FRAMEWORK FOR THE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH, WILDLIFE, AND MARINE RESOURCES

WILDLIFE HEALTH PROGRAM

STRATEGIC PLAN 2011 – 2015

This plan was developed with Federal Aid in Wildlife Restoration funds.

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PRONOUNCEMENT

Wildlife are integral to a healthy, diverse ecosystem and the health of wildlife is closely intertwined with that of human and domestic animals. While disease and death are part of the normal life cycle that maintains a balanced ecosystem, factors such as the introduction of an invasive species or new and emerging disease, climate change, habitat destruction and human development can alter the equilibrium so that the health and long term well-being of a species is threatened. The goal of the Wildlife Health Program is to identify and monitor both infectious and non-infectious diseases in wildlife populations, put that information to use in making sound management decisions, and to be prepared to intervene where necessary to ensure that New York has sustainable, robust and diverse wildlife populations for the future.

The Wildlife Health Program, Strategic Plan 2011 – 2015 (Plan) was developed by a team of wildlife professionals from the New York State Department of Environmental Conservation (DEC) and Cornell University College of Veterinary Medicine and Department of Natural Resources (see Appendix A) to provide a framework for the development of a Wildlife Health Program in the Division of Fish, Wildlife and Marine Resources (DFWMR) under the administration of the Wildlife Health Unit. A Definitions section has been included to facilitate the understanding of some terms used in this Plan (see Appendix B).

BACKGROUND

The relationship between wildlife, domestic animals and humans in a shared environment is complex and interdependent. Stressors, in the form of an increasing human population, loss of biodiversity, climate change, and global trade and travel, to name a few, have resulted in an increase in emerging infectious diseases and zoonotic diseases that threaten humans, livestock and wildlife. A multi-disciplined approach to disease surveillance and response involving human medicine, veterinary medicine and wildlife medicine is required to effectively address these threats.

In the wildlife management profession, the Association of Fish and Wildlife Agencies (AFWA) developed the National Fish and Wildlife Health Initiative (see Appendix C) as a roadmap to assist state fish and wildlife agencies in the development of programs to effectively respond to health issues involving free-ranging wildlife, as well as minimizing negative impacts of wildlife health issues affecting domestic animals and humans. A number of state fish and wildlife agencies already have fish and wildlife health programs in place. Those state fish and wildlife agencies that have "nationally" recognized fish and wildlife health programs, California, Colorado, Wyoming, Wisconsin and Michigan, achieved that status because their programs are built on collaborative relationships with their state's veterinary college.

The Wildlife Health Program will integrate statewide wildlife health activities into a single unified program to address wildlife health issues, to prevent the introduction of disease, to develop rapid disease response capacity, to provide a suite of wildlife veterinary services, and to represent the DFWMR in multi-agency state, regional, and national wildlife health programs.

GLOSSARY OF TERMS, located in Appendix B, has been included in this document to facilitate the understanding of some terms used in this Plan.

PROGRAM NEED

The legal framework for a fish and wildlife health program is clearly established in the New York State Environmental Conservation Law (ECL).

- The ECL begins with a declaration that states, in part, it shall be the policy of the State of New York to link the quality and health of the environment to the quality of life in New York State (ECL 1-0101).
- ECL Section 1-0101 specifically states that the DEC will guarantee the widest range of beneficial uses of the environment "without risk to health or safety, unnecessary degradation or other undesirable or unintended consequences."
- ECL Section 11-0325 provides the DEC with broad authority to prevent, control or eliminate diseases that threaten fish, wildlife, livestock or human health.

The management of wildlife resources includes maintaining healthy wild populations in the midst of threats posed by emerging and endemic infectious diseases, the movement of animals by humans, climate change, and ecosystem alteration, including habitat fragmentation and loss, environmental degradation, and contamination. In recent years, the DFWMR has responded to a range of diseases in fish and wildlife, including but not limited to, Chronic Wasting Disease, Lyme disease, Bovine Tuberculosis, Avian Influenza, White Nose Syndrome and Botulism. In all cases, the DFWMR would have been able to respond more effectively either to prevent the introduction of the disease or to implement more effective disease control measures if the DFWMR had disease expertise on staff and disease response protocols, including disease surveillance and monitoring, in place prior to the disease outbreak in New York. The DFWMR does not have the veterinary medical expertise, epidemiological expertise, disease management expertise, diagnostic capability, or herd health management expertise on staff to effectively address disease threats to the wildlife resources of the state. The Wildlife Health Program addresses those deficiencies by including services and expertise from the College of Veterinary Medicine at Cornell University and by designing a program that incorporates existing expertise within and across the DFWMR and from other agencies.

"Globally, approximately 60% of emerging infectious diseases (EID) are zoonotic diseases. Of these, more than 71% have wildlife origins. The nature of these diseases highlights the connection between human health, animal health and ecosystem health."

Globally, approximately 60% of the emerging infectious diseases (EID) are zoonotic diseases. Of these, more than 71% have wildlife origins including pandemic H1N1 influenza, severe acute respiratory syndrome (SARS), West Nile Virus, Ebola Hemorrhagic fever and Avian Influenza (Daszak and Cunningham 2000, Jones et. al. 2008). The nature of these diseases highlights the connection between human health, animal health and ecosystem health. It also speaks to the need for a collaborative approach to responding to the threat of diseases, which is comprehensive, integrative and interdisciplinary. Internationally, the "One Health" (see Appendix B) concept has been used to represent the inextricable links among human and animal health and the health of the ecosystems they inhabit (International Bank for Reconstruction and Development/World Bank, 2010). The One Health concept focuses on the interaction between humans and animals, both domestic and wild, in the ecosystem where they live. The One Health concept brings together public health, domestic animal health and wildlife health to prepare for and respond to the threats posed by diseases. In New York, the Department of Health addresses public health issues, the Department of Agriculture and Markets addresses domestic animal health issues and the Department of Environmental Conservation addresses ecosystem and wildlife health issues. The Wildlife Health Program will provide the DFWMR with the expertise to more effectively and efficiently address disease threats to the wildlife populations and link the DFWMR in a collaborative, multi-disciplined approach when wildlife diseases affect human health and domestic animal health and when domestic animal diseases affect wildlife health.

PURPOSE

The purpose of the Plan is to define the areas of responsibility of the new Wildlife Health Program and to provide a framework for the development of the Program within the DFWMR and across the state. This Plan commences at the inception of the Program through the first five years and, by design, will initially focus only on the "wildlife" component of fish and wildlife health. Later, fish health and programs involving contaminants and other non-infectious diseases will be incorporated into a more comprehensive Fish and Wildlife Health Program. During the first five years, the primary focus of the Plan will be on addressing the threats posed by infectious diseases and the diagnosis of non-infectious diseases of wildlife. Each year, an Annual Work Plan will be developed to meet the goals identified in the Plan and to better address wildlife health issues in a changing world.

The Plan identifies strategies to develop a fully integrated Program in the DFWMR that employs the One Health concept to address wildlife health issues in New York State. The Program will include DFWMR staff at the Central Office, at the Wildlife Resources Center, at the Regional Wildlife Offices and staff from the Animal Health Diagnostic Center at the College of Veterinary Medicine at Cornell University. In keeping with the One Health concept, the Plan strives for a coordinated, multi-agency response to the threat of diseases and includes liaison and collaboration with the Departments of Health and Agriculture and Markets, the U.S. Department of Agriculture, Animal and Plant Health Inspection Service: Veterinary Services, Wildlife Services and Animal Care, U.S. Fish and Wildlife Service and other government and nongovernmental organizations concerned about wildlife health.

THE ONE HEALTH INITIATIVE

A "One Health" approach aims to promote and implement meaningful collaboration and communication between veterinary medicine, human medicine, wildlife management, and multiple allied disciplines working locally, nationally, and globally to attain optimal health for people, animals, and our shared environment."

~American Association Of Wildlife Veterinarians

WILDLIFE HEALTH PROGRAM AREAS

The following section provides an overview of specific areas that define the Wildlife Health Program, and a list of goals and strategies to accomplish the program objectives effectively and efficiently.

The specific program areas included in this section are:

- *Program Management*
- *Policy Development*
- *Preparedness and Response*
- *Training and Development*
- *Surveillance and Monitoring*
- *Communication*
- *Information Management*
- *Research*
- *Veterinarian Health Services*

PROGRAM MANAGEMENT

The Wildlife Health Program will incorporate the tenets of the One Health concept by bringing internal (within DEC) and external (outside of DEC) skill sets and expertise from multiple disciplines into the wildlife health decision-making process. Ideally, such collaboration will result in a Program that functions horizontally across disciplines, agencies, institutions, DFWMR program areas and various areas of responsibility. Recommendations and guidance developed by the Program will be made by the Unit Leader of the Wildlife Health Unit to the Chief of the Bureau of Fish and Wildlife Services and the Chief of the Bureau of Wildlife. The One Health principles of collaboration and cooperation will be part of the DFWMR operating procedures for all Program decisions. Final policy decisions will be made either by the Chiefs in collaboration or by the DFWMR Management Team or the Executive Office of the DEC.

The DFWMR has assigned a Wildlife Health Unit Leader who will be responsible for programmatic coordination and for the day to day supervision of the Wildlife Health Unit including coordination internally within the DFWMR and across Division lines within DEC and externally from the DFWMR to agencies and institutions and private sector partners and collaborators (see Appendix B). A broad range of activities that would come under the Program's area of responsibility are now performed by DFWMR staff in various Bureaus and Units. These activities include disease surveillance, disease prevention, herd health, animal handling, and translocation of animals. A key facet of Program development and Program success will hinge on the ability of the DFWMR's to foster the interdisciplinary collaboration necessary to deliver a comprehensive wildlife health program. This will require not only DFWMR staff awareness but also staff participation to achieve meaningful results. DFWMR staff must be aware of and employ the tenets of wildlife health, such as multi-disciplinary collaboration and the One Health concept, as part of their mandate to manage the wildlife resources for current and future generations.

Program management strategies will include building effective lines of communication and collaboration within DEC and to and from other agencies in order to share expertise and technical skills and to ensure a systematic approach to wildlife health that includes human health, animal health and ecosystem health. Rigorous programmatic evaluation will occur on an annual basis to ensure that the Program is accountable, effective and current for the delivery of desired results and benefits.

The success of the Program will depend on the DFWMR and DEC's Executive Office support and understanding of the importance and significance of wildlife health in the management of the wildlife resources of the State.

GOALS AND STRATEGIES

Develop a Wildlife Health Program that safeguards the natural populations of wildlife in New York State.

- Clearly define roles, responsibilities, and accountabilities within the DFWMR and within various state and Federal agencies with respect to wildlife health. Ensure that staff and wildlife health collaborators have a clear understanding of their roles, responsibilities, and their legal authority to respond to wildlife health events.
- Identify potential collaborators to help accomplish Wildlife Health Program goals.
- Determine existing and potential capacity (expertise and resources) to accomplish Wildlife Health Program goals.
- As necessary, create teams composed of DFWMR staff and experts from other entities to effectively deal with wildlife health issues as they arise.
- Make certain that all staff are adequately informed of the capabilities of the Program and ensure that procedures for dealing with wildlife health issues are communicated in a clear and effective manner.
- Integrate Animal Health Diagnostic Center (AHDC) Cornell staff into the DFWMR Wildlife Health Program.
- Ensure that wildlife health is fully integrated into the core program within DFWMR and recognized by all staff as an essential aspect of wildlife management.

Secure stable and comprehensive funding that can support Wildlife Health Program needs for all wildlife taxa, including amphibians and reptiles.

- Secure (in addition to Federal Aid) additional program funding to support wildlife health programs for taxa beyond birds and mammals.
- When funding is limited or unavailable, seek collaborative partnerships to support specific wildlife health-related initiatives.

Develop a comprehensive Wildlife Health Program that is accountable and effectively and efficiently administers and manages work, resources and staff to provide tangible results and benefits.

- Execute a contract with the AHDC to provide diagnostic, veterinary, pathology and epidemiological services.
- Develop a clear procedure for DFWMR staff to request input or technical guidance from the Wildlife Health Unit staff and collaborators.
- As necessary, integrate wildlife health tenets into all relevant wildlife Standard Operating Procedures (SOPs) and all wildlife management and recovery plans.
- As necessary, integrate wildlife health into the terms and conditions of relevant special licenses issued by DEC.
- On an annual basis, develop operational work plans with specific tasks and associated evaluation criteria for each program area in the Wildlife Health Strategic Plan.
- On an annual basis, prepare a year-end report that will include statements of activities, an evaluation of progress and recommendations for improvement and future actions.
- On an annual basis, meet with members of the DFWMR Division Management Team to review the Program to ensure that work performed is consistent with the desired direction of the DFWMR.

Elevate New York to a position of national leader in the field of Wildlife Health.

- Continually ground the Program on a foundation of good management and well-executed public administration within a comprehensive statewide wildlife management program.
- Provide respected leadership and professionalism in every facet of program delivery.
- As the Program develops, work with the Northeast states to strengthen and advance the Northeast Wildlife Disease Cooperative.
- Work toward the establishment of an official State Wildlife Veterinarian title that is recognized in statute.

POLICY DEVELOPMENT

For purposes of this Plan, "policy development" includes a wide range of activities and actions related to or involving wildlife health issues and events and, in certain cases, may extend to DEC Executive Office level policies. Policy development will be based on sound scientific data and principles. Program staff will ensure that policy recommendations and policy development actions include collaboration both within the DFWMR and with relevant agencies and collaborators under the One Health concept.

Policy development responses by Program staff include but are not limited to, providing comments and recommendations on state and federal laws and regulations related to wildlife health; developing formal DEC and other agency guidance or participation in the development of management plans; providing sampling and bio-safety protocols; providing protocols for DFWMR staff for handling live and dead wildlife and setting priorities that have potential implications associated with wildlife health including human health risks from interactions with wildlife. Program staff will provide recommendations and guidance in the form of technical documents, white papers, position papers, study and research design, animal handling protocols and informal communication.

POLICY DEVELOPMENT - GOALS AND STRATEGIES

Wildlife health concerns are addressed and integrated into policy development throughout the DFWMR, DEC, and other One Health agencies.

- Over the next five years, develop and update internal standard operating procedures (SOP), protocols and guidelines for the handling, immobilization and euthanasia of various wildlife species and other animals by staff and cooperators.
- On an on-going basis, provide science-based and timely technical guidance or comments on proposed state and federal laws, regulations, and policies that have wildlife health implications.

Policy recommendations will be consistent and supportive, to the fullest extent possible, with established policies of other states or interstate or international agencies and organizations, and other New York State One Health agencies and partners.

- Develop and maintain an inventory of laws, regulations, programs, policies, and protocols of New York State agencies, federal agencies, international organizations, and other adjoining states related to zoonotic disease prevention and response.

PREPAREDNESS AND RESPONSE

Preparedness will be a major component of the Program. Such preparedness includes executing measures to prevent the introduction of disease into New York State. While surveillance and monitoring are the key foundation of preparedness, the Program must also be able to respond to unanticipated disease events. To be effective, the Program must avoid the "wait and see" approach as a disease advances towards our borders or is an imminent threat of entering the state. The Program must provide a generic structure for an emergency response plan that allows the DEC and our partners to move quickly and aggressively. This Plan should be developed in concert with other agencies for a total state government disease response similar to what was done for Chronic Wasting Disease.

The Incident Command System (ICS) and the principles of the National Incident Management System (NIMS) (see Appendix B) will be incorporated into Program plans as the framework for responding to disease outbreaks or incidents to facilitate interagency cooperation. The Program will also establish general and specific policies and protocols for handling existing wildlife health issues and for responding to emerging wildlife health threats. Such plans for responding to disease outbreaks will be developed using well-established principles and procedures, including the use of appropriate personal protective equipment, defining containment zones, building communication networks, and identifying resources inside and outside DEC. Program staff, DFWMR staff, and DEC staff will receive training in emergency disease response including tabletop exercises and ICS structure to operate effectively in the event of a wildlife disease outbreak.

PREPAREDNESS AND RESPONSE - ***GOALS AND STRATEGIES***

DEC will be prepared to respond to wildlife health incidents in a timely, effective manner and work cooperatively as needed with other agencies and collaborators.

- Develop an adaptable framework to facilitate prompt and effective response to wildlife morbidity and mortality incidents.
- Identify human and non-human resource needs to effectively respond to potential wildlife health incidents.
- Over the next five years, develop disease-specific prevention and response plans or review existing plans for such diseases as Tuberculosis (TB), Chronic Wasting Disease (CWD), Epizootic Hemorrhagic Disease (EHD) and botulism
- Train staff in field response and Incident Command Systems (see Training also)
- Involve agencies and collaborators in development of the framework and response plans.
- Develop relationships and procedures for working with other agencies and collaborators in disease response situations.

TRAINING AND DEVELOPMENT

DFWMR field staff are frequently the first DEC staff contacted about a wildlife health incident or potential wildlife health incident and they must be trained how to respond to known, unknown and unanticipated diseases in a safe, effective, and coordinated manner. Staff will know how to protect themselves and others from zoonotic disease transmission. Staff must be able to recognize disease signs in a multitude of wildlife species, how to effectively conduct field investigations to collect and deliver useable carcasses and samples for analysis, how to handle and transport live wildlife including safe, effective and legal immobilization protocols. All training will incorporate the One Health concepts as underlying principles of collaboration and cooperation. Staff will be trained in ICS to provide a coordinated emergency response to wildlife disease outbreaks.

TRAINING AND DEVELOPMENT -
GOALS AND STRATEGIES

DFWMR staff is fully aware of, and employs the tenets of wildlife health, including the One Health concept.

- The Wildlife Health Program will develop and facilitate training for relevant staff and interagency collaborators in the following subject areas:
  - ✓ Common wildlife disease signs and affected species
  - ✓ Foreign Animal Disease signs and significance to wildlife and domestic animals
  - ✓ Zoonotic diseases and selection and use of personal protective equipment
  - ✓ Proper specimen selection and packaging
  - ✓ The One Health concept and how it relates to wildlife management
  - ✓ Live animal handling best practices including chemical immobilization, movement, and humane euthanasia
  - ✓ Incident Command System and emergency response
  - ✓ Animal welfare and bio-safety in research design
  - ✓ Forensic implications of wildlife mortality investigations including those involving environmental pollutants
  - ✓ Disinfection techniques and appropriate carcass disposal
- Conduct a needs assessment for training, certification and licensing of DFWMR staff.
- Provide training programs based on the results of the training and licensing needs assessment.

DFWMR staff is protected from wildlife disease risks associated with their job responsibilities.

- Ensure that all appropriate staff and collaborators are in compliance with federal and state regulations and all DFWMR and DEC policies regarding wildlife handling and associated human health and safety concerns.
- Ensure that all staff receive proper training and resources necessary to ensure their personal health and safety.

Wildlife programs are conducted in accordance with accepted standards of animal welfare, humane treatment, bio-safety, and euthanasia.

- Ensure that DFWMR staff are aware of established veterinary guidelines, including but not limited to, the American Association of Wildlife Veterinarians and American Veterinary Medical Association, which may be applicable to handling live wildlife and euthanasia under field conditions.
- Ensure that staff are trained, supplied and equipped to meet the established protocols and standards recognized in veterinary guidelines for wildlife in field situations.

SURVEILLANCE AND MONITORING

The Program will develop and implement a coordinated, structured system of disease and contaminant surveillance to inform efforts to prevent or mitigate the impact on wildlife and to support the Departments of Health and Agriculture and Markets where wildlife diseases affect human health or livestock. Surveillance and monitoring activities will consider wildlife health issues that are of priority to the DEC as well as federal, state and regional partners. Routine opportunistic monitoring of wildlife can provide baseline data on seasonal or geographic patterns of endemic disease and contaminants. These data will be used to facilitate detection of new and unusual morbidity and mortality patterns that signal emerging threats. In addition, proactive surveillance programs will be designed that address diseases and contaminants that have been identified as high priority emerging threats. This surveillance will include diseases that primarily impact wildlife populations (White Nose Syndrome, Epizootic Hemorrhagic Disease, CWD), but may also include diseases that cross wildlife boundaries into domestic animals or livestock (distemper, tuberculosis, Avian Influenza), public health (rabies, West Nile, Lyme Disease) or National Security (anthrax, Foot and Mouth Disease, tularemia).

Program priorities will include risk assessment (including but not limited to formal, informal, qualitative, and quantitative methodologies) that considers all available information for addressing such threats. Data gathered from surveillance and monitoring will be included in scientifically- based risk assessment and used to characterize the ecology of wildlife diseases in natural systems.

Program staff understands patterns of endemic disease so they can recognize abnormal behavior and emerging wildlife health issues.

- Develop a structured system for standardized submission and processing of wildlife disease cases that will render accurate and high quality surveillance information.
- Provide guidance to staff and the public regarding submission of wildlife specimens for passive (opportunistic) surveillance to help identify new or unexpected disease threats.
- Identify and prioritize infectious and non-infectious wildlife diseases for development of active surveillance, monitoring, or response plans and update the priorities as circumstances dictate.
- Develop formal pro-active sampling programs to detect or monitor potential or anticipated infectious and non-infectious wildlife disease threats.
- Program staff will remain current with respect to wildlife disease incidents, trends, and information on a local, regional and national level.

Policy decisions for the prevention, management and mitigation of disease or contaminant impacts are based on sound surveillance and monitoring information.

- Perform data analysis and risk assessment to provide interpretations of significance or recommendations.

Disease reporting will support coordinated surveillance and monitoring activities within NY State and with national and international agencies.

- Contribute data to regional and national partners and collaborators on a continual basis.
- Produce scientific papers and attend conferences annually.
- On a continual basis, foster relationships with other agency wildlife health programs for mutual sharing of information.

COMMUNICATION

Effective and efficient communication is a critical component and will directly affect the DFWMR's ability to assimilate the Program and to deliver the Program in the field. The Program will establish well defined intra-agency communications in order for various individuals and bureaus to be able to work together, and to gain an understanding of existing and emerging wildlife health issues. The Program will identify points of contact to facilitate the transfer of information in a timely and efficient manner, which will also foster greater awareness of the status of wildlife health in New York and the One Health concept.

Communication strategies will be developed and implemented in conjunction with other agencies and partners to allow for the efficient transfer of information, which will foster cooperation in system thinking for problem solving and decision-making. Efficient, timely communication is essential to successfully address emerging wildlife health issues and events.

Communication with the public is essential to inform an interested public, to build an understanding of the Program, to address concerns and fears that are typically associated with diseases in wildlife and to establish that wildlife health and wildlife diseases are the responsibility of the DFWMR's Wildlife Health Program. The Program will cultivate a working relationship with DEC media outlets and through established and novel channels of communication in a consistent, timely and structured manner to ensure that accurate information is available to the public. The Program will collaborate with other agencies and partners to ensure that our messages are consistent. The Program will take measures to ensure that communication involving wildlife health flows to and from the Program as part of the One Health concept.

COMMUNICATION - GOALS AND STRATEGIES

DFWMR staff is adequately informed and supportive of wildlife health programs via effective and efficient communication.

- Develop multiple avenues for communication (i.e., email, listserv, website) and identify key points of contact (develop a contact plan) within DFWMR to promote timely sharing of information.
- Provide a centralized reference location for SOPs, publications, and guidance information of interest for staff.

Cooperative relationships with external agencies and collaborators for coordinated response to wildlife health issues will be maintained through open communication.

- Identify key points of contact in federal, state, and local agencies, as well as appropriate NGOs, for sharing of wildlife health information.
- Establish specific channels of communication for public input to DEC personnel and to other appropriate agencies.

The public is aware of wildlife health concerns and the wildlife health program.

- Develop a standardized protocol for releasing wildlife health information to the press.
- Develop a plan for outreach to inform and respond to inquiries from the public.
- Establish specific channels of communication for public input to DFWMR personnel and to other appropriate agencies reporting or awaiting results.

INFORMATION MANAGEMENT

Information management encompasses all systems and processes for the creation and use of information related to the health of wildlife in New York. Science-based decisions are assisted by an integrated information management environment that can detect issues or trends, define priorities, identify solutions, and allocate resources. This requires reliable data collection from multiple sources, standardization, storage, security, and dissemination of information to various audiences, both internal and external. Initially, it will be a Program priority to organize wildlife disease information in a structured manner. The Program will identify data needs and identify sources of information that are relevant to wildlife health. The Program will improve the efficiency of data capture and recordkeeping, structure and digitize information, provide access to data and identify and deliver new information management services.

DFWMR's staff and collaborators will have reliable wildlife health data readily available to support all program goals.

- Identify key information to include along with all wildlife disease submissions and ensure that Program staff have access to the Laboratory Information Management System (LIMS).
- Develop a system for standardized submission and processing of wildlife disease cases.
- Develop a database for surveillance and monitoring information that is robust, based on sound business rules and usable for retrieval and analysis.
- Identify pertinent sources of information and develop electronic methods for data sharing.
- Identify knowledge gaps that deserve further attention.
- Develop data collection protocols for staff that include geographic references, so that surveillance and monitoring database allows for basic mapping and geospatial analysis of wildlife disease incidents.
- Develop guidelines for ancillary data to provide supporting or additional wildlife disease information.

RESEARCH

Research is the systematic acquisition and analysis of data to examine a hypothesis or scientific question. Research is a vital part of wildlife health, disease response preparedness and management. The Program will conduct and facilitate research to assess impacts, causes, and responses for high priority threats to wildlife health, or where wildlife diseases pose threats to domestic animals and humans. Research will be structured, scientifically sound, and statistically rigorous and take into consideration management priorities of the DFWMR, agency partners, and regional and national stakeholders. The Program will facilitate such research through various avenues including but not limited to providing funding support, building collaborative relationships, providing samples, and providing technical assistance. Research will have defined goals and contribute to DEC preparedness in addressing wildlife health issues.

DFWMR staff will address wildlife health concerns and issues in their study design and field work when they conduct research involving the handling of live wildlife. Program staff will provide technical support and guidance on field projects and may review applications for licenses that have wildlife health components. Research conducted under the authority of DFWMR licenses will require sharing of data and samples when such information would be useful to the Program or when needed to inform DFWMR policies.

RESEARCH-
GOALS AND STRATEGIES

Program staff will conduct and support basic and applied research on wildlife health issues, and ensure that research is rigorous, goal-oriented and scientifically sound.

- Identify highest DFWMR priorities for wildlife health research.
- When necessary, review and comment on agency and agency supported research that has direct and immediate wildlife health implications.
- Identify external (non-DFWMR) potential collaborative investigators, resources, and funding sources.
- When necessary, ensure that veterinary services are integrated into agency or agency supported research.

VETERINARY HEALTH SERVICES

The DEC is the lead agency for all matters related to the wildlife resources of the state including the "take" of wildlife from the wild. Hunting and trapping are traditional methods of take. However, the DFWMR also has the statutory authority to issue licenses to people for other methods of take including but not limited to wildlife rehabilitation, education with live wildlife, nuisance wildlife control, exhibition with live wildlife, and scientific research involving live wildlife. These licenses allow the possession, transport and, in some cases, the release of wildlife. In addition, the DFWMR, as part of routine wildlife management practices, has occasion to handle live wildlife. These activities, involving live wildlife, present opportunities for disease transmission, public safety concerns, staff safety concerns and animal welfare concerns.

The Program will provide the DFWMR with access to a suite of veterinary medical services including direct or indirect medical care for endangered and threatened species, standards for DFWMR staff when handling live wildlife, programmatic review of all special licenses involving the take and possession of live wildlife, euthanasia guidelines for DFWMR staff, biosafety protocols, and animal welfare guidelines. The Program will provide recommendations and expert opinion on proposed statutes and regulations involving the take, possession, transport, release and euthanasia of live wildlife. The Program will build a collaborative working relationship with veterinary practitioners across the state for the purpose of developing a network of veterinary support for DFWMR staff and for certain activities authorized by special licenses.

Veterinary medical "best practices" will guide the handling of live wildlife by DFWMR staff and the regulated community.

- Develop protocols for DFWMR and the regulated community to respond to injured, ill or orphaned endangered and threatened species.
- Develop a program to build a network of cooperating veterinary practitioners who can assist DFWMR staff and licensees with issues related to veterinary medical services for wildlife.
- Review current DFWMR practices and procedures involving the handling of live wildlife and provide standards to ensure that such practices and procedures are in compliance with veterinary medical principles for handling live wildlife.
- Review current licenses issued by the DFWMR and provide recommendations to ensure that activities conducted under the authority of such licenses are in compliance with veterinary medical principles and do not pose a threat to the wildlife resources of the state.

Veterinary services are integrated into DFWMR activities and those activities authorized by the DFWMR.

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Current collaborative research by the DEC, Cornell Department of Natural Resources and Cornell Veterinary College is being conducted to help advance knowledge in the genetics, behavior, and health of black bears in New York State. Veterinary College personnel help ensure that the animals are handled safely for both the team and the bear.

~Photo courtesy of Angela Fuller~

APPENDIX A:
Wildlife Health Strategic Planning Team

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APPENDIX B:
Glossary of Terms

Active – Targeting a particular disease or species (or group of species) with a sampling strategy and goal.

Collaborator/Partner – The term "collaborator" is used when an agency or NGO is actively participating in a wildlife health response or event. The term "partner" is used when an agency or NGO is involved with or concerned about but not actively participating in a wildlife health response or event. In both cases, the terms collaborator and partner may refer to agencies or NGOs depending on the wildlife species or the disease or both.

Contaminant - Biological, chemical, physical, or radiological substance (that may or may not be present in the environment) which, in sufficient concentration, can adversely affect living organisms through air, water, soil, and/or food.

Disease – An absence of health that impairs bodily function and affects populations by reducing fitness (i.e., offspring) or probability of survival; an interaction of the affected animal (the host), the pathogen causing illness (the agent), and the environmental factors influencing both of them; if enough individuals are affected, the collective effects reduce sustainability of the overall population

Wobeser (1997): disease is any impairment that interferes with or modifies the performance of normal functions, including responses to environmental factors such as nutrition, toxicants, and climate; infectious agents; inherent or congenital defects, or combinations of these factors

Emerging/Re-emerging -Infectious diseases whose occurrence during the past two decades has substantially increased or threatens to increase in the near future relative to populations affected, geographic distribution, or magnitude of impacts

Enzootic (Endemic) – A disease in animals that occurs with predictable regularity and rate in a population or in an area

Epidemiology – The study of the distribution of disease in populations, and the factors that determine its occurrence. The emphasis is on populations, not any single case of disease viewed individually

Epizootic (Epidemic) – A disease in animals that is occurring in a time, place, or species where it is not expected or at a greater rate than expected based on past experience

Foreign animal disease (FAD) – More recently termed "Transboundary diseases" a disease which does not currently exist within the borders of a country but one which will have significant economic, trade and/or food security importance if it is introduced.
(Transboundary Animal Diseases: Assessment of socioeconomic impacts and institutional responses. FAO 2004)

Health – The state of an organism when it functions optimally without evidence of disease or abnormality

Incident Command System (ICS) - A standardized, all-hazards incident management approach that allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure that enables a coordinated response and establishes common processes for planning and managing resources. ICS is flexible and can be used for incidents of any type, scope, and complexity. (FEMA 2011; http://www.fema.gov/emergency/nims/IncidentCommandSystem.shtm)

Laboratory Information Management System (LIMS) - A software system that allows a laboratory to track diagnostic testing on submitted samples and to synthesize summary data from those samples.

Monitoring – On-going or repeated efforts directed at assessing the health and disease status, including routine recording, analysis, and distribution of data related to health or disease, in a defined population for specific diseases or disease/health in general to ascertain changes in prevalence and determine the rate and direction of disease spread

National Incident Management System (NIMS) - A systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. (FEMA 2011; http://www.fema.gov/emergency/nims/AboutNIMS.shtm)

NGO – Non-governmental organization.

One Health - Collaborative effort of multiple disciplines-working locally, nationally, and globally – to attain optimal health by recognizing the interconnectedness of people, animals and our environment

Passive (opportunistic) – Examining sick or dead animals as they become available over time as a means of accumulating valuable disease tracking data

Pathogen – Any agent (organism or substance) capable of inducing abnormal structural or functional changes in the body leading to illness and clinical manifestations of disease

Risk analysis – A process for objectively assessing risks of disease introduction into a population, evaluating management options for diminishing or controlling those risks.

Surveillance – Sampling individual animals in a population for a specific disease, typically used for disease incursion into a new area, where predefined action for prevention or control will be taken as soon as a specified threshold (disease prevalence or incidence) is passed

Toxicant – Man-made (synthetic) substance that presents a risk of death, disease, injury, or birth defects in living organisms through absorption, ingestion, inhalation, or by altering the organism's environment. In comparison, a toxin is produced in nature by a living animal or plant.

Vector – An organism or object capable of transferring an agent from one host to another biologically or mechanically

Wildlife Health – Multidisciplinary approach involving biologists and veterinary medicine to understand the interconnections and complexities of species and ecological health problems.

State fish and wildlife agencies are the principal front-line managers of fish and wildlife and are responsible for managing diseases in free-ranging wildlife and have in place the local knowledge, personnel, equipment and local public support to address wildlife disease issues, including emergencies.

An effective agency will routinely conduct surveillance to detect diseases, to respond to outbreaks and to implement management programs to minimize disease impacts on wildlife and domestic animal populations.

Wildlife Health Programs - Examples of well-known state wildlife health programs: California, Colorado, Wyoming, Wisconsin, Michigan, all have established affiliations with their state veterinary college

Zoonoses – Infectious diseases that can be transmitted from animals to humans

APPENDIX C: ASSOCIATION OF FISH AND WILDLIFE AGENCIES - SELECT SECTIONS FROM THE NATIONAL FISH & WILDLIFE HEALTH INITIATIVE TOOLKIT

ASSOCIATION of FISH & WILDLIFE AGENCIES

The mission of the National Fish and Wildlife Health Initiative (NFWHI) is to conserve, restore, and enhance healthy fish and wildlife resources of the United States by recognizing and respecting the missions, jurisdictions, and abilities of fish and wildlife managers to address health issues. This mission will be achieved by six principal strategies:

1. Identify, characterize, respect, and integrate the authorities and capabilities of cooperating partners in complementary fashion.
2. Identify state, federal and other fiscal and staff resources for state, federal, and territorial fish and wildlife health programs and facilitate their optimal use and allocation.
3. Conduct proactive, coordinated and sustained surveillance for pathogens in fish and wildlife, and respond to findings according to risk.
4. Support applied research pertinent to fish and wildlife health, development of integrated disease management strategies, and improved technology for fish and wildlife health management.
5. Establish and maintain a fish and wildlife disease Web site, uniform training for critical staff of cooperating partners, and communication plans and networks to inform policymakers and citizens about fish and wildlife health.
6. Establish a NFWHI Steering Committee to facilitate, oversee, and coordinate interactions among partners and provide the support necessary for effective implementation of the Initiative.

Examples of Successful Fish & Wildlife Health Partnerships

With that independent vision, the Michigan Department of Conservation's Wildlife Disease Laboratory (WDL) was established in 1933, the first of its kind. Its initial stated role was to study starvation, nutrition and diseases of Michigan wildlife. And for over seven decades the WDL has trained veterinary and wildlife biology students at Michigan State University, monitored causes of death and illness for the multitude of game and non-game Michigan wildlife species, and carried out research and management of several significant animal diseases including bovine tuberculosis, Type E botulism, and epizootic hemorrhagic disease. This success story was possible in large measure because of substantial and sustained funding from both state (hunting and fishing license fees, State Building Authority bond funds, and general fund monies) and federal (Pittman-Robertson grants) sources. The Michigan Department of Natural Resources (MDNR) WDL is an example of how strong state wildlife health programs can benefit not only wildlife, but domestic animal and public health as well.

Managing Wildlife Disease Issues: What *Has Not* Worked

Yet another example of what has not worked in managing wildlife disease issues is attributable to the states themselves. The high profile of such diseases as chronic wasting disease and bovine tuberculosis has led a number of states to initiate wildlife disease surveillance programs of varying scope. Not uncommonly, a single person, often a veterinarian, is hired to oversee the program but instead ends up being the entire program. With little management or administrative support, an uncertain budget, and no commitment on the part of state government for its sustained support, such programs frequently have not survived. Although strength and persistence are usually improved by involving other states cooperatively as regional partners, even this does not assure success in the absence of committed and sustained support. For example, the Northeastern Research Center for Wildlife Diseases, in Storrs, Connecticut, was established as a cooperative venture

with funding from several state fish and wildlife agencies in the region. However, the lack of full participation by some nearby states, coupled with a lack of federal agency cooperators (Nettles and Davidson 1996), as well as other factors, eventually led to the group's dissolution.

Managing Wildlife Disease Issues: What *Has* Worked

Though challenges remain, there are also many examples of state federal agency interactions that have worked quite well, to the benefit of all. The first and most prominent example is the provision of significant and sustained federal funding for wildlife disease surveillance and management programs administered and carried out by state fish and wildlife agencies. A pair of success stories comes to mind. First, since the passage of the Federal Aid in Wildlife Restoration (Pittman-Robertson) Act of 1937, proceeds from an 11 percent excise tax on sporting firearms, ammunition and archery equipment have been collected by the federal government and have been distributed to state fish and wildlife agencies as grants to fund wildlife conservation programs. As noted, management and research of wildlife disease issues fit well within the framework of conservation. To that end, Pittman-Robertson monies have been put to good use in many states to supplement state funds or to leverage state funds and to allow their application to other needs.

Conflicts of Authority and Strategies to Address Wildlife Diseases

Although the same basic methods are used to study, diagnose, and manage diseases of domestic animals and wild animals, managers of wild animal diseases face significant difficulties that are relatively unimportant in management of diseases of domestic animals (Wobeser, 1994). Some of these difficulties are inherent in the wild nature of truly free-ranging animals, while others are related to a lack of knowledge and/or tools necessary to effectively manage diseases of concern. All these difficulties are compounded by varying perceptions of ownership and management jurisdiction. In addition, wild animals capture the interest of diverse constituencies, including some advocacy groups that have little concern for the health of domestic animals.

Wildlife Disease Diagnostics

Wildlife Disease Diagnostics

The DEC Wildlife Health Unit (WHU) is responsible for diagnosing the causes of sickness and death in wildlife for New York State. WHU staff routinely analyze deer carcasses to test for and learn more about the widespread Chronic Wasting Disease.

The Cornell University Animal Health Diagnostic Center (AHDC) is the only full-service, multidisciplinary (i.e., Avian, Bacteriology, Comparative Coagulation, Clinical Pathology, Endocrinology, Immunology, Molecular Diagnostics, Parasitology, Serology, Toxicology, and Virology) animal disease diagnostic facility in the northeastern U.S. It is just one of seven of the National Animal Health Laboratory Network (NAHLN) laboratories providing a full range of services in the testing for diseases like Foot-and-Mouth Disease, Classical Swine Fever, Avian Influenza, Chronic Wasting Disease, Scrapie, and Bovine Spongiform Encephalopathy ("Mad Cow Disease").

The services provided by this accredited American Association of Veterinary Laboratory Diagnosticians (AAVLD) laboratory can help DEC perform timely and effective management for the health of our State's wildlife resources.