Summary of Significant Changes from 2005 Maryland Wildlife Diversity Conservation Plan

General Approach
The 2015 revision of the Maryland State Wildlife Action Plan (SWAP) presents updates and improvements to the 2005 Wildlife Diversity Conservation Plan for each of the eight elements required by the U.S. Fish and Wildlife Service. A guiding focus for the revision was to create a statewide plan that would be more easily implemented by the Maryland Department of Natural Resources (MD DNR) and its conservation partners, and that would be supported by Maryland's diverse citizens. The revision also includes an increased emphasis on standardization and coordination with states in the Northeast region as well as other regional partnerships. Due to the importance of working at different scales for effective conservation, MD DNR, along with the other states in the Northeast region, agreed to use a consistent regional conservation planning framework in revising their SWAPs.

This included a lexicon of terminology that each state followed, especially for those terms related to the required elements of the SWAP. This Northeast regional conservation planning framework has enabled the systematic development of common habitat and threat classifications, an integrated monitoring framework for species and their habitats, and regional assessments of species and habitat condition in relation to climate change and other threats. In addition, Maryland followed the Association of Fish and Wildlife Agencies (AFWA) best practices guidance document developed nationally for states to use in their SWAP revisions (AFWA 2012). Case studies and examples have been added throughout the SWAP to highlight ongoing and completed conservation actions from the 2005 Plan. Text hyperlinks have been added to provide access to material used in the revised SWAP and a Glossary of Terms is also provided. The sections below describe more specific major differences between the 2005 Wildlife Diversity Conservation Plan and the 2015 State Wildlife Action Plan.

Organization of Information
Maryland's revised general approach resulted in a different organization and presentation of information for the 2015 SWAP. In the 2005 Plan, threats, conservation actions, and inventory, monitoring, and research needs were listed under key wildlife habitat descriptions along with the species that rely on those habitats. New to the 2015 revision, key wildlife habitats are described in their own chapter, and two separate chapters detail information on each of 15 standard threat categories (from the International Union for Conservation of Nature, Appendix 5a), with a separate Chapter detailing impacts of climate change at regional, state, and local scales (Chapters 5 and 6). Conservation actions are discussed in a separate chapter as well (Chapter 7).

In that chapter, conservation actions are arranged by specific, standardized threat categories and are organized by general habitat categories, individual key wildlife habitats, groups of species, and Species of Greatest Conservation Need (SGCN). Overarching conservation actions are likewise presented in association with identified threat categories. Inventory, monitoring, and research needs are addressed as conservation actions in Chapter 7 to reflect their role as part of larger strategies to address threats. This new organization of information benefits conservation partners in that they will be able to strategically address specific threats by directing actions to them as outlined in the SWAP, both for species and habitats. Use of a common, transparent

threats lexicon, applied to habitat categories that are consistent across the Northeast region, will also support coordination of conservation actions to address threats across the region.

Species of Greatest Conservation Need (SGCN)

Similar to the 2005 process, MD DNR's Wildlife and Heritage Service (WHS) led the effort to collect the best available information and research from the many existing conservation plans, programs, and priorities, including regional SGCN, to reevaluate Maryland's 2005 SGCN list (Chapter 3). For the revision, project results from studies conducted through 10 years of State Wildlife Grant funding (Chapter 10) were also used to inform SGCN selection, including odonate surveys, moth and butterfly conservation status assessments, the 2nd Maryland Breeding Bird Atlas, ongoing aquatic monitoring, and the Maryland Reptile and Amphibian Atlas. WHS then coordinated with local, state, and federal agencies; non-governmental organization (NGO) conservation partners; and academic and local experts for input and collaboration to refine and finalize the updated SGCN list. This process resulted in there being a net 108 more species on the 2015 SGCN list compared to the 2005 list, due to the addition of 202 additional species and removal of 94 species from the 2005 SGCN list. The final 2015 list of Maryland's SGCN includes 610 species, with 260 vertebrates and 350 invertebrates. In particular, 153 of the new SGCN species are invertebrates, the majority of which are insects (127 species). The overall increase in the number of SGCN reflects knowledge gained over the last 10 years, especially for invertebrates; consideration of additional marine species; and evaluation of species impacted by new threats (Chapter 5), including diseases (white-nose syndrome) and invasive species (emerald ash borer). Information on SGCN is expanded, including updated threats and conservation actions for particular taxa groups.

Although SGCN were not prioritized for conservation actions during the 2015 revision process, they were placed into conservation status groups according to combinations of existing state and global conservation ranks or known data deficiencies to assist partners in the process of prioritizing conservation actions (Chapter 3).

New for the revision is the inclusion of 751 rare and uncommon plants and their associated key wildlife habitats (Appendix 3j). Plant species also are incorporated in Chapter 4 and throughout the SWAP to characterize key wildlife habitats.

Key Wildlife Habitats

Key wildlife habitats are listed and described using a new classification system that follows regional guidelines for terrestrial habitats (Northeast Terrestrial Wildlife Habitat Classification System, Appendix 4e) and that is cross-referenced to a regional aquatic classification system (Northeast Aquatic Habitat Classification System, Appendix 4f). In the 2015 SWAP, 59 key wildlife habitats are identified, described, and mapped using new mapping resources and information gained from decades of work on Maryland's natural communities. Although some of these habitats are the same as or similar to the 35 key wildlife habitats described in the 2005 Plan, the 2015 revision incorporates new information and uses a standardized classification system that Northeast states have agreed to use. Additions to key wildlife habitat descriptions include county distributions, along with examples of public lands to visit, state rare natural communities, and signature state rare plants, which are native plants in Maryland that help to determine and define key wildlife habitat types.

In the 2015 revision, structural modifiers developed for terrestrial habitats are used to distinguish different seral stages, such as early successional forest and old growth forest, rather than distinguishing these as separate key wildlife habitats as had been done in 2005. New information is presented on the number of acres of old growth forest on state lands under appropriate forest key wildlife habitats. In addition, human-made and managed key wildlife habitats from the 2005 Plan have been re-organized and expanded to recognize their role as surrogates or substitutes for limited or non-existent native habitats.

Bay and ocean key wildlife habitats have been revised, with the assistance of partners, from three habitats based on salinity levels plus open ocean to Shellfish Bed, Hard Bottom (living and non-living), Submerged Aquatic Vegetation, Macroalgae, and Pelagic-Open Water. These revised key wildlife habitats better reflect the resources that support different SGCN in these types of aquatic habitats.

Analysis of Threats

As mentioned previously, a standardized system has been used to classify threats to SGCN and their habitats for the 2015 revision. Information on each threat type is organized into two new chapters, with one summarizing a variety of threats ranging from land conversion to data needs (Chapter 5), and the other summarizing climate change information (Chapter 6). A regional perspective on threats is included from a regional synthesis contracted by the Northeast states.

A description of current knowledge on climate change impacts at regional, sub-regional, and state scales is presented in much more detail and with examples in the 2015 SWAP revision. Information from a 2015 synthesis of climate change impacts in the Northeast and Midwest, provided by the Northeast Climate Science Center, and from a 2008 Maryland Climate Change Assessment was incorporated into Chapter 6, along with the results of other regional assessment tools. Climate change vulnerability scores for 265 Maryland SGCN (Appendix 6a) and 47 globally rare Maryland plants (Appendix 6b) and habitat assessments for coastal, select terrestrial, and coldwater riverine habitats in Maryland are presented, as well as the results of regional adaptability ranking for tree species, predicted habitat shifts for birds in the Northeast, and sources of documentation for select invasive species' responses. These materials reflect the great increase in knowledge about climate change impacts since 2005 and provide important background information to determine conservation actions for habitats and species affected by climate change and other threats.

Determining and Prioritizing Conservation Actions

Chapter 7 of the 2015 revision presents new and updated information on conservation actions to address standardized threat categories, including a regional perspective. The general categories of actions described in the 2015 SWAP are land and water acquisition and protection; law and policy; direct management of natural resources; planning and administration; data collection and analysis (inventory, monitoring, and research); education, outreach, and technical assistance; and climate change adaptation. These categories include two conservation target mapping efforts completed since 2005: BioNet (Biodiversity Conservation Network) for terrestrial systems and Stronghold Watersheds for freshwater aquatic systems. Other examples of new conservation actions described in the 2015 revision include climate change adaptation strategies for regional and state scales, including for forest and terrestrial ecosystems and Chesapeake Bay and aquatic

ecosystems, and development of a Maryland Natural Areas program to address education and outreach needs. Overarching conservation actions have been revised from the 2005 plan based on current information, partner input, and the need to address broad-scale threats identified for 2015 SGCN and their habitats.

For the 2015 revision, conservation actions for SGCN and key wildlife habitats were first updated from the 2005 Plan and assigned to the standardized threats categories that they address. These lists of actions and threats were reviewed by species experts during a series of facilitated workshops, a process new to the revision. The workshops were organized by major species taxa groups: mammals, birds, reptiles and amphibians, insects, freshwater mussels, and fish. The three main objectives of the partnership workshops were to 1) identify threats to SGCN and key wildlife habitats, 2) determine potential conservation actions to address those threats, and 3) prioritize the potential conservation actions. Over 165 partners, representing over 50 organizations, were invited to these workshops. Threats and conservation actions identified for key wildlife habitats were reviewed and revised as needed during a follow-up workshop in May 2015 with WHS and MD DNR Resource Assessment Service staff.

Conservation actions were prioritized using more specific criteria than in 2005, similar to those used by other Northeast states (urgency, cost, benefit, collateral benefit, feasibility, chance of success, and public support). These criteria were selected to assist in identifying priorities for implementation during the partner workshops. Prioritized conservation actions are presented by threat categories for key wildlife habitat groups (e.g., forests, tidal wetlands, rivers and streams) and species groups, the latter indicating affected SGCN where appropriate (Chapter 7). Establishing links between threats and actions provides the connections needed to develop improved effective strategies with measurable outcomes. An example of how these tables of conservation actions and threats have been used to identify specific projects, potential partners and their roles, target dates, and funding sources by a partner organization is included in Chapter 9.

Improved Monitoring

The revised SWAP takes advantage of recent developments in monitoring that view this action not as a stand-alone activity, but as tightly integrated into a conservation or management strategy (Chapter 8). A more detailed description of monitoring and adaptive management is included, as well as regional monitoring coordination (including for climate change) and data management. An extensive update of existing monitoring programs for SGCN and habitats was undertaken for the 2015 SWAP in order to identify partners and new or continuing monitoring gaps based on priority conservation actions.

The use of results chains and conceptual models to link actions to impacts on conservation targets and threats is described with examples in the 2015 SWAP. This process can be used to identify research and monitoring needs, as well as to develop measures of success at both intermediate and end points and goals that are impact-oriented, measurable, time-limited, and specific. Regional performance monitoring measures developed since 2005 are reviewed in Chapter 8, including targets and indicators for the Northeast and for State Wildlife Grant-funded activities.

Increased Outreach

With a focus on developing the 2015 SWAP for implementation, involvement of government agencies, NGOs, other stakeholders, and the public was key for the revision process. Use of social media, presentations, online posting, a dedicated email address, coordination with communications specialists, and personal outreach to internal and external stakeholders, including the taxa-specific workshops described above, was expanded during the 2015 SWAP revision process to reach a wider audience. In addition, targeted efforts were made to involve Native American tribes, two of which have been recognized by the state since 2005. As this is the first revision to the SWAP, it allows the opportunity to not only assess SGCN and habitats, but to communicate the effectiveness and success of past conservation actions and strategies. Chapter 10 describes outcomes and results from SWG-funded projects concerning species and habitats from the past decade, and completed projects are included as case studies throughout the document.

Citations and Sources

AFWA. 2012. Best practices for State Wildlife Action Plans: Voluntary guidance to States for revision and implementation. Teaming With Wildlife Committee's State Wildlife Action Plan (SWAP) Best Practices Working Group. Available online from http://www.fishwildlife.org/files/SWAPBestPractices.pdf (accessed October 2015).