



**Business Plan for  
Conservation of Birds  
of Early Successional Habitats**

*A 10-Year Plan to Secure a Keystone Habitat*

**American Woodcock Task Force  
Golden-winged Warbler Working Group  
National Fish and Wildlife Foundation  
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## **WHAT IS A BUSINESS PLAN?**

A business plan serves two broad, primary functions. First, it provides specific information to those (e.g., prospective investors) not familiar with the proposed or existing business, including its goals and the management strategy and financial and other resources necessary to attain those goals. For outside individuals, it is imperative that the business plan offer a clear rationale for why the goals represent a good investment and why the strategy for achieving those goals is the best one possible. Second, a business plan provides internal guidance to those who are active in the operation of the business, allowing all individuals to understand where the business is headed and the means by which it will get there. The plan helps keep the business from drifting away from its goals and key actions through careful articulation of a strategy.

In the context of the National Fish and Wildlife Foundation's conservation efforts, business plans represent the strategies necessary to meet the goals of Keystone and other initiatives. At its core, each business plan emphasizes the type(s) and magnitude of the impacts (benefits) that will be realized through the initiative, the monetary costs involved, and the potential obstacles (risks) to achieving those gains. Readers of the business plan must be able to see the strength of the relationship between the activities identified within the strategy and the anticipated outcomes. Investors also must be able to see their investment as being integral to achievement of those outcomes.

## EXECUTIVE SUMMARY

American Woodcock and Golden-winged Warbler are two of more than two dozen bird species highly dependent upon young regenerating forests – termed early successional habitat – and exhibiting steep population declines. Those two species form the focus of this early successional habitat initiative. Woodcock are small game birds that require a mixture of early successional forest and open areas to complete their life cycle. Once numbering more than million birds, woodcock have declined by more than 30% in the past 40 years, with little sign that that decline is waning. Golden-winged Warblers, too, require early successional forests for breeding but spend nearly 8 months of each year in tropical forests and scrub. The population of this species has plummeted by over 50% in the past 40 years. Highly correlated with these and other population declines has been a shrinking land base that supports early successional forests. Scientists believe that human encroachment (through expansion of towns and cities), regeneration of abandoned agricultural lands, and a major shift in attitudes and perception about forest management are root causes of habitat loss. Indeed, early successional growth in the regions of highest woodcock and Golden-winged Warbler densities has declined by 30% since the 1970s.

Despite existing conservation efforts, both of these focal species are projected to continue to decline by a minimum of 3-7% during the next decade. This initiative is dedicated to a 10-year investment that, if at least partially funded at \$2.4 million per year (all partners; NFWF share = \$0.8 million per year), will result in population increases of 19% (woodcock; half of the long-term population goal) and 20% (warbler; 13% of the long-term population goal) above that level if this initiative were not launched. Scientists believe that the enhanced populations, and especially the anticipated change in attitudes towards forest management, will provide a robust foundation for long-term persistence of these species.

Management efforts will be focused strategically on specific regions of eastern United States and Canada that provide the greatest return-on-investment. Three tiers of strategies have been identified for recovering those species, but only Tiers 1 and 2 are recommended for this initiative:

*Tier 1: Restoration and management of habitat in key bird conservation regions.* The initiative will place greatest emphasis on putting habitat biologists into the field to provide technical assistance to public and private landowners in the northeastern and north central states and provinces. This approach has been highly effective at educating land owners about the environmental and financial benefits of active forest management. These biologists also will serve as liaison to commercial interests in wood products and to funding agencies that can help defray habitat management costs. By-and-large, however, financial incentives of harvesting wood and biomass is expected to be the financial engine that propels this initiative.

*Development of Golden-winged Warbler conservation plan.* This is a single year investment that will provide guidance on the most cost-effective strategy for recovering this imperiled species.

*Tier 2: Conservation of habitats in tropical wintering areas.* Golden-winged Warbler and several other high priority species will serve as the focus of efforts to (a) protect key natural habitats in the form of a system of reserves; (b) integrate bird conservation measures into land use practices, particularly agriculture; and (c) provide highly targeted outreach to government agencies, commercial interests, and local communities about the value of natural resources conservation.

*Restoration and management of habitat in lower priority bird conservation regions.* Same approach as in Tier 1, but in areas of eastern U.S. with lower woodcock and warbler densities.

Low-to-moderate levels of risk are associated with meeting the initiative's goals, the most significant risk being related to the capacity to change landowner attitudes about forest management.

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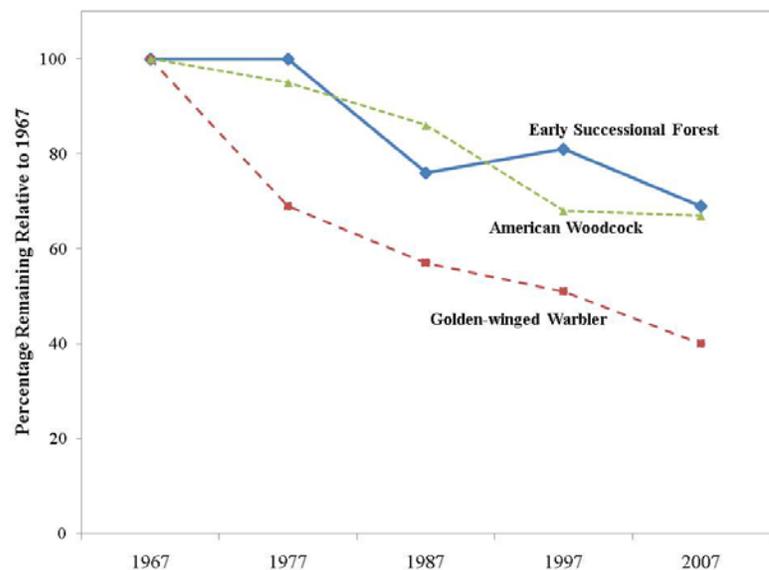
## CONSERVATION NEED

Approximately 50 species of birds in eastern North America rely upon early successional or scrub habitat, young forests that are low in stature and often in the process of regenerating following cutting or other major disturbance. Of 36 species for which reliable population data are available, 47% have shown large declines between 1966 and 2007; only 14% of those 36 species are increasing. Most of those declining trends can be attributed to a recent loss of habitat, as replacement of farmland and natural habitats with towns and cities, and re-growth of forests on abandoned farmland have resulted in >30% loss of the early successional habitat that was present in the 1960s.

Inn the last 30 years loss of early successional forest has been accelerated because of maturation of forest lands, a direct result of a change in the behavior of forest owners and governmental policies. Beginning in the 1970s, the prevailing land ethic in many places in the United States changed to one that believed that clear-cutting of mature forest for timber products had severe environmental ramifications. Some of the disturbances prevalent in the mature forest lands for thousands of years (e.g., fire, insect defoliation, disease) were now being controlled to a large extent through forest management, and the 300-year practice of cutting trees for timber products was curtailed in certain regions. This rendered many forested landscapes, once mosaics of various stages of forest succession, more-or-less uniform in age and plant species composition. The loss of habitat diversity resulted in a loss of wildlife diversity.

From a continental perspective, scientists have identified nine species of birds that require early successional habitat in eastern North America that are in urgent need of conservation attention; at least ten additional species are showing severe regional declines. As a group, only grassland birds have exhibited more widespread and pronounced population down turns in the past 50 years. During that period, early successional specialists, including the American Woodcock, Willow Flycatcher, Painted Bunting, and Prairie, Golden-winged, Kentucky, Chestnut-sided, Canada, and Blue-winged warblers, have decreased by 30-50%. The close relationship between loss of early successional forests in eastern North America and the decline of a large suite of bird species dependent upon that habitat (Figure 1) suggests that conservation actions need to focus on restoring and managing that dwindling habitat.

At the same time, most of these species spend up to seven months each year in wintering areas of Central and South America and the Caribbean. Those tropical regions, too, have undergone dramatic changes during the 20<sup>th</sup> century. Clearing of both young and old forests for agriculture, cattle ranching, and other forms of human development are believed to be contributing to the recent precipitous declines of Neotropical migratory birds that require early successional habitats in the tropics.



**Figure 1. Forty-year changes in coverage of early successional habitats in northeastern and north central U.S. (solid blue line) and in relative population size of two early successional forest habitat specialists that are the focus of this initiative. Lines represent the proportion of the habitat or population that existed in various years relative to the condition in mid-1960s.**

## CONSERVATION OUTCOMES

Our conservation targets are based upon population increases for both American Woodcock (*Scolopax minor*) and Golden-winged Warbler (*Vermivora chrysoptera*), two “umbrella” species whose habitat requirements largely overlap one another and those of some three dozen other bird species, including seven high priority birds. Because habitat and other requirements for American Woodcock and Golden-winged Warbler do differ to some extent, the key to meeting our conservation outcomes is to develop and implement an integrated strategy that, while not perfect for either species, optimizes benefits to both.

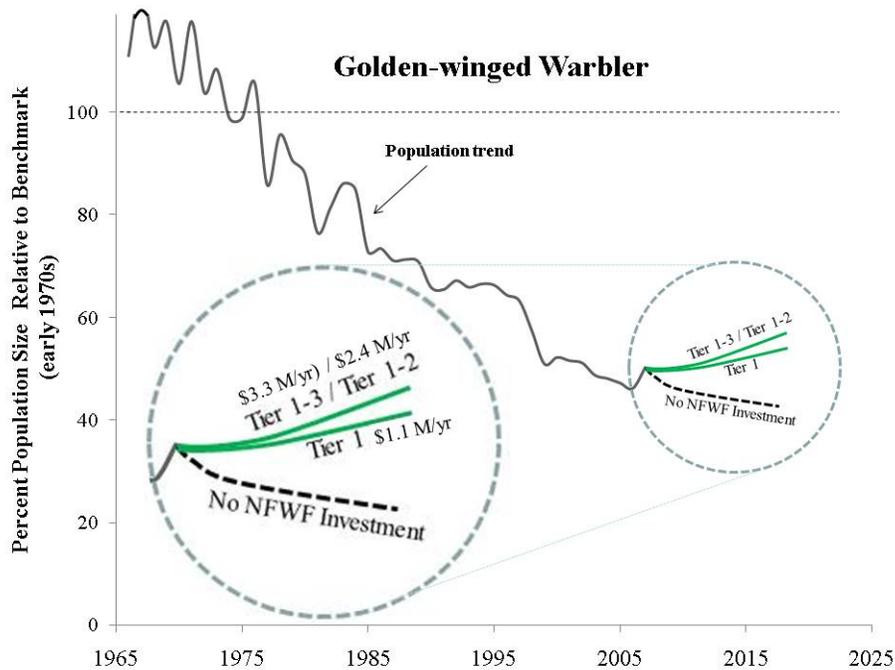
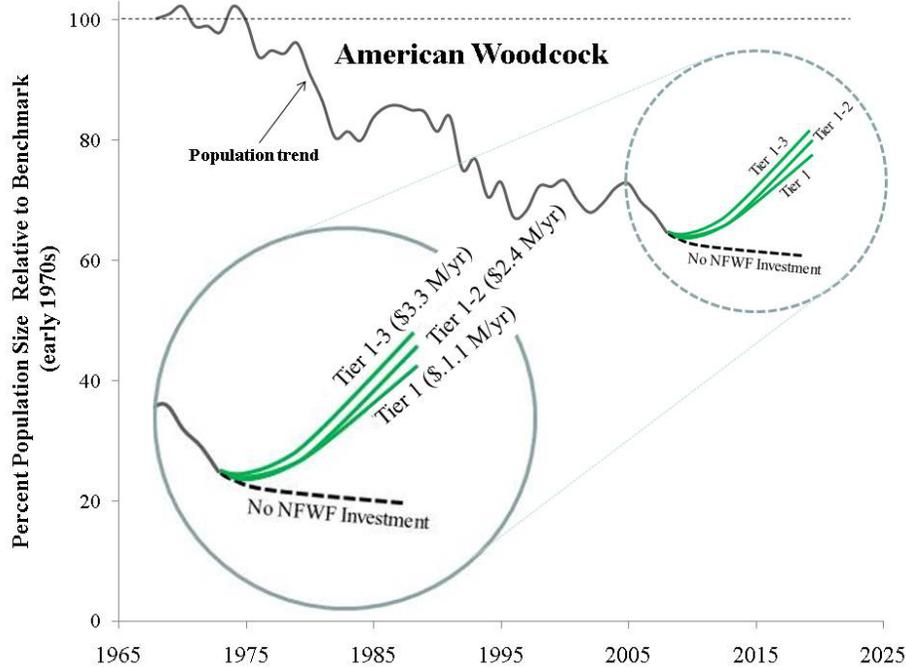
**American Woodcock.** The long-term (20 year) goal established by the Northern Forest Woodcock Initiative<sup>1</sup> is to create and manage 21.3 million acres of new early successional habitat that will result in a permanent increase of approximately 800,000 male woodcock (females are not counted in surveys because they are too inconspicuous) to the population. Those gains would bring the woodcock population back to the desired densities of the early 1970s (approximately 3 million males). Using those goals as our guideline, a fully funded, 10-year effort undertaken through this business plan will result in an increase of 18% in the continental population of American Woodcock, *which represents half of the population gain necessary to attain the long-term desired outcome*. The marginal gain in population size through NFWF participation will equal 21% (difference between population with and without NFWF investment), as we anticipate that decline of woodcock will equal ~3% during the next 10 years without additional funding. (We assume that loss of early successional habitat will slow in the next 10-years even without NFWF involvement because of recent efforts of the Northern Forest Woodcock Initiative, such that the annual decline of woodcock will be lowered from the long-term decline of -1.1%/year to -0.5%/year.) This population gain, however, is dependent upon full funding, which is \$3.3 million annually (Figure 2A; Tier 1-3). Given the difficult challenge of raising funds at that level, we have included projections of woodcock population gains under two other funding scenarios; a Tier 1-2 strategy that results in a marginal gain of 19% (\$2.4 million), and a Tier 1 (\$1.1 million/yr) strategy that marginally increases woodcock by 16% over 10 years.

**Golden-winged Warbler.** The long-term (40 year) goal established by Partners in Flight<sup>2</sup>, and modified by the Golden-winged Warbler Working Group for this business plan, is to double the current worldwide population of Golden-winged Warblers through habitat management and protection on North American breeding grounds and South American wintering areas. Those gains would bring the warbler population back to the desired densities of the early 1970s (approximately 400,000 birds). Using those goals as our guideline, a fully funded, 10-year effort undertaken through this business plan will result in an increase of 13% in the global population of Golden-winged Warbler, *which represents 13% of the population gain necessary to attain the long-term desired outcome*. The marginal gain in population size through NFWF participation will equal 20% (difference between population level with and without investment), as we anticipate that the warbler will decline an additional 7% during the next 10 years without additional funding. (We assume that loss of early successional habitat will slow in the next 10 years even without NFWF involvement, such that annual decline of Golden-winged Warblers will be lowered from the long-term decline of -2.8%/year to -1.4%/year.) This population gain, however, is dependent upon full funding, which is \$3.3 million annually (Figure 2B; Tier 1-3). Given the large challenge of raising funds at that level, we have included projections of the warbler population gains under two other funding scenarios; a Tier 1-2 strategy that results in a marginal gain of 20% (\$2.4 million), and a Tier 1 (\$1.1 million/yr) strategy that marginally increases Golden-winged Warbler by 11% over 10 years.

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<sup>1</sup> Kelly, J.R., Jr. and S.J. Williamson (editors). 2008. American Woodcock conservation plan. Wildlife Management Institute, Washington, DC.

<sup>2</sup> Rich, T. D., C. J. Beardmore, H. Berlanga, et al. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology, Ithaca, NY.



**Figure 2.** Long-term population trend (solid black line) of American Woodcock (A; top) and Golden-winged Warbler (B; bottom) and projected changes in those populations based upon several different funding scenarios. The “benchmark“ population goal established is indicated by the dotted horizontal line at 100%. Solid green lines reflect population increases based upon three different implementation strategies (with different funding levels). Tier 1 strategy represents highest priority actions, Tier 2 the second highest, and Tier 3 the lowest priority. The dashed line beginning where the population trend line ends in 2008 represents the estimated population trajectory if NFWF were not to invest.

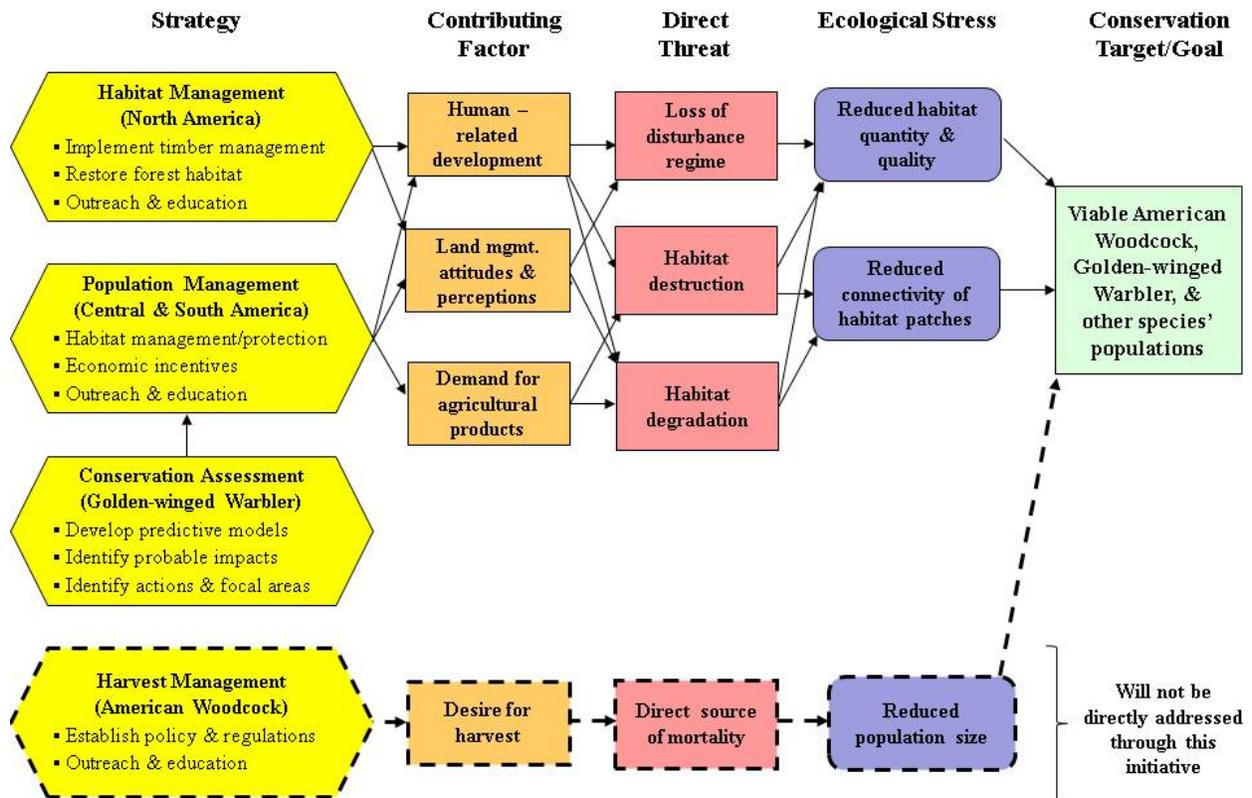
This initiative addresses the need of a large group of bird species, but focuses efforts on two species whose habitat requirements and other life history needs significantly overlap those of other early successional habitat specialists. *American Woodcock populations are limited mainly by the lack of available habitat necessary to reproduce and raise young. Golden-winged Warblers, too, are limited by reduction of habitat within the breeding range, but also appear to suffer from habitat loss and degradation in wintering areas of Central and South America.* Our implementation strategy for early successional species, therefore, is focused on increasing fecundity (fledging more chicks per nest) through creation of additional, higher quality breeding habitat and increasing annual survivorship in Latin America wintering sites. The complexity of determining limiting factors for species that migrate to and from South America every year, such as the Golden-winged Warbler, dictates that thorough assessments of limiting factors be completed prior to finalizing specific strategies to pursue. Therefore, we will complete the limiting factors assessment for the Golden-winged Warbler within two years of commencement of this initiative. Finally, both species, and indeed most of the entire suite of early successional species, also face certain threats dealing with loss of habitats along migration routes. As a secondary priority, our plan incorporates habitat-based actions to address migration route issues.

We propose *three tiers of strategies* that reflect core conservation efforts necessary to address those limiting factors. Within each Tier, we have established one or more strategies that reflect specific actions in specific geographic areas. Tier 1 projects are of highest priority because those actions are focused in areas that offer the greatest chances for contributing to population goals, or that are necessary to complete prior to commencing other types of projects. Tier 2 strategies also have direct and important links to population goals, but are not expected to have the same level of benefit as Tier 1 projects. Nonetheless, both tiers of activities are necessary to achieve the desired population outcome. The Tier 3 strategy focuses on migration habitat for woodcock, a key link in the annual cycle of this and other species, but an issue that lacks the importance of the issues addressed in the first two tiers. For that reason, we recommend that this business place its emphasis on Tier 1 and Tier 2 strategies that, at an overall annual cost of \$2.4 million, can produce significant and cost-effective conservation gains.

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The logic model on the following page outlines the hypothesized relationships among threats to the woodcock and Golden-winged Warbler and the broad strategies that are proposed to address those limiting factors. Strategies emphasized in Tier 1 and Tier 2 below are projected to increase populations of American Woodcock and Golden-winged Warbler by 19% and 20% (respectively) above population levels that would exist in 10 years if National Fish and Wildlife Foundation did not invest in this initiative. Note that one of the strategies identified in the logic model, harvest management of the hunted American Woodcock, is not addressed in this business plan because the decline of woodcock has occurred in the context of more than 100 years of more-or-less constant hunting pressure. In fact, hunting pressure has declined in the past 20 years, yet the woodcock population continues to fall. Hence, though hunting is a cause of annual mortality, it is not considered to be a factor in the observed, widespread population declines of American Woodcock.

## LOGIC FRAMEWORK – Early Successional Habitat Initiative



### ***Tier 1 Strategy: Habitat Restoration and Management in High Priority Breeding Areas and Development of Golden-winged Warbler Implementation Plan***

*Loss of breeding habitat has been shown to be directly related to decline of American Woodcock and Golden-winged Warbler populations. Efforts to expand the shrinking habitat base in key breeding areas will have the greatest impact on these species.*

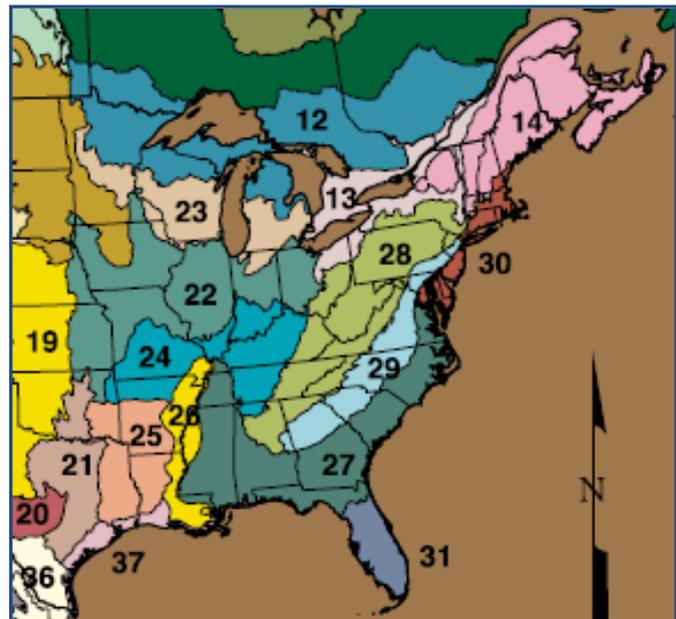
**Habitat restoration and management.** This initiative will focus on habitat restoration and management that encourages a landscape-scale perspective on forest conservation and which offers financial and environmental incentives for implementing sound conservation practices on those lands. The approach of this strategy will be to position highly experienced, highly networked habitat biologists into high priority Bird Conservation Regions (BCRs) that hold the greatest potential for woodcock and warbler population gains. Each BCR (Figure 3) represents a unique assemblage of habitats and bird species, such that conservation actions within each often require a somewhat unique approach as well.

Habitat biologists will provide the requested technical guidance to small and large landowners, both private and public, to determine the most appropriate course of action for their forest lands. Currently the demand for these services far exceeds the capacity of conservation organizations and agencies to respond. A series of best management practices have been established for each BCR and, in addition to assisting landowners develop management plans, habitat biologists serve as liaisons between the landowner and

government sources of assistance and funding, such as the U.S. Department of Agriculture. Habitat biologists also monitor the success of habitat actions for American Woodcock and Golden-winged Warbler through both population and habitat assessments (see also *Evaluation* section below).

Critical to the success of this initiative will be the careful consideration of how to configure practices that produce early successional habitat without jeopardizing other wildlife habitat values. That is, cutting forests and promoting blocks of young forest may not be beneficial to the conservation of some old growth forest species. Hence, the small blocks (often <50 acres) of early successional forest that are imbedded into a larger, forested landscape will need to be positioned so as to minimize the loss of quality of existing mature forest stands. That level of coordination over such a large area has never been achieved. The somewhat haphazard approach to creation of early successional forests has helped to create the perception that forest regeneration through timber harvest has severe negative ramifications. Changing those perceptions, through sound scientific guidance and demonstrated achievement, is central to this keystone initiative's success. The Northern Forest Woodcock Initiative has tested and implemented the above approach to creation and maintenance of early successional forest with high success; more than 500,000 acres in 12 states have been affected in the past three years or are in development stages.

Tier 1 strategy focuses on BCRs with the highest woodcock and Golden-winged Warbler densities, covering the northern hardwoods forests (BCRs 12, 13, 14, 23) the Appalachian Mountains (BCR 28) and the mid-Atlantic (BCR 30; Figure 3). Habitat goals in these six BCRs, if fully met, will produce an estimated 636,000 acres of new early successional habitat each year. That acreage will meet 86% of the 10-year population goal for American Woodcock and virtually all of the breeding habitat needs for Golden-winged Warbler. Table 1 outlines the acreage goals for Tier 1 BCRs. Table 2 summarizes restoration and management activities and the estimated benefits to woodcock.



**Figure 3. Bird Conservation Regions (BCRs) that are used throughout North America for bird conservation planning and implementation. Highest priority (Tier 1) habitat management focuses on BCRs 12, 13, 14, 23, 28 & 30. Those areas that support lower woodcock densities, yet are important to species recovery, include BCRs 22, 24, 25, 26, 27, and 29.**

**Development of Golden-winged Warbler implementation plan.** NFWF is currently supporting a 3-year coordinated project across the breeding and wintering range of the Golden-winged Warbler to collect the necessary scientific and other information that will be necessary to develop an implementation plan that not only fully integrates into the existing American Woodcock plan, but also ensures that it optimizes the benefits accrued to other high priority bird species as well. In particular the Golden-winged Warbler plan will bring together the most up-to-date information and implementation strategies to address threats on breeding, overwintering and migration areas. A single year of funding will be necessary to complete this plan (by 2010). Plan development is considered top priority because it will offer the strategic guidance necessary to produce cost-effective population gains.

**Table 1. New acreage of early successional habitat necessary to create each year in each Bird Conservation Region (BCR) to attain American Woodcock and Golden-winged Warbler breeding habitat goals.**

<b>Tier</b>	<b>Bird Conservation Region</b>	<b>New Early Successional Forest Created Annually (acres)</b>	<b>Existing Forest Land (acres)</b>
<b>1</b>	12	174,199	77,619,282
	13	179,115	23,592,700
	14	200,302	63,484,982
	23	75,576	14,768,003
	28	149,913	66,892,834
	30	111,504	7,655,000
	<i>Sub-Total</i>	<i>890,609</i>	<i>254,012,801</i>
	<b> </b>		
<b>2</b>	22	35,730	13,979,738
	24	25,457	31,790,660
	25	0	33,236,000
	26	0	5,218,978
	27	24,848	79,924,752
	29	63,906	25,744,276
	<i>Sub-Total</i>	<i>149,994</i>	<i>175,928,645</i>
	<b> </b>		
	<b>TOTAL</b>	<b>1,040,603</b>	<b>429,941,446</b>

**Table 2. Estimated outcomes for American Woodcock Tier 1 and Tier 2 activities undertaken over a 10-year timeframe in each Bird Conservation Region (BCR). Key partners reflect current and anticipated organizations that are expected to play an important role.**

<b>BCR</b>	<b>KEY PARTNERS</b>	<b>ESTIMATED OUTCOME</b>
12	USFWS, Canadian Wildlife Service, USFS, USGS, NRCS, MN DNR, WI DNR, MI DNR, ONT DNR, QC DNR, NGOs	Increase woodcock population by <b>121,939</b> males
13	USFWS, Canadian Wildlife Service, USFS, USGS, NRCS, OH DNR, PGC, NYDEC, VTFW, ONT DNR, QC DNR, NGOs	Increase woodcock population by <b>45,664</b> males
14	USFWS, Canadian F&W Service, USFS, USGS, NRCS, NYDEC, VTFW, NHFG, MA DW, CT DEP, ME DIFW, NB DNR, NS DNR, QC DNR, NGOs	Increase woodcock population by <b>57,082</b> males
22	USFWS, USGS, NRCS, IL DNR, IND DNR, OH DNR, NGOs	Increase woodcock population by <b>14,471</b> males
23	USFWS, USFS, USGS, NRCS, MO DNR, AR DNR, NGOs	Increase woodcock population by <b>45,647</b> males
24	USFWS, USGS, NRCS, IL DNR, IND DNR, OH DNR, NGOs	Increase woodcock population by <b>9,696</b> males
25	USFWS, USFS, TPWD, LA F&W, AR DNR, NGOs	Increase availability of quality AMWO habitat by 10%
26	USFWS, NRCS, LA F&W, MS F&W, AR DNR, NGOs	Increase availability of quality AMWO habitat by 10%
27	USFWS, NRCS, USFS, LA F&W, MS F&W, TWRA, AL DNR, GA DNR, SC DNR, NC DNR, VA DIFW, NGOs	Increase woodcock population by <b>9,265</b> males
28	USFWS, NRCS, USFS, NY DEC, PGC, WV DNR, MD DNR, OH DNR, VA DIFW, NGOs	Increase woodcock population by <b>30,865</b> males
29	USFWS, NRCS, USFS, SC DNR, VA IFW, MD DNR, PGC, GA DNR, NC DNR, NGOs	Increase woodcock population by <b>10,375</b> males
30	USFWS, USGS, NRCS, NHFG, MA DW, CT DEP, RI DNR, ME DIFW, NJ DFW, DE DNR, MD DNR, VA IFW; NGOs	Increase woodcock population by <b>16,193</b> males

## ***Tier 2 Strategy: Habitat Restoration and Management in Lower Priority Breeding Areas and Conservation of Golden-winged Warblers on Wintering Grounds***

*Scientists believe that Neotropical migratory birds are limited by events on their wintering grounds in Latin America and the Caribbean. To ensure recovery of Golden-winged warblers, efforts need to be directed towards those regions of South America that are likely to have caused population declines.*

**South American wintering grounds.** For this business plan, scientists working with the Golden-winged Warbler Working Group have tentatively estimated that at least 40% of the limitations to Golden-winged Warbler populations are likely to occur outside of the breeding grounds, in South American highlands where the species overwinters. This Tier 2 strategy implements the conservation plan completed under the Tier 1 strategy to address the loss and degradation of habitat in wintering areas and along migration routes. Golden-winged warblers spend October-April each year in forests of many types between southern Mexico and Colombia and Venezuela. The correlation between loss of habitat in Latin America and declines of numerous species of birds, including Golden-winged Warbler makes a persuasive argument for focusing efforts there. While the implementation plan ring completed under Tier 1 priorities will offer specific details of the work that needs to be completed, we do know that efforts will be directed towards (a) protecting the integrity of existing forest reserves; (b) integrating wildlife conservation into prevailing and anticipated land use practices, especially agriculture; and (c) concentrating on highlighting the benefits of preserving the unique forest natural resources to a wide audience, including government officials, agribusiness, and local communities.

**Habitat restoration and management in lower priority areas.** While not as important as Tier 1 BCRs because of lower woodcock population densities, the regions included in this strategy represent the historic range of American Woodcock and therefore are necessary to maintain the long-term integrity of the North American population (BCRs 22, 24, 25, 26, 27, and 29; Figure 3). The approach to habitat creation and maintenance is similar to that described for Tier 1 BCRs, though habitat work in these areas will also include developing habitat conditions that are conducive for overwintering birds, as well as breeding birds. Anticipated impacts to woodcock populations and key partners are identified in Table 2.

## ***Tier 3 Strategy: Conservation of Habitats along American Woodcock Migration Routes***

American Woodcock experts believe that the significant degradation of habitat along migration routes in the Central United States and along the Eastern Seaboard has occurred, and that those problems have contributed to the decline of this species. One hypothesis suggests that migrating woodcock are now subjected to increased mortality rates from elimination or degradation of habitat. Another suggestion is that birds may be arriving on the breeding grounds in poor body condition due to poor quality migratory habitat. The continued ability of these migratory habitats, especially critical funnel points, to support woodcock migrating between northern ranges and southern wintering ranges is unknown, but is thought to be threatened.

This strategy focuses on a three-pronged approach for evaluating the impacts of migration habitat and for preserving those historic flyways. First, an *assessment* will be completed to better identify the likely contribution of migration habitat degradation to the decline of woodcock, and to prioritize conservation actions that can best address those threats. Second, if warranted based upon the assessment, strategic *land protection* will be put in place to provide habitat in several regions known to serve as a heavily used migration pathway. And finally, using the approaches described for Tiers 1 and 2, *land management* will be enhanced to increase the quality of migration habitat.

**Risk: Obstacles to Success**

Risk is an uncertain event or condition which, if it occurs, could have a negative effects on an initiative’s desired outcome. We have identified seven risk event categories (see box below) that could substantially impede progress towards our stated population goal for the American Woodcock, Golden-winged Warbler, and more than two dozen additional bird species dependent upon early successional forests during the next 10 years. Risks associated with threats that are not likely to be manifested in that time period, but are likely to have a significant influence on our ability to attain the desired population outcomes, are also identified. These seven categories are evaluated below in the context achieving our stated woodcock and warbler population goals. Overall, we see only slight risk of achieving our stated population and habitat goals (Figure 4).

**Regulatory.** Chances are low that regulatory or policy changes will impede the conservation activities in this plan because the plan has already been constructed to account for those existing impediments. Changes that would make existing laws or policies less compatible with early successional habitat conservation do not appear likely in the foreseeable future.

**Financial.** Bringing about a 19% marginal increase in American Woodcock and a 20% increase in Golden-winged Warbler populations requires substantial funding. Two types of financial risk events have potential to prevent long-term security of species that depend upon early successional forest. Insufficient generation of funds by both NFWF and its partners during the course of this program is certainly a concern. However, while challenging, the funding hurdles may not be insurmountable. For example, the Northern Forest Woodcock Initiative, a consortium of organizations and agencies focused on conservation of early successional forest species, has been raising approximately \$0.5 million per year for woodcock and other species, despite the fact that the initiative is still in its formative stages. Tripling that fundraising success (to \$1.6 million, which would provide a 2:1 match with NFWF funds) will be difficult, but achievable. The second type of financial risk involves the ability of the early successional partnership to maintain necessary funding for conservation activities once NFWF funding is no longer available, regardless of whether our population target has been met. Fortunately, the strategy employed under this keystone initiative uses financial incentives driven by demand for timber products as a chief stimulus for creating early successional habitat. The initiative seeks to change attitudes about forest management such that, if we are successful, the level of investment by NFWF and its partners should be dramatically reduced because landowners enrolled in the program will have both the incentive (financial and environmental) and experience (because our habitat biologists will have worked with them) to continue the program with minimal guidance.

<b>Categories of Risk Events</b>	
	The extent by which the following risk events impede progress towards desired initiative outcomes.
<b>Regulatory.</b>	Existing or potential future laws, regulations, policies, or judicial decisions.
<b>Financial.</b>	Level or stability of financial resources necessary to implement strategies outlined in business plan.
<b>Environmental.</b>	Biological or environmental.
<b>Scientific.</b>	Scientific understanding of the threats or necessary conservation actions.
<b>Social.</b>	Social conditions or considerations.
<b>Economic.</b>	Existing or anticipated economic factors or conditions.
<b>Institutional.</b>	Existing or anticipated institutional capabilities.

Overall, both short-term and long-term financial shortfalls appear to be likely risks of this initiative, though those shortfalls are not likely to be so severe that the

impacts will be large. In addition to that identified above, several strategies have been put in place that will help ensure adequate funding. First, the American Woodcock was chosen (in part) because it is a high priority to both the federal and multiple state governments in eastern United States and Canada. Through this initiative, regular updates on progress towards population outcomes are expected to keep early successional habitats “visible” to our partners and other prospective funding sources. Second, development of this business plan will provide prospective funders with an unequivocal understanding of the direction of this initiative and explicit insight into how their investment will benefit some two dozen species of birds and other wildlife. The business plan also lays out a diverse set of actions that is intended to better engage a broader suite of partners and donors, both in North America and in Latin America.

***Environmental.*** Early successional habitat is sustained through disturbance, so severe environmental events, including drought, fire, disease, or insect outbreaks, are not likely to have severe consequences on this habitat type. Also, early successional forest encompasses a wide array of tree and shrub species that, collectively, are not particularly susceptible to the negative ramifications of climate change. We see little risk posed by environmental disturbances or change.

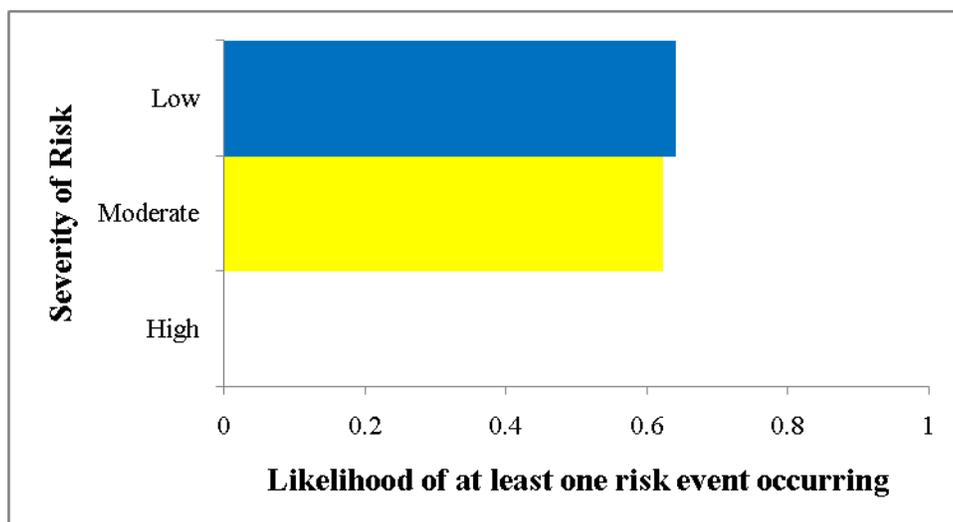
***Scientific.*** American Woodcock conservation has benefited greatly from an active, sophisticated group of biologists and scientists. The causes behind woodcock declines and limitations for recovery are well known, as are the short-term and long-term actions necessary to meet population targets. While the same is not true for Golden-winged Warbler and many other high-priority species that require early successional growth, we do have general indications about the causes behind population declines of those species. In the end, our success depends on the accuracy of our hypotheses about factors limiting populations of American Woodcock, Golden-winged Warblers, and other species. Current NFWF funding is helping to more thoroughly identify those limiting factors, and the first two years of this keystone initiative will include development of a rigorous conservation plan for that species. Identification of potential limiting factors that are not critical to our focal species (e.g., the importance of habitats during migration) will lead to misguided conservation actions that will not produce the intended changes. We will minimize the risk associated with incorrect identification of limiting factors (and actions required to address those factors) by placing all actions in the context of adaptive management. This strategy not only uses research and monitoring to assess current hypotheses, but also to make adjustments to those hypotheses and actions in light of new scientific information. In certain situations, the correct limiting factor may have been identified along with management actions that can abate those limitations, but for social or other reasons those actions cannot be implemented. In these instances, the adaptive management approach will still allow for identification and testing of alternative actions that can reduce the stress on the population.

***Social.*** Public and landowner perception about active forest management and creation of early successional habitat is central to the success of this initiative. Existing attitudes about management is what is believed to have caused much of the steep decline in young forested habitat during the past 40 years. If that attitude is maintained, despite the best efforts of this habitat biologists employed through this initiative, then the risk is very great that our habitat and bird population targets will not be met. However, we believe there are good reasons to suspect that those attitudes will change to a more moderated view of forest management. First, the massive declines of early successional species has caught the attention of numerous nongovernmental conservation groups and government agencies. Hence, there is rational biological justification for pursuing these types of management actions. And second, the growing demands for wood and biomass makes it economically attractive to use forests to generate income. Thus, though some social risk does exist, we believe it to be fairly contained.

***Economic.*** The increasing economic value of wood and timber products offers encouragement that human demand for those commodities will provide a long-lasting incentive for creation of early

successional habitat. Regions where those markets may not exist could face numerous challenges in meeting habitat goals established in this business plan.

**Institutional.** Federal and state wildlife agencies, and non-governmental groups have shown keen interest in American Woodcock, Golden-winged Warbler, and other early successional specialists and have devoted significant resources towards recovery of those species. We do not anticipate that those efforts will diminish.



**Figure 4.** *The likelihood that at least one negative event of low (20% or less of goal affected), moderate ( 21-40% of goal affected) ,or high (41-100% of goal affected) magnitude will occur during this initiative. Probabilities for each magnitude were derived by estimating the probability (to nearest 10%) and impact (using five categories, but reduced to three in this graphic) of different risk events (with at least a 10% chance of occurring), then calculating the probability that at least one event of each different severity would occur.*

## FUNDING NEEDS

The population changes that we have estimated to occur through implementation of the described actions are dependent, in large part, on the level of financial investment. This business plan is built upon the assumption that adequate funds can be raised on an annual basis to affect a 19% increase in American Woodcock and a 20% increase in Golden-winged Warblers over a 10-year period. We have presented several strategies for affecting population change in those target species. ***We recommend that Tier 1 and Tier 2 strategies be used as the foundation for implementation of this business plan.*** The total investment, \$2.4 million per year, is broken down into the budget categories identified in Table 3, along with the anticipated population benefit each strategy contributes.

Fully one-third (\$800,000) of the \$2.4 million of annual funding necessary to realize our population outcomes needs to be raised by NFWF. Federal appropriations directed towards this initiative are expected to be approximately \$600,000/year (these are high priority species for the USFWS). The remaining \$200,000/year needs to be realized through other existing or new funding sources. Existing NFWF Charter programs, including Chesapeake Bay Small Watershed Grants, Southern Company Power of Flight and Longleaf Legacy programs, Wal-Mart’s Acres for America, and the Upper

Mississippi Watershed Fund are potential sources for the early successional habitat initiative. NFWF's Impact-Directed Environmental Account (IDEA) Program, which manages funds that originate from court orders, settlement of legal cases, regulatory permits, and mitigation plans, also could serve as a funding source for habitat projects, including the Gulf of Maine Fund.

**Table 3. Annual budget estimates for three tiers of strategies that address species reliant upon early successional habitat. Figures represent first 10-years of the initiative. Also indicated is the percent contribution of each activity to the overall 10-year population goal for both American Woodcock and Golden-winged Warbler.**

<b>TIER 1</b>	<b>Activity</b>	<b>Bird Conservation Regions</b>	<b>Total Annual Cost</b>	<b>NFWF Portion (33%)</b>	<b>Percent Contribution to American Woodcock Goal</b>	<b>Percent Contribution to Warbler Goal</b>
	Habitat Restoration (N America)	12, 14, 28,30	780,000	260,000	56%	40%
		13, 23	320,000	106,000	23%	15%
	Warbler Assessment		200,000 (yr 1 only)	67,000		
		<b>Sub-Total</b>	<b>1,100,000 (1,300,000)</b>	<b>366,000 ( 433,000)</b>	<b>79%</b>	<b>55%</b>
<b>TIER 2</b>	Restoration (N America)	22, 24, 25, 26, 27, 29	900,000	300,000	11%	5%
	Latin American Conservation		400,000	134,000		40%
		<b>Sub-Total</b>	<b>1,300,000</b>	<b>434,000</b>	<b>11%</b>	<b>45%</b>
<b>TIER 3</b>	Woodcock migration habitat		900,000	300,000	10%	0%
		<b>Sub-Total</b>	<b>900,000</b>	<b>300,000</b>	<b>10%</b>	<b>0%</b>
		<b>TOTAL</b>	<b>3,300,000</b>	<b>1,100,000</b>	<b>100%</b>	<b>100%</b>

## EVALUATION

Timely success of this initiative requires dedication to an evaluation process that focuses on individual projects, each of the five strategies, and the collective outcomes across all projects. At each level, we will determine whether the planned actions are achieving the desired results.

Individual projects funded by NFWF will be evaluated based upon the anticipated outcomes identified in the full proposal. Typically, individual grantees will provide a summary of results and outcomes directly to NFWF as part of each grant agreement. However, periodically, individual projects will be evaluated by NFWF or independent 3<sup>rd</sup> party evaluators. Achieving the stated outcomes is obviously the desired result of these projects but, in those cases where outcomes were not realized, it is equally important to identify the reasons behind the discrepancy between expected and observed outcomes.

Because of the numerous extraneous factors operating on biological populations and the time lags between conservation actions and actual changes in population size, the contribution of an individual project to the desired outcome of a larger American Woodcock or Golden-winged Warbler population can often not be directly measured (but, see below). Rather, in most situations, *indicators associated with potential population change* will be used to evaluate the level of success of a project (Table 4).

Most significantly, the most important indirect indicator -- habitat change -- can be reliably measured through the U.S. Forest Service Forest Inventory and Analysis (FIA) program. The FIA program annually provides the information needed to assess the status, trends, and sustainability of America's forests. The FIA collects, analyzes, and reports information on the status and trends of America's forests: how much forest exists, where it exists, who owns it, and how it is changing, as well as how the trees and other forest vegetation are growing, how much has died or been removed, and how the harvested trees are used in recent years. This information can be used in many ways, such as in evaluating wildlife habitat conditions, assessing sustainability of current ecosystem management practices, monitoring forest health, supporting planning and decision making activities undertaken by public and private enterprises, and predicting the effects of global climate change.

Other indirect indicators of success include tallying the number of landowners participating in the program and the number of acres protected or enhanced through the program.

Direct indicators of changes in the demographics (population changes, or changes in fecundity or mortality) can be readily measured via existing national and regional surveys. Woodcock are surveyed through a Singing Ground Survey (SGS) coordinated by the U.S. Fish & Wildlife Service. A random network of secondary roads in northern states with breeding woodcock was selected in 1968 as the sampling universe for the SGS. Observers drive the SGS route in early spring and count displaying males on 10 survey points. The resulting SGS metric is the number of singing males per route. SGS data have been collected annually in an area bounded on the south by northern Virginia, on the west by Minnesota, on the east by the Atlantic Ocean, and on the north by Quebec, Ontario, and New Brunswick. Datasets have been analyzed using cutting-edge assessment models and are highly reliable reflection of woodcock numbers on the breeding grounds, or within any state or BCR within that range. The SGS will allow for an annual assessment of the progress of this keystone initiative.

For Golden-winged Warbler and other early successional bird species, the North American Breeding Bird Survey (BBS) is conducted every year and is capable of detecting both short-term and long-term population changes at the state, BCR, or continental level. Because of habitat loss and a shrinking population, the Golden-winged Warbler has become patchily distributed and no longer occurs in

sufficient abundance to be tracked accurately by the BBS on a large scale. As part of the Golden-winged Warbler Conservation Initiative, a partner in this keystone initiative, new protocols have been developed to monitor the warblers' distribution and abundance. Data collected through the Golden-winged Warbler Atlas Survey will be compared with data collected between 2000-2002 to allow for further evaluation of progress from the initiative.

Because genetic introgression with Blue-winged Warbler is a major threat to the Golden-winged Warbler, populations targeted for management under the early successional habitat keystone initiative will be monitored to assess genetic integrity and to prevent management that may favor introgression by Blue-winged Warbler. Genetic markers are being developed to assess population integrity, and a genetic atlas of both species is being completed to accompany the monitoring surveys. Changes in rates of genetic introgression (lower) will be a good indicator of success of the initiative.

### **LONG-TERM NFWF SUPPORT**

This business plan lays out a strategy to achieve clear outcomes that benefit American Woodcock, Golden-winged Warbler and other species that rely upon early successional habitats over a 10-year period. At that time, it is expected that the conservation actions taken under this initiative will have brought about new institutional and societal standards (e.g., change in perception and attitudes about forest management) and environmental changes (e.g., more habitat) that will have set the population in a positive direction such that maintaining those successes will be possible without further (or greatly reduced) NFWF funding. To help ensure that the population and other gains made in 10 years won't be lost after the exit of NFWF funding, the partnership must seek development of solutions that are long-lasting, cost-effective, and can be maintained at lower levels of funding in the future. Therefore, part of the evaluations of this initiative will address that staying power and the likelihood that successful strategies will remain successful at lower management intensity and financial investment.

The adaptive nature of this initiative will also allow NFWF and partners to regularly evaluate the strategies behind our objectives, make necessary course corrections or addition within the 10 year frame of this business plan. In some cases these corrections and additions may warrant increased investment by NFWF and other partners. However, it is also possible that NFWF would reduce or eliminate support for this initiative if periodic evaluation indicates that further investments are unlikely to be productive in the context of the intended outcomes.

**Table 4. Indicators used to measure the results of individual projects associated with the two recommended Tiers of projects for the early successional habitat initiative. Indirect indicators are those measures that do not directly reflect demographic properties of AMWO/GWWA populations. Direct indicators are those metrics that more closely reflect changes in AMWO/GWWA demographics.**

STRATEGY	INDIRECT INDICATORS	DIRECT INDICATORS
<p><b>Tier 1</b></p> <p><b>Reverse population declines through habitat restoration</b></p>	<p>Acres of small-diameter forestland as measured by the USFS Forest Inventory and Analysis</p> <p>Number of landowner contacts and management assistance</p>	<p>Number of singing male American Woodcock as measured by the USFWS Singing Ground Survey</p> <p>Change in American Woodcock or Golden-winged Warbler populations on demonstration areas</p> <p>Number of breeding Golden-winged Warblers as measured by Breeding Bird Survey or other specific assessment protocol</p> <p>Increase in Golden-winged Warbler reproduction on demonstration sites</p>
<p><b>Tier 2</b></p> <p><b>Reverse population declines through habitat restoration</b></p> <p><b>Address threats to Golden-winged Warblers in Latin America</b></p>	<p>Acres of small-diameter forestland as measured by the USFS Forest Inventory and Analysis</p> <p>Number of landowner contacts and management assistance</p> <p>Number of acres protected or enhanced</p> <p>Number of active partners</p>	<p>Number of singing male American Woodcock as measured by the USFWS Singing Ground Survey</p> <p>Change in American Woodcock or Golden-winged Warbler populations on demonstration areas</p> <p>Number of breeding Golden-winged Warblers as measured by Breeding Bird Survey or other specific assessment protocol</p> <p>Increase in density of Golden-winged warblers on demonstration areas</p> <p>Changes in rates of genetic introgression between Blue-winged Warblers and Golden-winged Warblers</p> <p>Number and distribution of warblers in target Latin American countries.</p>

*Appendix 1. Ancillary species to benefit from actions directed at restoring early successional habitats in eastern North America and wintering ground conservation in Latin America. Only bird species that are of high conservation priority are listed, despite the fact that more than 80 other wildlife species are likely to benefit.*

Species	Overall Benefits	Early Successional Habitat Restoration	Wintering Ground Conservation in Latin America
Blue-winged Warbler	High	✓	✓
Canada Warbler	Low	✓	✓
Kentucky Warbler	Mod	✓	✓
Chestnut-sided Warbler	Mod	✓	✓
Prairie Warbler	Mod	✓	✓
Willow Flycatcher	Mod	✓	✓
Painted Bunting	Low	✓	

## ***Appendix 2: About this Document***

The Business Plan for the Early Successional Habitat Keystone Initiative was facilitated by earlier and ongoing investments of the National Fish and Wildlife Foundation in supporting the development of the American Woodcock Conservation Plan and the Golden-winged Warbler conservation assessment. By having those plans completed, or in development, allowed us to rapidly assemble this business plan. This business plan combines the technical expertise and land management experience of the American Woodcock Task Force, the technical assessment capability of the Golden Winged Warbler Working Group, and the conservation vision of the NFWF. Detailed within the plan is an ambitious strategy to restore populations of American Woodcock, Golden-winged Warbler, and some two dozen other bird species by increasing the quality and quantity of the early successional habitats that these species require.

### **About the American Woodcock Task Force**

The Woodcock Task Force was created in March of 2000 as a working group under the Migratory Shore and Upland Game Bird Committee of the Association of Fish and Wildlife Agencies. Membership includes state, provincial, federal, non-governmental and private representatives. The charge assigned to the Task Force was to 1) develop and plan to coordinate AMWO habitat needs with federal, state, provincial, NGO, and private land managers in the U.S. and Canada and 2) coordinate AMWO management needs with those groups who are working on waterfowl, shorebird, waterbird, Partners in Flight, NABCI, or other bird management plans/joint ventures/initiatives. With funding from the NFWF, the task force authored the AMWO Management Plan to establish population and habitat goals for AMWO in the U.S. and Canada. Following completion of the plan, the task force shifted its focus to effective implementation of the plan through collaborative AMWO habitat initiatives. To date, three initiatives have been developed within the woodcock breeding range.

### **About the Golden Winged Warbler Working Group**

The Golden-winged Warbler Working Group has brought together biologists and committed conservationists to pursue the goal of reversing population declines of this high-priority Neotropical migrant species. The Working Group includes members of state wildlife agencies, biologists from U.S. Fish and Wildlife Service (USFWS), U. S. Forest Service (USFS), U. S. Geological Survey (USGS), multiple universities, forest industry, power utility industry, as well as members of non-governmental conservation organizations including the American Bird Conservancy, the Ruffed Grouse Society, the Audubon Society, and partners in Central and South America, such as ProAves Colombia. This group has worked with NFWF for the past 2 years on development of the Golden-winged Warbler Rangeland Conservation Strategy. Completion of experimental management, research, and monitoring activities in 2009 are critical to pave the way for implementation activities that will benefit GWWA and other early successional species.

### **About the National Fish and Wildlife Foundation**

The National Fish and Wildlife Foundation is a 501(c)(3) organization dedicated to funding sustainable conservation initiatives. Chartered by the United States Congress in 1984, NFWF leverages federal grants and private support to achieve maximum conservation impact. Recently, the NFWF – through its Keystone Initiatives -- strategically repositioned itself to more effectively capture conservation gains by directing a substantial portion of its investments towards programs that had the greatest chance of successfully securing the long-term future of imperiled species. By leveraging innovative program design from scientific experts NFWF is able to structure smart conservation programs that consistently achieve measurable and meaningful outcomes. [[www.nfwf.org](http://www.nfwf.org)]