The least fragmented of these corridors have also been included.

The depiction of riparian corridors is intended to illustrate likely patterns of species movement through town, and the affects that existing growth patterns may be having on potential species flow. Unfragmented ridge lines, large undeveloped upland areas, and linear wetland features also have the potential to function as connecting corridors.

Rare Plants and Natural Communities

When considering regionally significant features of Brunswick in the framework of “flora”, several topics come to mind. From a historic perspective, one may think of the work of Kate Furbish and her collection of rare occurrences from the Brunswick area. Many of these species have not been documented since her time, and likely no longer occur in Brunswick. However, given the geographic location and geologic features of the town, Brunswick is able to support natural communities of regional significance from which many modern day rare plant occurrences have been documented. Significant communities related to large un-forested wetlands and water bodies (salt marshes and floodplain forests) fall under existing Brunswick natural resource protection zone regulations. Given these existing protections and relative security, comprehensive mapping of salt marsh and floodplain communities has not been included on this initial sketch plan. However, two rare upland community types currently recognized by the

Maine Natural Areas Program (MNAP) that receive little formal protection under existing regulations have been included. A third community type, Hemlock-Hardwood Pocket Swamp is not currently tracked by MNAP, but is proposed as an S2 (threatened) forested wetland community type. Although no significant examples of this community type are known within Brunswick, small patches are known to occur in the extreme western part of town and may occur elsewhere.

Pitch Pine –Heath Barrens

This portion of the mid-coast region includes an extensive glacial outwash sand deposit.



Photo 2: Pitch-Pine Heath Community in Town Commons

The resulting sandy soils enable the development of regionally rare community types including pitch pine-heath barrens. Although several patches of this community type are known to occur in the Brunswick area, only one location is included in the MNAP data base. To assist with future efforts to document additional occurrences we have outlined forested areas with soils consisting of loamy sands, or coarser, capable of supporting this community type as well as rare plant species dependent on sands. The polygons as

drawn should not be misinterpreted to represent community occurrences. The polygons do depict forested areas with proper soil conditions only. For the most part, ideal conditions for sand dependent species are limited to the well-developed central Brunswick area.

Although the pitch pine – heath barren community is significant from the perspective of maintaining overall diversity (potential for rare plants and rare lepidoptera) protection of each remaining fragment may not be a practical goal for the plan. Field surveys should be conducted to identify the most significant/least fragmented stands remaining that could be incorporated into neighborhood open space areas.

Sandplain Grasslands

Using soil texture criteria as a guide, we identified those fields with potential to support sandplain grassland communities and rare plant species dependent on sandy soil in old field conditions. As discussed above, polygons shown do not depict the limits of intact sandplain grasslands in the Town, but are intended to better target areas for future field surveys. Aside from the potential to harbor rare plants, large fields are capable of supporting grassland bird species. The Upland Sandpiper (State threatened) and Grasshopper Sparrow (State endangered) have both been documented in the runway apron of BNAS. Other species including Vesper Sparrow, Bobolink, Meadowlark, and American kestrel have declined throughout the northeast as old field habitat is lost to

succession and development. The occurrence of grassland bird species in Brunswick is not necessarily tied to sandplain grassland communities. As a result, we have included the largest, unfragmented fields on this sketch map.



Photo 3: Sandplain Grassland Community near High School

Hemlock-Hardwood Pocket Swamp

This forested wetland community type typically occurs as small patches within well-drained uplands often between ledge knolls. In Brunswick, only remnant patches are known along the Lunt Road, but it is likely that other examples occur. The single known patch is dominated by red maple (*Acer*

rubrum), eastern hemlock (*Tsuga canadensis*), and black gum (*Nyssa sylvatica*). The understory includes seasonally ponded, dense shrub growth dominated by winterberry (*Ilex verticillata*). Standing water present in the swamp during the Spring and early Summer supports breeding wood frogs (*Rana sylvatica*), and is likely to support other vernal pool dependent species.



Photo 4: Hemlock-Hardwood Pocket Swamp in Western Brunswick

Additional Landscape Features

Large Unfragmented Fields

As discussed above, large open fields have the potential to support bird species that are rapidly declining throughout the northeastern United States. Most of these species depend on large fields that are mowed infrequently. Protection and management of old fields not only benefits wildlife, but also helps to

maintain the rural character of towns. Fields included on the sketch map are those greater than 50-acres that have the best potential to support grassland species (if properly managed) based on limited fragmentation and close association with other fields and open areas.

Potentially High-Value Wetlands

In general, the Town of Brunswick wetland protections only cover tidal wetlands, wetlands within the 250-foot shoreland zone, and non-forested inland wetlands that are in excess of 10-acres. Currently, only 10 inland wetlands are included in the Town's natural

resource protection zone. Several large, and potentially high value, wetland complexes occur in Brunswick that do not conform to current ordinance definitions, or have not been properly characterized in existing databases. Some of these resources may warrant field investigations and possible future protections. This effort is beyond the tasks currently charged to the flora and fauna subcommittee. We have made initial attempts to illustrate some of these areas that are relatively unfragmented and potentially of high functional value. Due to the fact that all wetlands are regulated under MDEP and Corps jurisdiction regardless of size, strengthening local protections may result in greater open space

benefits while having minimal effects on the overall regulatory burden.



Photo 5: Large Old Field Community in Western Brunswick

As a subset of wetland resources warranting future inventory efforts, vernal pools could be located and mapped throughout the Town. Although technically included under the jurisdiction of MDEP's Natural Resources Protection Act (NRPA), vernal pools often slip through regulatory cracks due to their size and problematic identification.

Identification of the pools and evaluation of existing upland buffers surrounding the pools is necessary in

order to ascertain the status of this resource type within the Town boundaries.

Draft Significant Species List

Significant Fauna

Listed Species

Three species currently listed as threatened or endangered by the Maine Department of Inland Fisheries and Wildlife (IF&W) are known to occur in Brunswick. These species include two grassland species: upland sandpiper and grasshopper sparrow, both occur on the Brunswick Naval Air Station property. Breeding habitat for these species is rapidly declining with the loss of old field communities to natural succession and development. Bald eagles also breed in Brunswick along the New Meadows "lake" and on Lower Coombs Island.

Species of Special Concern

Several species of special concern occur in Brunswick. Two of these species are the Cooper's Hawk and Northern Goshawk, both are woodland accipiters. The Cooper's hawk is better able to deal with fragmented woodlands. Potential breeding areas for the northern goshawk are likely limited to large unfragmented forests in the western part of Brunswick. Saltmarsh sharp-tailed sparrows are known to breed in Brunswick's larger

saltmarshes at the head of Maquoit Bay, Harpswell Cove, and New Meadows “lake”. The eastern meadowlark, also listed as a species of special concern, has been observed in old fields along Mere Point and fields in western portions of Brunswick. This species is likely breeding in the Town. Vesper sparrows, also listed as a species of special concern may also occur in old-field communities in Brunswick.

Amphibians listed as special concern that are known or are likely to occur in Brunswick include Northern Leopard Frog and Four-toed Salamander. Habitat requirements for both species a variable, but typically include a variety of wetland types including sphagnum dominated bogs (salamander) and shallow open water and emergent wetlands (Leopard Frog).

Watch List Species

Partner’s in Flight (PIF) publishes a priority species list in attempt to set management priorities for regional avifauna identified by federal or state endangered species programs, and more importantly those that show long-term decline that are not identified on state or federal lists. Brunswick is located in Physiographic Area 27 (Northern New England). Seven priority habitats are listed for Area 27. Three of these priority habitats are found in Brunswick including large unfragmented blocks of mixed forest, early successional forest, and grassland communities. Large forested blocks harbor watch list species including Wood Thrush, Scarlet Tanager, Rose-breasted Grosbeak, Veery, Ovenbird, Northern Saw-whet Owl, and accipiters (Northern Goshawk, Cooper’s hawk, and Sharp-shinned hawk). Early successional/edge stands may provide habitat for watch list species including Chestnut-sided Warbler, American Woodcock, Whip-poor-will, and Prairie Warbler. Grassland species are well represented on IF&W’s list due to the rapid decline of this community type in the state. The only grassland species on the watch list not mentioned on IF&W’s list, and known to occur in Brunswick, is the bobolink.

The importance of the PIF work is that it identifies priority habitat types that currently receive little formal protection under endangered species mandates. Although avifauna is the focus of this work, the PIF protocol can be applied as an umbrella approach to managing for a wide range of species that occur in the priority habitats.

Significant Flora

The following are rare, threatened, and endangered plant species known to occur in Brunswick. Further review of updated BCD data may result in additions.

Aletris farinosa Unicorn root

Collected by Furbish in sand from Hardings in 1884. This location is near the New Meadows River. Collection is cited by Fernald (1911). Occurs in open woods with sandy, gravelly, or peaty soils.

Bidens eatonii New England estuarine beggar ticks

First collected from the Androscoggin River (fresh tidal marsh) in 1921 by Fassett.

Bolboschoenus fluviatilis River bulrush

Collected from Hardings in 1891 by Furbish. This species is typically found on tidal river shores and therefore was likely collected from the New Meadows River.

Calystegia spithamea Upright-bindweed

This species is known from the field around the Brunswick High School (Vickery, pers. comm.). No details about the plants are known. Occurs in sandy fields.

Carex siccata Dry land sedge

In the mowed field of the new Brunswick High School (Haines 1998). Stations may not have yet been reported. Dry, sandy soil of open areas.

Carex vestita Clothed sedge

Collected by Chamberlain from a sandy embankment (unspecified location) in Brunswick. This collection is cited by Fernald (1911). Recently at BNAS and Cook's Corner (Haines / Walker). Occurs in dry sandy woods and clearings.

Castanea dentata American chestnut

Observed by Gawler and Tyler in 1978 and cited by Eastman (1981). Dry, rocky or gravelly, acid soil.

Chenopodium berlandieri var. *boscianum* Pitseed goosefoot

Collected from a railroad yard in 1912 by Kate Furbish. This represents one of only two collections in state. Occurs in disturbed soils in open areas.

Chenopodium humile Marsh Orach

This species reported by Fernald (1911) from a 1906 collection by Furbish. The specimen was collected from a ditch and sent to the Gray Herbarium (Harvard). The species has never been seen again in Maine.

Cypripedium reginae Showy lady's slipper

Three plants were observed in an unspecified swamp, collected by Norton, Bean, and Chamberlain in 1907. Fens and bogs.

Eleocharis aestuum Spike-rush

The first collection in the state of this species was by Davis was in 1894 from Brunswick (Haines, in ed.). It was collected again in 1911. The collection was first called

Eleocharis diandra based on taxonomic confusion. However, this species has been recently described and is considered to be globally imperiled (G3). It was collected from an unspecified location on the Androscoggin River. An extant location can be found across the river near the upstream end of Cow Island in Topsham.

Juncus anthelatus a rush

This rare rush has been collected once from Mt. Desert Island (1905) and recently (2000) in Brunswick in a wet area under power lines by Haines. Occurs in swamps and wet ditches.

Lonicera dioica Wild honeysuckle

Several historic collections from Brunswick—1880, 1890, 1905, and 1933. The 1905 collection is from near the New Meadows River, a population rediscovered by Walker in 1998. Also reported from bank of Stevens River and “Gurnet” by Fernald (1911). Thickets, rocky banks, woods. An additional population was identified off Pennellville Road near Middle Bay by Walker in 2001.

Lonicera sempervirens Trumpet honeysuckle

Reported from Brunswick by Eastman (1981) based on a specimen by Furbish collected in 1907.

Mikania scandens Climbing hempweed

This species was collected in Brunswick in 1916 by Furbish. No other information is available. Moist thickets, swamps, stream banks.

Sassafras albidum Sassafras

Collected in 1906 by Kate Furbish. No additional data exists for this record.

Suaeda linearis Southern sea-blite

This species was collected by Furbish in 1899 from the area known as Hardings. It is a coastal shoreline species and therefore would have been collected from a wetland (perhaps the New Meadows River). Salt marshes and sandy coastal areas.