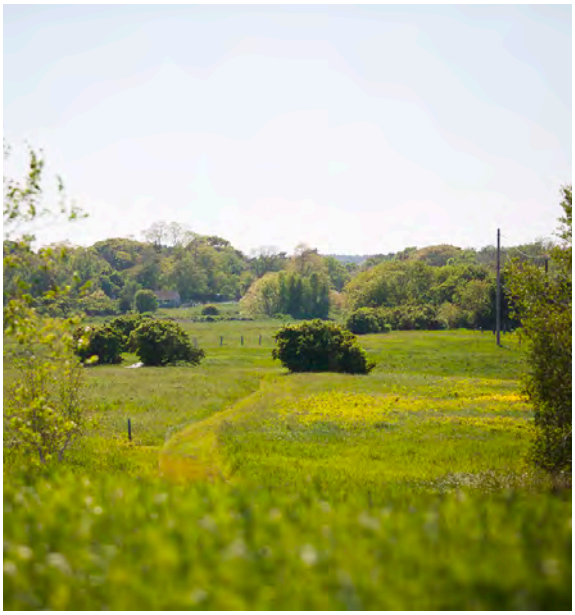
Master Plan *for* Conservation Science

A Five-Year Vision

Mass Audubon

Protecting the Nature of Massachusetts

Meadowlark Conservation © Rosemary Mosco



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"Conservation science underlies nearly every aspect of Mass Audubon's work. Throughout our entire 120-year history, staff have applied scientific research and knowledge to the protection of plants, wildlife, and their habitats. The priorities identified in this plan ensure that our scientific programs will remain vibrant, effective, and focused on solutions to the myriad environmental challenges facing the nature of Massachusetts."

Gary Clayton, President

FRONT COVER PHOTOS: Arcadia Wildlife Sanctuary © Phyl Doyle, Red Efts © Roberta Dell Anno, Piping Plover with Chicks © Larry Warfield, Osprey Banding © Barbara Van Dingstee. BACK COVER PHOTOS: Chestnut-sided Warbler © Dorrie Holmes, Tree canopy © Elizabeth Ninemire, Barred Owl © Andrea Bean. All photos © unless otherwise noted.

MASTER PLAN *for* Conservation Science

PURPOSE

This Master Plan for Conservation Science will integrate science activities across Mass Audubon to ensure that the organization is optimally positioned, structured and funded to implement the goals and objectives of Mass Audubon's Strategic Plan 2020. Through further integration and strategic focus of our resources, we will have greater conservation impact, generate greater visibility for the organization, and attract greater support for our work, ultimately resulting in an increased ability to deliver on our mission.

This plan includes the following sections:

- Historical context on the role of conservation science at Mass Audubon.
- A vision for the future role of conservation science at Mass Audubon.
- Our major conservation science goals and specific objectives and activities across Mass Audubon through 2020.
- Processes and support necessary to meet our stated objectives.

A staff working group from across the organization developed the initial plan framework and priorities, with input from sanctuary directors, department heads, senior staff, the Board Science Committee and the full Board of Directors. Other staff including educators, Communications & Marketing, Philanthropy, and administrative staff reviewed draft materials and feedback has been incorporated. Ecological Management and Bird Conservation staff were closely involved throughout.

The plan will position Mass Audubon to capitalize on our unique strengths:

- The leading voice for bird conservation in Massachusetts, widely respected beyond our borders.
- Trusted managers of 30,000 acres of permanently protected land spanning all major ecosystems in the state.
- A heritage of conservation leadership based on applied research.
- Dedication to continued conservation of highest priority lands across the state.
- The ability to communicate our work to members, partners, and the general public.

These strengths prepare us to take on the thorniest challenges including managing land in perpetuity, protecting declining birds and other imperiled species, and sustaining wildlife habitat in the face of climate change.

The depth and breadth of conservation science expertise across our staff is one of Mass Audubon's key strengths. By better coordinating and directing our work through the priorities of this plan and making strategic investments in capacity, we will leverage that strength to achieve greater impact. In a virtuous cycle, greater impact will lead to greater awareness of our work; greater awareness will result in greater support for our work; greater support will sustain increased conservation science capacity to protect the nature of Massachusetts. Accordingly, this plan addresses not only the leadership role of the Conservation Science Department in developing, guiding, and implementing our conservation science priorities, but also the supporting work across the organization including that of wildlife sanctuary staff, volunteers, and external researchers.

> *Scientific credibility is key to the long-term achievement of Mass Audubon's mission. The Society is committed to basing its conservation activities on the best available scientific understanding, research results, and methodologies.*
>
> Policy on the Role of Science at Mass Audubon, 1996

MISSION

To protect the nature of Massachusetts for People and Wildlife

VISION

Mass Audubon embraces a vision of our state in which nature—whether found in a city park or deep inside the forests of western Massachusetts or within an urban greenway or along the 1,500 miles of Massachusetts coastline—is valued as essential to quality of life, and where people live with appreciation and respect for the complex ecological systems that sustain life on earth, working together to ensure that they are protected.

A VISION *for* CONSERVATION SCIENCE *at* MASS AUDUBON

By integrating expertise from across the organization, Mass Audubon's Conservation Science Department will significantly increase our ability to protect the nature of Massachusetts. We will utilize our own wildlife sanctuaries to promote cutting-edge ecological research, to understand and adapt to the impacts of climate change, and to demonstrate habitat management and restoration for the benefit of our most imperiled species.

We will seize our heritage as the leading voice for bird conservation in Massachusetts and halt the decline of priority species. We will collaborate with academic, agency, and public partners to extend our impact throughout the Commonwealth and the region. We will disseminate information and decision-support tools derived from our research, management actions and natural history observations to scientists, conservation organizations, natural resource managers and the general public.

A cohesive conservation science program, unified around common goals, will serve as the foundation of the organization and contribute to maximizing the impact of our conservation, education, and advocacy programs.

VALUES

Love of Nature

We value the diversity and resilience of nature and treasure its beauty. Nature sustains and renews us, provides unexpected moments of joy, and inspires our daily work.

Passion and Commitment

We are committed to nature and to people. We share our passion with others to connect people with nature and to inspire everyone to be stewards of the environment.

People and Community

We care deeply about our colleagues, our partners, our members, and the communities with whom we work. We learn from their experience, expertise, and beliefs, and together we build conservation communities that welcome and respect all people.

Inspiring Action

We believe that every person can make a positive difference. Through education, personal discovery, and transformational experiences, we foster a conservation ethic in current and future generations.

Credibility

We bring expertise, sound science, long-term thinking, and community knowledge to solve pressing and important environmental challenges. Our personal and organizational integrity serves as a foundation for our work.

Teamwork

We work together to embrace opportunities and challenges in an ever-changing world. We encourage creativity, innovation, and action, while respecting individual points of view.

A Brief History of Conservation Science at Mass Audubon

Mass Audubon has a long history of science being central to fulfilling the organization's mission. Our earliest roots, in the late 1800's and early 1900's, revolved around protection of birds, and the organization quickly assumed regional and global influence as a science-based voice for conservation. During a major reorganization in the 1950s, Mass Audubon's mission was articulated as Conservation supported by Research and Education. Since that time, for multiple decades, our in-house research has often been directed at specific conservation issues, challenges and aspirations (e.g., the effect of pesticides on bird populations, or identifying and managing rare species and natural communities on our wildlife sanctuaries). However, science has also been understood to provide a foundation for all of the organization's conservation efforts, lending credibility to a wide range of initiatives and projects (e.g., biological atlas projects, ecological management of the sanctuary system, publications, and in carefully selected cases, advocacy positions.).

Because Mass Audubon has utilized a variety of strategies to fulfill its mission, there has always been a lively internal debate about the degree to which any of these areas should be pursued as independent initiatives as opposed to integrating their efforts with other programmatic functions of Mass Audubon. Science has been no exception. The various structures of the organization's science programs have often been aimed at striking the proper balance between attention to statewide and regional conservation priorities and attention to the needs of the individual wildlife sanctuaries.

When Mass Audubon's headquarters was moved to Drumlin Farm in the late 1950s, the organization established the Hathaway Institute of Education and Research. In the 1960s, these functions were separated into Education and Environmental Science Departments. In 1988, the Environmental Science department was eliminated and the science staff was integrated into the Advocacy and Conservation Departments. In 1993, the Conservation Department was reconstituted as the Center for Biological Conservation to pursue research, sanctuary-based ecological inventories and management, and to promote bio-literacy through publications and other educational efforts. In 2000, a major reorganization ensued after an analysis by outside scientists. This resulted in the establishment of another largely centralized structure—a division of Conservation Science. It was hoped that this

structure would strengthen Mass Audubon's scientific efforts by providing statewide and external scientific focus, while also promoting integration of Mass Audubon's science activities across the state. To accomplish the latter, a regional structure was introduced where specific staff scientists were assigned to work with sanctuaries on their ecological management issues in each region.

In 2010, this organizational structure was changed again. The regional scientists were retained in a Department of Ecological Management, and a Chief Scientist was hired to lend expertise to statewide and external science issues, especially related to birds, but without significant management responsibilities. The Chief Scientist position was eliminated in 2014 for cost considerations. It had also been widely observed that the previous structure resulted in a bifurcated science program, with the Chief Scientist overseeing a small bird conservation unit, and the rest of Mass Audubon's science work being carried out by the regional and sanctuary-based scientists.

Since 2014, the Regional Scientists, Bird Conservation staff, Salt Marsh Science, and Ecological Extension Service have reported to the Director of Conservation Science (formerly Director of Ecological Management) and coordinated their work as a cohesive unit. Additional important science activities reside within Mass Audubon's other departments and wildlife sanctuaries in order to enhance programmatic and operational opportunities and efficiencies. The development and implementation of this Conservation Science Master Plan will guide and further integrate *all* Mass Audubon conservation science activities.

The Role of Conservation Science at Mass Audubon

What do we mean by 'conservation science'? Wilcox and Soulé, founders of conservation biology, defined it in 1980 as "the scientific study of nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions."[1] It is critical to note that Mass Audubon's scientific endeavors have that aim in mind, that we are not engaged in theoretical pursuits. Much like a physician applies scientific principles to maintaining the health of a patient, we utilize science in support of protecting the nature of Massachusetts. We have a proud heritage of applying scientific research to address over a century of environmental threats. Moving forward, we must retain and grow this capacity to best respond to ongoing challenges, including the evolving threat of climate change.

The question frequently arises, "Which Mass Audubon activities are accurately described as 'conservation science'?" And by corollary, what is not conservation science? The Scientific Method includes observation, formulating questions based on those observations, developing hypotheses and experiments to test the questions, collecting data, analyzing results, drawing conclusions, and disseminating findings. Projects which include each of these steps, especially a carefully designed experiment and rigorous analysis, are recognized as science projects. The Breeding Bird Atlases, Grassland Bird Program, Coastal Waterbirds Program, Nantucket Sound surveys, Losing Ground reports, and horseshoe crab research, among others, are recent examples of conservation science projects. Each of these has informed major conservation programs that effectively advance our overall mission.

While these projects demonstrate our research capacity, we do not launch a full study to answer every one of our land management, conservation, or advocacy challenges. We often rely on existing staff knowledge and review of scientific literature and other sources to inform our actions. For example, our Regional Scientists draw on their observational skills, training in ecological principles, scientific literature, and general knowledge to complete an Ecological Management Report[2] for each of our properties.

Thanks to the broad range of training and experience among our science staff, we are prepared to apply a science and natural history prism to support other departments across the organization. Ecological Management, Bird Conservation, and sanctuary-based scientists regularly contribute to policy comment letters and position statements, offer professional development for sanctuary staff, assess land conservation opportunities, write technical sections of grant applications and permit applications, provide geographic analyses and map graphics, respond to inquiries from media and the public, and provide support for statewide publications. It is critical that education or other training in natural history and biological sciences be valued in jobs throughout the organization, especially among our education staff, as so many of these activities take place outside the Conservation Science Department.

[1] *Wilcox, Bruce A.; Soulé, Michael E. (1980). Conservation biology: an evolutionary-ecological perspective. Sunderland, Mass: Sinauer Associates*
[2] *Ecological Management Reports (EMRs) identify natural resources, threats and habitat management priorities at each wildlife sanctuary.*

Various Mass Audubon staff members participate in parts of the scientific process—observation, hypothesis forming, data collection; but many fewer are tasked with or have time and training to carry out entire research projects from start to finish. We may at times engage in selected projects that do not include the full spectrum of the Scientific Method, for instance data collection that will contribute to a larger research project run by a university. And yet, it is absolutely critical that we guard against inappropriate investment of staff time in 'science projects' that will not lead to actionable conclusions or otherwise support our priorities. Data collection activities that are not incorporated into a fully developed research project can have an important role to play as Science Education programs. Additionally, our Natural History programs use observation of birds and other wildlife, plants, and natural phenomena to build environmental awareness and concern among the public. These programs often generate observations and questions that motivate specific research.

Finally, there are times when we invite members, program participants, and the broader public to participate in Citizen Science projects. These projects will be carefully designed to answer regionally relevant and pressing conservation questions. Approved projects will involve citizen scientists in rigorous data collection which we will analyze or which is submitted to a host organization for analysis and reporting. Citizen Science projects must include a commitment to communicating interim findings and final results to the participants.

ADDITIONAL RESOURCES REQUIRED

We do not currently have the financial or staff resources required to carry out this ambitious set of priority actions. Existing staff sustain our program by wearing many hats, working very efficiently, and maintaining focus on a limited set of key priorities while also allocating time to support colleagues across the organization. We miss opportunities to increase our impact when time for planning, research, training, and external collaboration is subsumed by more basic day-to-day tasks. Limited capacity also hampers our ability to launch new efforts; for example, strengthening our planning for climate change adaptation, or developing new Citizen Science projects. Specific elements requiring additional resources are indicated on pages 14–21.

Goals for Conservation Science 1

GOAL 1 *Promote Mass Audubon Wildlife Sanctuaries as Outdoor Laboratories*

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Our 30,000 acre wildlife sanctuary system is a unique asset and one that we can utilize to advance our knowledge and impact well beyond our own lands. We will focus and enhance our own inventory, monitoring, assessment, and management activities; develop and conduct research to assess management actions and to answer our own pressing questions; and invite external researchers to conduct research and educate future generations of ecologists on our lands.

Long-term Objective

Mass Audubon's wildlife sanctuary system functions and is recognized as an incubator of collaborative, long-term ecological research and showcase for innovative habitat management and restoration. Best practices for habitat management are developed on our land and disseminated to conservation partners.

1.1 Ecological Management of our Wildlife Sanctuaries

1.1.1. Continue to develop Ecological Management Reports (EMRs) as a model for land management planning in a changing climate, implement highest priority EMR recommendations, and update reports on a 5-year basis in preparation for Land Trust Accreditation renewal in 2020.

1.1.2. Refine consistent approach to identifying high priority EMR recommendations and develop a database for tracking progress on their completion, by May 2017.

1.1.3. Evaluate pilot White-tailed Deer Management Program at Moose Hill by March 2017, and consider expansion to at least three additional wildlife sanctuaries (Sesechacha, Ipswich River, Broadmoor), including robust monitoring protocols, by December 2018.

1.1.4. Become a recognized leader in developing, implementing, and demonstrating habitat management actions to enhance the capacity of natural systems to adapt to climate change and other ecological processes, by December 2019.

1.2 Harness Sanctuary-based Research Projects

1.2.1. Evaluate, refine, and relaunch the biological Inventory & Monitoring Project to inform adaptive land management actions and to build a world-class longitudinal dataset to track and monitor impacts of climate change, by March 2018.

1.2.2. Complete intensive initial forest inventory to support sale of carbon offsets on California Air Resources Board market by May 2017 and ongoing verification inventories by December 2020.

1.2.3. Catalogue and review ongoing sanctuary research, data collection, and citizen science efforts, with a mechanism for ongoing updates, by March 2017.

1.2.4. Develop a Citizen Science Program that coordinates statewide efforts to maximize impact and contribute directly to sanctuary research or long-term monitoring, by December 2017.

1.3 Promote External Researchers on our Wildlife Sanctuaries

1.3.1. Articulate our priority sanctuary research needs, based on EMR recommendations, and develop a plan for attracting external researchers to address these and other questions, by December 2018.

1.3.2. Add a page to our web site highlighting external research on Mass Audubon wildlife sanctuaries, by December 2017.

1.3.3. Develop plan for maximizing benefit of *Living Observatory*[3] collaboration at Tidmarsh by June 2018.

1.3.4. Continue to pilot the Wildlife Sanctuary Research Fellow program in 2017 and develop a proposal for funding a broader research fellow program to engage M.S. and Ph.D. students by December 2017.

[3] *An existing academic, agency, and NGO research collaborative hosted at Tidmarsh Farms.*

Goals for Conservation Science 2

GOAL 2 *Protect and Restore the Nature of Massachusetts*

Bobolink © Knut Hansen

Sesechacha heathland on Nantucket

Mass Audubon is the most recognized and respected voice for nature conservation in the state, and we have a unique standing as champions of bird conservation. As we have done with birds over the past several decades, we will review the species and natural communities that are most in need of our conservation attention in the age of climate change and develop programs to support their survival. We will extend our impact by working with partners in land trusts, towns, and agencies to implement best practices for habitat conservation.

Long-term Objective

Populations of the most imperiled bird species are stabilized or increasing, rare natural communities are managed to support adaption to climate change, and partner organizations implement best practices developed by Mass Audubon.

2.1 Halt the Decline of Priority Bird Species

2.1.1. Publish 2017 *State of the Birds* focusing on climate change impacts on birds by June 2017.

2.1.2. Continue to implement recommendations from current and future *State of the Birds* reports.

2.1.3. Evaluate role in assessing and monitoring impacts of offshore wind development on birds by June 2017.

2.1.4. Develop a specific plan for strengthening collaboration of Coastal Waterbird Program and Conservation Science Department by June 2017.

2.1.5. Develop multi-year work plan for Bertrand Chair of Ornithology & Natural History[4] by March 2017.

2.1.6. Promote integration of *State of the Birds* conclusions and recommendations and awareness of regional/national/global bird conservation priorities in Mass Audubon publications and programs, by December 2017.

2.2 Conserve Other Key Species and Natural Communities

2.2.1. Identify selected list of species and natural communities of responsibility, those in which we have a unique conservation role, and outline Mass Audubon's role by June 2018.

2.2.2. Implement a prescribed burn at Sesechacha Heathlands by June 2018.

2.2.3. Remove one dam from a Mass Audubon property by December 2020.

2.3 Leverage Partnerships to Extend our Reach

2.3.1. Distribute updated management recommendations for grassland habitat to owners and managers of conserved grasslands by March 2017.

2.3.2. Expand Foresters for the Birds program statewide, in collaboration with partners, by December 2017.

2.3.3. Remain active in relevant partnerships and advisory boards such as the Massachusetts Invasive Plant Advisory Group, Natural Heritage Advisory Board, Plum Island Estuary LTER, and Quabbin Watershed Advisory Committee.

2.3.4. Grow Ecological Extension Service[5] to 2 FTEs funded by external projects by December 2018.

[4] *Existing endowed position, created in honor of former Mass Audubon president, Gerry Bertrand.*
[5] *Existing fee-for-service technical assistance program.*

Goals for Conservation Science 3

GOAL 3 *Apply State-of-the-Art Conservation Science Methods across Mass Audubon*

Meadowlark Conservation © Rosemary Mosco

We have frequently been leaders in applying new methods to our work. Mass Audubon completed the first breeding bird atlas in North America; we pioneered reporting on land use change; and we have utilized satellite technology to track Long-tailed ducks and Snowy owls to the Arctic and back. It is critical that we harness scientific expertise across the organization and support staff in remaining on the cutting edge of ecological research.

Long-term Objective

Mass Audubon's conservation science program attracts, maintains, and builds staff expertise and partnerships to apply and demonstrate cutting-edge tools in field ecology so that our work is of the highest quality and broadest impact.

3.1 Enhance Support Structure for Science Programs[6]

3.1.1. Finalize Science Leadership Team[6] charter, convene cross-departmental staff team, and establish near-term goals by February 2017.

3.1.2. Increase engagement of Board Science Committee with science projects across the organization.hhh

3.2 Provide Training and Resources across the Organization

3.2.1. Ensure scientific staff remain current in their fields through frequent trainings, regular attendance at professional conferences, and access to scientific literature.

3.2.2. Partner with Education and Advocacy staff to ensure key staff are competent and confident in speaking about the basic science and projected impacts of climate change.

3.2.3. Enhance GIS[7] capacity and impact; provide regular training for all GIS users; develop method for ongoing analysis of member geographic distribution by December 2018; and provide technical analysis for next edition of Losing Ground by December 2019.

3.3 Adopt New Tools & Techniques

3.3.1. Test applications for the use of drones in our habitat management work by September 2017.

3.3.2. Integrate mobile apps in field data collection by December 2017.

3.3.3. Train staff in remote audio data loggers and other remote wildlife tracking techniques by December 2018.

3.4 Communicate our Science

3.4.1. Disseminate regular updates, findings and recommendations based on our work through a variety of platforms including regional and national conferences each year.

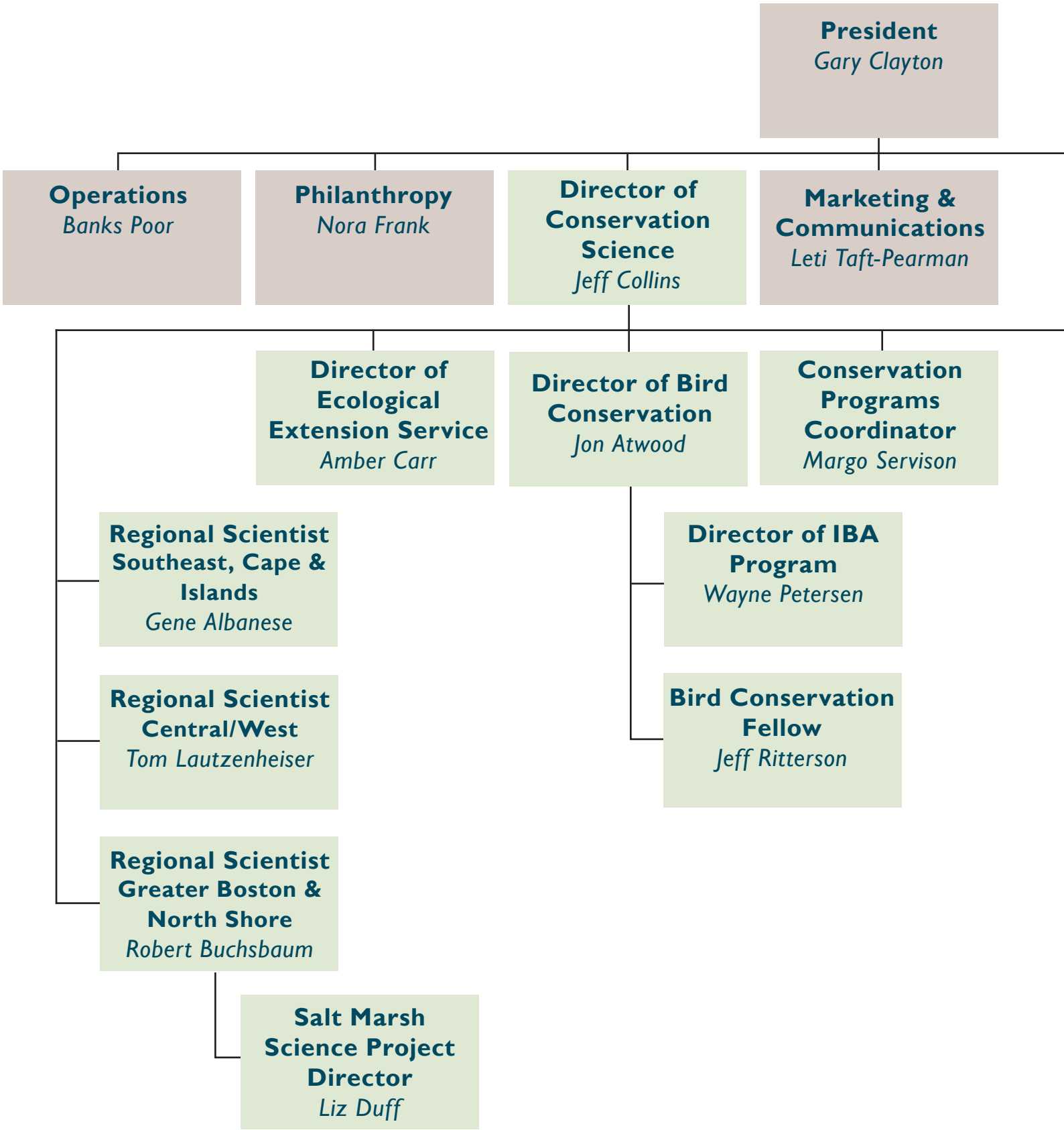
3.4.2. Partner with Marketing & Communications staff to develop and implement Conservation Science Communication Plan by December 2017.

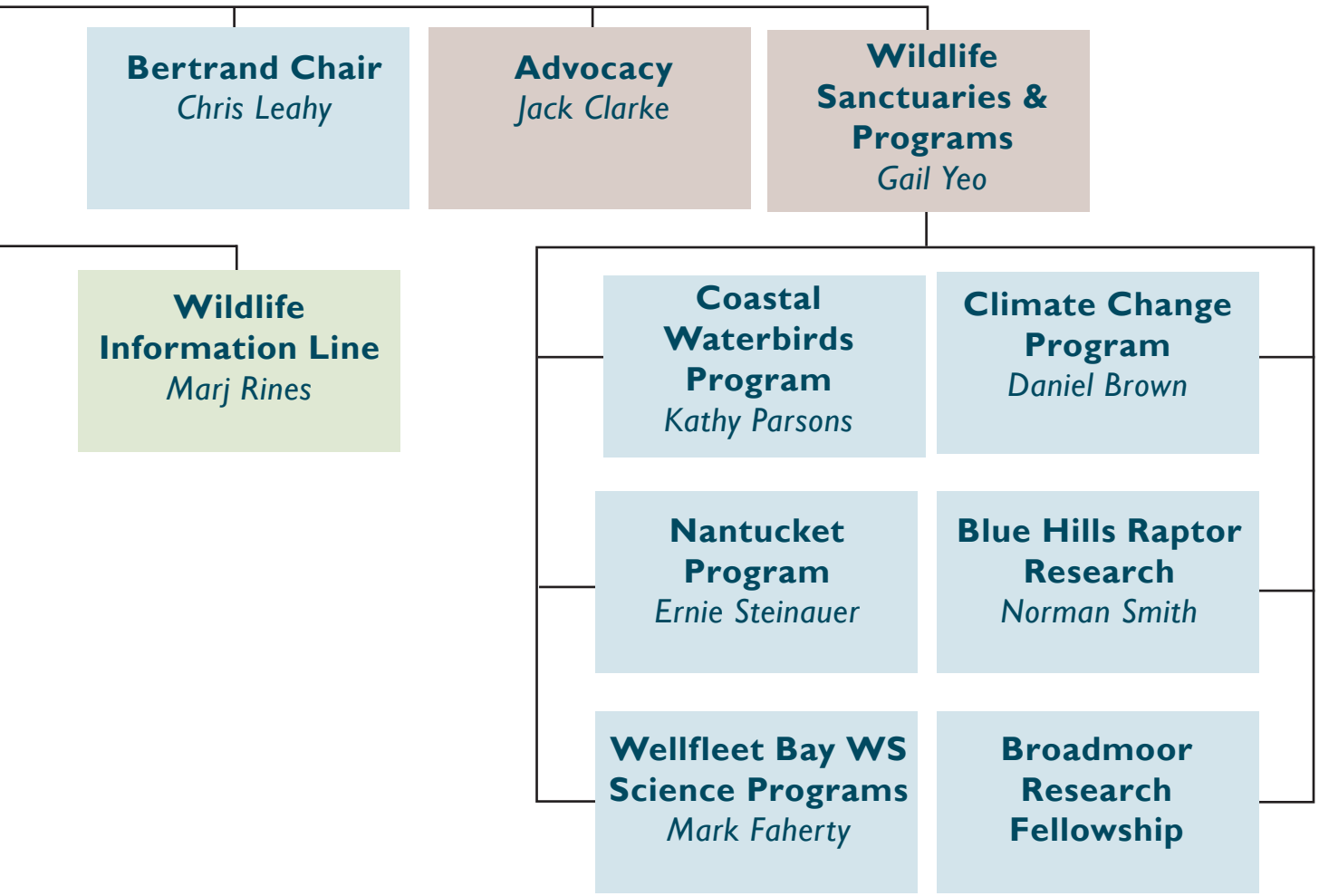
3.4.3. Compile Annual Report on Mass Audubon Conservation Science by January each year and distribute to staff, Board, Council, funders, and partners.

3.4.4. Continue to hold annual Birders Meeting and Staff Natural History Conference[8]

[6] *A cross-departmental staff group charged with reviewing and supporting science projects throughout Mass Audubon.*
[7] *"Geographical Information System" mapping software.*
[8] *Presentations focusing on sanctuary-based research and natural history observations*

Figure 1. Mass Audubon Organization Chart, Highlighting Conservation Science Activities – January 2017





Examples of other Conservation Science Programs

Conservation Science Department Staff

Other Programs & Staff Engaged in Conservation Science

Other Supporting Departments & Staff

GOAL 1

Promote Mass Audubon Wildlife Sanctuaries as Outdoor Laboratories

1

OBJECTIVE 1 Ecological Management of our Wildlife Sanctuaries

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
1.1.1 Continue to develop Ecological Management Reports (EMRs) as a model for land management planning in a changing climate, implement highest priority EMR recommendations, and update reports on a 5-year basis in preparation for Land Trust Accreditation renewal in 2020.	% of priority actions in progress; % of EMRs up-to-date	Regional Scientists	Director of Conservation Science	Assistant Regional Scientists	2.2.1. Restore & Enhance Habitats
2017	**2018**	**2019**	**2020**	**2021**	
1.1.2 Develop a database for tracking progress on high priority EMR recommendations by May 2017.	database functional by FY18	Regional Scientists	IT	IT database design	2.2.1. Restore & Enhance Habitats
2017	**2018**	**2019**	**2020**	**2021**	
1.1.3 Evaluate pilot White-tailed Deer Management Program at Moose Hill by March 2017, and consider expansion to at least three additional wildlife sanctuaries (Sesechacha, Ipswich River, Broadmoor), including robust monitoring protocols, by December 2018.	evaluation complete, deer management at additional sites	Director of Conservation Science	Regional Scientists	sanctuaries staff engagement, Communications support	2.2.1. Restore & Enhance Habitats
2017	**2018**	**2019**	**2020**	**2021**	
1.1.4 Become a recognized leader in developing, implementing, and demonstrating habitat management actions to enhance the capacity of natural systems to adapt to climate change and other ecological processes, by December 2019.	# of projects in each region	Regional Scientists	sanctuary staff	Training/ Conferences in climate change adaptation	3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**	**2021**	

OBJECTIVE 2 Harness Sanctuary-based Research Projects

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
1.2.1 Evaluate, refine, and relaunch the biological Inventory & Monitoring Project to inform adaptive land management actions and to build a world-class longitudinal dataset to track and monitor impacts of climate change, by March 2018.	review complete	Regional Scientists	Director of Conservation Science	Assistant Regional Scientists	2.2.1. Monitor Our Land
2017	**2018**	**2019**	**2020**		**2021**
1.2.2 Complete intensive initial forest inventory to support sale of carbon offsets on California Air Resources Board market by May 2017 and ongoing verification inventories by December 2020.	inventories complete	Regional Scientist	Director of Conservation Science	funds derived from carbon offset sale	3.2.3. Advance Carbon Sequestration-based Land and Water Protection Projects
2017	**2018**	**2019**	**2020**		**2021**
1.2.3 Catalogue and review ongoing sanctuary research, data collection, and citizen science efforts, with a mechanism for ongoing updates, by March 2017.	data collection complete	Director of Conservation Science	data collection intern, Regional Directors, Sanctuary Directors	IT database design	3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**		**2021**
1.2.4 Develop a Citizen Science Program that coordinates statewide efforts to maximize impact and contribute directly to sanctuary research or long-term monitoring, by December 2017.	project in process	Citizen Science Coordinator	Director of Conservation Science, Director of Education	0.5 FTE Citizen Science Coordinator, Education, sanctuary staff	2.2.3. Foster Innovation
2017	**2018**	**2019**	**2020**		**2021**

OBJECTIVE 3 External Researchers on our Wildlife Sanctuaries

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
1.3.1 Articulate our priority sanctuary research needs, based on EMR recommendations, and develop a plan for attracting external researchers to address these and other questions, by December 2018.	# of external researchers focused on priority projects	Regional Scientists	Science Leadership Team, Conservation Programs Coordinator		3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**		**2021**

OBJECTIVE 3 External Researchers on our Wildlife Sanctuaries *(cont.)*

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
1.3.2 Add a page to our web site highlighting external research on Mass Audubon wildlife sanctuaries, by December 2018.	page maintained	Conservation Programs Coordinator	IT		3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**	**2021**	
1.3.3 Develop plan for maximizing benefit of Living Observatory collaboration at Tidmarsh by June 2018.		Regional Scientists	Tidmarsh WS staff, Science Leadership Team		3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**	**2021**	
1.3.4 Continue to pilot the Wildlife Sanctuary Research Fellow program in 2017 and develop a proposal for funding a broader research fellow program to engage M.S. and Ph.D. students by December 2017.	# of fellows	Director of Conservation Science, Regional Scientists, Sanctuary Directors	BU students and advisors, Broadmoor volunteers	donor funds to support expansion of program	3.2.1. Expand Habitat-Based Research & Ecological Management
2017	**2018**	**2019**	**2020**	**2021**	

GOAL 2

Protect and Restore the Nature of Massachusetts

2

OBJECTIVE 1 Halt the Decline of Priority Bird Species

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
2.1.1 Publish 2017 State of the Birds focusing on climate change impacts on birds by June 2017	publication complete	Director of Bird Conservation	Conservation Programs Coordinator		2.3.1. Protect Bird Species and Habitats
2017	**2018**	**2019**	**2020**	**2021**	

OBJECTIVE 1 Halt the Decline of Priority Bird Species *(cont.)*

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
2.1.2 Continue to lead implementation of recommendations from current and future *State of the Birds* reports.	% of SotB recommendations in progress.	Director of Bird Conservation	Bird Conservation Fellows	Continued Philanthropy support for major gifts and grants	2.3.2. Improve Habitat Management for Birds
2017	**2018**	**2019**	**2020**		**2021**
2.1.3 Evaluate role in assessing and monitoring impacts of offshore wind development on birds by June 2018.	evaluation complete	Director of Bird Conservation	Science Leadership Team		2.3.1. Protect Bird Species and Habitats
2017	**2018**	**2019**	**2020**		**2021**
2.1.4 Develop a specific plan for strengthening collaboration of Coastal Waterbird Program and Conservation Science Department by June 2017.	staff meeting regularly	Director of Bird Conservation, Director of Coastal Waterbirds Program	Director of Conservation Science, Regional Director		2.3.1. Protect Bird Species and Habitats
2017	**2018**	**2019**	**2020**		**2021**
2.1.5 Develop a multi-year work plan for Bertrand Chair of Ornithology & Natural History by December 2017.	plan complete	Director of Bird Conservation	Conservation Programs Coordinator	Endowment funds to fully support Chair position	2.3.1. Protect Bird Species and Habitats
2017	**2018**	**2019**	**2020**		**2021**
2.1.6 Promote awareness of bird conservation priorities and integration of State of the Birds conclusions and recommendations in Mass Audubon publications and programs.		Director of Bird Conservation, Bertrand Chair			2.3.4. Integrate Birds into Environmental Education Programs
2017	**2018**	**2019**	**2020**		**2021**

OBJECTIVE 2 Conserve Other Key Species and Natural Communities

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
2.2.1 Identify selected list of species and natural communities of responsibility, those in which we have a unique conservation role, and outline Mass Audubon's role by June 2018.	outline complete	Science Leadership Team	Regional Scientists, Director of Bird Conservation		2.2.4 Work Beyond Our Sanctuaries
2017	**2018**	**2019**	**2020**	**2021**	
2.2.2 Implement a prescribed burn at Sesechacha Heathlands by June 2019.	acres burned	Sanctuary Director, Regional Scientist	Director of Conservation Science	Partners and funds for burning	2.2.1. Restore & Enhance Habitats
2017	**2018**	**2019**	**2020**	**2021**	
2.2.3 Remove one dam from a Mass Audubon property by December 2020.	dam removed	Regional Scientists	Director of Capital Assets and Planning	Funding, technical assistance from state DER.	2.2.1. Restore & Enhance Habitats
2017	**2018**	**2019**	**2020**	**2021**	

OBJECTIVE 3 Leverage Partnerships to Extend our Reach

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
2.3.1 Distribute updated management recommendations for grassland habitat to owners and managers of conserved grasslands by June 2017.	# of organizations receiving BMPs	Director of Bird Conservation	Marketing		2.3.2. Improve Habitat Management for Birds
2017	**2018**	**2019**	**2020**	**2021**	
2.3.2 Expand Foresters for the Birds program statewide, in collaboration with partners, by December 2018.	counties covered by program	Bird Conservation Fellow	Director of Bird Conservation, Conservation Programs Coordinator		2.3.2. Improve Habitat Management for Birds
2017	**2018**	**2019**	**2020**	**2021**	
2.3.3 Remain active in relevant partnerships and advisory boards such as the Massachusetts Invasive Plant Advisory Group, Natural Heritage Advisory Board, Plum Island Estuary LTER, and Quabbin Watershed Advisory Committee.	number of relevant committees participating in	various staff			2.2.4 Work Beyond Our Sanctuaries
2017	**2018**	**2019**	**2020**	**2021**	

OBJECTIVE 3 Leverage Partnerships to Extend our Reach *(cont.)*

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
2.3.4 Grow Ecological Extension Service to 2 FTEs funded by external projects by December 2018.	total FTEs in EES	Director of EES	Director of Conservation Science	contract income to support 2 FTEs	2.2.4 Work Beyond Our Sanctuaries

2017	2018	2019	2020	2021

GOAL 3

Apply State-of-the-Art Conservation Science Methods across Mass Audubon

3

OBJECTIVE 1 Enhance Support Structure for Science Programs

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.1.1 Finalize Science Leadership Team charter, convene cross-departmental staff team, and establish near-term goals by February 2017.	SLT convened	Director of Conservation Science	various SLT members	staff time to participate in meetings and work between meetings	Imperative 5. Enhance Integration and Collaboration

2017	2018	2019	2020	2021

3.1.2 Increase engagement of Board Science Committee with science projects across the organization.	# projects reviewed by committee	Director of Conservation Science	Board Science Committee	administrator	

2017	2018	2019	2020	2021

OBJECTIVE 2 Provide Training and Resources Across the Organization

	Measures of Progress			Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.2.1 Ensure scientific staff remain current in their fields through frequent trainings, regular attendance at professional conferences, and access to scientific literature.	# of trainings attended	all science staff	Human Resources	staff time and funds to attend training, access to literature	

2017	2018	2019	2020	2021

3.2.2 Partner with Education and Advocacy staff to ensure key staff are competent and confident in speaking about the basic science and projected impacts of climate change.	staff trainings offered	Climate Change Program Coordinator	Regional Scientists		3.1.1. Climate Literacy

2017	2018	2019	2020	2021

OBJECTIVE 2 Provide Training and Resources Across the Organization *(cont.)*

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.2.3 Enhance GIS capacity and impact; provide regular training for all GIS users; develop method for ongoing analysis of member geographic distribution by December 2018; and provide technical analysis for next edition of Losing Ground by December 2019.	% FTE dedicated to GIS	GIS Coordinator		support for 0.5 FTE, as part of Asst. Regional Scientist	2.2.3. Foster Innovation

2017	2018	2019	2020	2021

OBJECTIVE 3 Adopt New Tools & Techniques

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.3.1 Test applications for the use of drones in our work by September 2017.	applications of drone	Regional Scientists		funds for equipment, training	2.2.3. Foster Innovation

2017	2018	2019	2020	2021

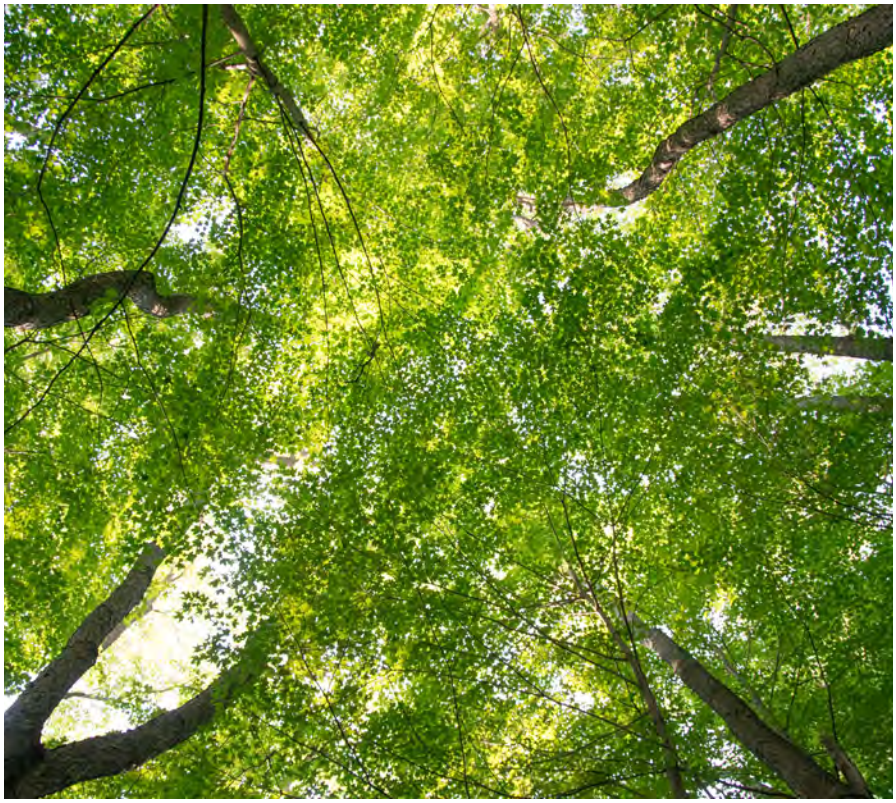
OBJECTIVE 3 Adopt New Tools & Techniques *(cont.)*

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.3.2 Integrate mobile apps in field data collection by December 2017.	# applications of mobile technology	Director of EES, LIS Coordinator, CR Stewardship	IT Staff	funds for hardware, training	2.2.3. Foster Innovation
2017	**2018**	**2019**	**2020**	**2021**	
3.3.3 Train staff in remote audio data loggers and other remote wildlife tracking techniques by December 2018.	# applications of technology	Bird Conservation Fellow		funds for training	2.2.3. Foster Innovation
2017	**2018**	**2019**	**2020**	**2021**	

OBJECTIVE 4 Communicate our Science

	Measures of Progress	Lead	Support	Additional Resources Needed	Aligns with Strategic Plan Action/ Imperative
3.4.1 Disseminate regular updates, findings and recommendations based on our work through a variety of platforms including regional and national conferences each year.	# articles, blog posts, enewsletter opens, conferences, presentations	Conservation Programs Coordinator	Marketing & Communications staff	0.5 FTE science communicator	Imperative 2. Expand Visibility and
2017	**2018**	**2019**	**2020**	**2021**	
3.4.2 Partner with Marketing & Communications staff to develop and implement Conservation Science Communication Plan by June 2018.	Plan complete		Marketing & Communications staff		Imperative 2. Expand Visibility
2017	**2018**	**2019**	**2020**	**2021**	
3.4.3 Compile Annual Report on Mass Audubon Conservation Science by January each year and distribute to staff, Board, Council, funders, and partners.	Annual report	Conservation Programs Coordinator	Marketing & Communications staff	funds for science communicator/ Asst Regional Scientist	Imperative 2. Expand Visibility and
2017	**2018**	**2019**	**2020**	**2021**	
3.4.4 Continue to hold annual Birders Meeting and Staff Natural History Conference.	annual events	Regional Scientists	IT staff	administrator	Imperative 5. Enhance Integration and Collaboration
2017	**2018**	**2019**	**2020**	**2021**	

Mass Audubon protects 36,500 acres of land throughout Massachusetts, saving birds and other wildlife, and making nature accessible to all. As Massachusetts' largest nature conservation nonprofit, we welcome more than a half million visitors a year to our wildlife sanctuaries and 20 nature centers. From inspiring hilltop views to breathtaking coastal landscapes, serene woods, and working farms, we believe in protecting our state's natural treasures for wildlife and for all people–a vision shared in 1896 by our founders, two extraordinary Boston women. Today, Mass Audubon is a nationally recognized environmental education leader, offering thousands of camp, school, and adult programs that get over 225,000 kids and adults outdoors every year. With more than 125,000 members and supporters, we advocate on Beacon Hill and beyond, and conduct conservation research to preserve the natural heritage of our beautiful state for today's and future generations. We welcome you to explore a nearby sanctuary, find inspiration, and get involved. Learn how at massaudubon.org.



Mass Audubon. 2017. Master Plan for Conservation Science: A Five-Year Vision. Lincoln, Massachusetts. 21 pp.