CHAPTER 11.0
SOURCES OF INFORMATION

The following is a compilation of sources of information consulted in developing Maine's CWCS. Only key sources of information are listed here; other sources are listed in the *Literature Cited and References* section. Sources are also cited in the body of this document, or in the appropriate tables and figures. Also, a number of species or taxa experts were consulted, and their specific contributions are cited within the text of the CWCS.

11.1 SOURCES FOR DETERMINING SPECIES STATUS, ABUNDANCE, DISTRIBUTION, AND THREATS

11.1.1 SOURCES FOR ALL SPECIES

Ecoregional Surveys

In 1996, the Maine Natural Areas Program embarked on an ambitious endeavor to conduct systematic, statewide surveys of rare species of plants, animals, and natural communities. To accomplish this, the state was divided into 15 biophysical regions (Figure 5, McMahon 1990), and a schedule was developed to inventory all 15 ecoregions. MDIFW has been a partner in this endeavor, and funding has come from a variety of sources. Wildlife surveys have included rare and listed birds, mammals, herpetofauna, and invertebrates (Appendix 13). To date, four surveys, covering a total of nine ecoregions, have been completed and reports written: Central Interior, Midcoast, and Penobscot Bay Regions (deMaynadier 1997, deMaynadier and Hodgman 1998), Southwest Interior and South coastal Regions (Givens et al. 2002), and St. John Uplands and Boundary Plateau (Herrmann, et al. 2003). Two regions are being surveyed (Aroostook Hills and Aroostook Lowlands), and a survey of one region is currently being initiated (Eastern Lowlands). Three ecoregions (Western Mountains, Central Mountains, and Western Foothills) remain to be surveyed.

Federal Aid Jobs and Work Plans

Currently, MDIFW's Wildlife Division is operating under a 5-year operational plan that covers the period October 1, 2001 through September 30, 2006 (MDIFW 2001). Part 2 is the Operational Plan, which includes PR Job Descriptions. MDIFW's Fisheries Division operates under a similar operational plan, though it has not been published. Most jobs (except the purely administrative jobs) provided some level of information used in assessing the distribution and abundance of Maine's wildlife species. A few jobs played key roles, especially species assessment (PR Job 103), species prioritization (PR Job 113), management system jobs, and jobs involving wildlife surveys, monitoring, and management.

Jobs 103, 601, and 628 (Species Planning) are the jobs under which all of Maine's wildlife species assessments are compiled and reviewed, and under which input from public working groups is solicited to establish management goals and objectives. Species assessments are state-of-the-species documents, which provide a concise summary of what was known about a species in Maine at the time the document was written. Species assessments served as important sources of information regarding population and habitat status and trends.

Job 113 (Identification of Priority Species) was designed to objectively prioritize species and groups of species that should receive management attention (Appendix 3). It is based on a system developed in Florida (Millsap et al. 1990). Prioritization processes have been developed for game species, Endangered and Threatened species, and species of Special Concern.

Management System Jobs are the operational arms of formal management systems, which are developed for each species or group of species that have had management goals and objectives established through the public working group process (Chapter 6, Figure 17, Appendix 11). Management systems identify data to be collected, appropriate analyses and interpretation, and rules-of-thumb that guide decisions toward appropriate management actions. System jobs are annually evaluated to determine if each system is working correctly, and it provides a current reading on the status of the species or group of species it covers. Current management system jobs include:

PR Job 200 – Waterfowl Management System
PR Job 205 – Bird Management Systems
PR Job 301 – Deer Management System
PR Job 326 – Moose Management System
PR Job 350 – Beaver Management System
PR Job 351 – Otter Management System
PR Job 352 – Bobcat Management System
PR Job 353 – Fisher Management System
PR Job 354 – Marten Management System
PR Job 355 – Coyote Management System
PR Job 385 – Bear Management System
PR Job 404 – Endangered and Threatened Species Management Systems
PR Job 626 – Technical Assistance

Population Surveys and Assessment Jobs are designed to gather information on the status of species populations; they include:

PR Job 201 – Waterfowl Breeding Population Surveys
PR Job 202 – Waterfowl Production Trends and Status
PR Job 204 – Winter Waterfowl Population Surveys
PR Job 211 – Wild Turkey Population Monitoring
PR Job 229 – Woodcock Population Monitoring in Selected Habitats
PR Job 331 – Colonial Waterbird Population Monitoring
PR Job 260 – Mourning dove Population Survey
PR Job 290 – Evaluation & Inventory of Priority Species
PR Job 291 – Bird Banding Studies
PR Job 294 – Bird Species Status Studies
PR Job 318 – Deer Population Indices and Surveys
PR Job 335 – Aerial Survey and Analysis of Moose Population Densities
PR Job 336 – Moose Population Indices and Attitude Surveys

PR Job 361 – Wolf Status Investigations
PR Job 362 – Lynx Status Investigations
PR Job 369 – Upland Furbearer Densities Studies
PR Job 370 – New England Cottontail Status and Distribution
PR Job 384 – Bear Movements, Home Range, and Habitat Use
PR Job 390 – Evaluation and Inventory of Priority Mammals
PR Job 413 – Bald Eagle Population Monitoring and Management
PR Job 419 – Peregrine Falcon Population Monitoring and Management.
PR Job 420 – Golden Eagle Population Monitoring and Management
PR Job 421 – Box Turtle Population Monitoring and Management
PR Job 422 – Black Racer Population Monitoring and Management
PR Job 423 – Grasshopper Sparrow Population Monitoring and Management
PR Job 425 – Northern Bog Lemming Population Monitoring and Management
PR Job 427 – Piping Plover Population Monitoring and Management
PR Job 429 – Common, Arctic, and Roseate Tern Population Monitoring and Management
PR Job 431 – Least Tern Population Monitoring and Management
PR Job 432 – Black Tern Population Monitoring and Management
PR Job 435 – Blanding's and Spotted Turtle Population Monitoring and Management
PR Job 437 – Evaluation and Inventory of Priority Amphibians and Reptiles
PR Job 438 – Evaluation and Inventory of Priority Invertebrates
PR Job 461 – Freshwater Mussel Monitoring and Management
PR Job 476 – Atlantic Puffin Population Monitoring and Management
PR Job 477 – Razorbill Auk Population Monitoring and Management
PR Job 478 – Harlequin Duck Population Monitoring and Management
PR Job 780 – Cooperation with Specific Jobs

DJ Job 103 – Fish Population Survey
DJ Job 104 – Sport Fishery Survey
DJ Job 106 – Baitfish Survey and Management
DJ Job 107 – Smelt-run Survey

Federal Endangered and Threatened Species and Species of Special Concern

The federal listing status of a species was a key input in prioritizing Maine's species and identifying SGCN (Chapter 3.2 and 3.3). Up-to-date federal listing status for Maine species was obtained from Mark McCollough of the USFWS, Old Town, ME (Appendix 4) and from the USFWS website
http://ecos.fws.gov/tess_public/servlet/gov.doi.tess_public.servlets.UsaLists?state=ME

Maine Endangered and Threatened Species and Species of Special Concern

We relied heavily on Maine's current list of Endangered and Threatened wildlife when developing lists of priority species (Appendix 4). The criteria used to list each species were also helpful in determining the extent and nature of the threats facing each listed species (Tables 30-35).

Species of Special Concern are defined by MDIFW as being any species of fish or wildlife that does not meet the criteria as an Endangered or Threatened species, but could easily become a Threatened, Endangered, or Extirpated species due to restricted distribution, low or declining

numbers, specialized habitat needs or limits, or other factors, or is a species suspected to be Endangered or Threatened, or likely to become so, but for which insufficient data are available. The list of Species of Special Concern is an administrative list, which can be updated at any time by the Department. Criteria for determining if a species qualifies as a Species of Special Concern and the current list of Species of Special Concern can be found in Appendix 4.

NatureServe

NatureServe represents an international network of biological inventories — known as Natural Heritage Programs or Conservation Data Centers — operating in all 50 U.S. states, Canada, Latin America, and the Caribbean. We referenced NatureServe extensively when determining global and national conservation status and management needs of invertebrates and certain other groups (NatureServe 2005). http://www.natureserve.org/explorer/

Wildlife Species of Regional Conservation Concern in the Northeastern United States

This publication is the product of The Northeast Endangered Species and Wildlife Diversity Technical Committee, a working committee of the Northeastern Association of Fish and Wildlife Agencies (Therres 1999). It is the result of a request from Region 5 of the U. S. Fish and Wildlife Service to develop a process to identify animal species within the northeastern states that may warrant federal listing, and the need for a list of species of regional concern. This list played a key role in determining which species should be SGCN.

11.1.2 BIRDS

Annotated checklist of Maine Birds

Annotated checklist of Maine birds: a complete, up-to-date survey of birds found in Maine is a booklet that summarized data submitted by birders as part of Maine's Rare Bird Alert (Vickery 1978). Although nearly 30 years old, it served as a useful summary of the relative occurrence of Maine birds year-round.

Atlas of Breeding Birds in Maine

This publication is the culmination of a 6-year, volunteer effort to determine the geographic distribution of birds that nest in Maine (Adamus 1987). Despite its age, it remains the definitive reference for the distribution of breeding birds in Maine based on field observations.

Bird Conservation Region (BCR 14 Workshop Recommendations)

When developing Table 30 for bird species, we referred to the draft version of the *Blueprint for the Design and Delivery of Bird Conservation in the Atlantic Northern Forest* (Dettmers 2005, http://www.acjv.org/pdf_files/BCR%2014%20Blueprint.pdf).

"Birds of North America"

Comprised of over 700 individual species accounts, the Birds of North America series is the definitive source for authoritative summaries of current knowledge for birds that breed in North America (http://www.birdsofnorthamerica.com/). Each account also includes a major bibliography of references and unpublished information.

Christmas Bird Count (CBC)

More than 50,000 observers participate each year in this all-day census of early-winter bird populations. The primary objective of the Christmas Bird Count is to monitor the status and distribution of bird populations across the Western Hemisphere. The results of their efforts are compiled into the longest running database in ornithology, representing over a century of unbroken data on trends of early-winter bird populations across the Americas (Sauer et al. 1996, http://www.audubon.org/bird/cbc/history.html).

Coastal Bird Surveys

Over the years, MDIFW and others conducted a number of coastal bird surveys that provided important baseline information referenced in this report. These surveys include surveys of Casco Bay (Hutchinson and Ferrero 1981, Banner and Libby 1995), Sheepscot Bay (Hutchinson and Lovett 1983), Muscongus Bay (Hutchinson and Lovett 1984), Southern Coastal Maine (Jones et al. 1988), Penobscot Bay (Woodward et al. 1986), coastal York County (MDIFW 1989a), and mid-coastal Maine (MDIFW 1989b).

Maine Coastal Waterbird Survey

MDIFW staff, in cooperation with USFWS, initiated a series of aerial surveys of coastal waterbirds along the entire coast of Maine. Aerial surveys are conducted over several seasons and are supplemented with on-the-ground boat surveys. It is designed to cover each area of the coast every five years (MDIFW unpublished data).

Maine Mid-winter Waterfowl Inventory

This is an aerial waterfowl inventory conducted annually by MDIFW during the first week of January, as part of a nationwide Midwinter Survey conducted by the USFWS (Corr 1988, http://migratorybirds.fws.gov/statsurv/mntrtbl.html - wntr). It is an index to the total number of waterfowl present in the state. For many species, it is the only annual index available that indicates changes in population size in Maine (Corr 1988).

Maine Owl Survey

MDIFW, Maine Audubon, and a host of volunteers, conducted a 2-year study (2002 – 2003) that involved 608 individual surveys for owls on 146 unique routes in Maine (Hodgman 2004).

Maine Waterfowl Brood Counts

This survey is conducted annually by MDIFW and is used as an index of the size of the breeding waterfowl population found in 36 wetlands (Corr 1988)

Mountain Birdwatch

The Vermont Institute of Natural Science (VINS) launched Mountain Birdwatch in the spring of 2000 to establish a monitoring program for Bicknell's Thrush and other montane forest birds. Results from this program are used to measure population trends, monitor changes in bird distribution, model potential breeding habitat, identify conservation opportunities, evaluate proposed development, and predict effects of climate change on mountain songbirds.

North American Breeding Bird Survey (BBS)

The BBS is coordinated by the Patuxent Wildlife Research Center of the U.S. Geological Survey (USGS). Initiated in 1966, the BBS is a large-scale, roadside survey of North American birds that includes over 3,500 routes that are surveyed in June by experienced birders. The primary objective of the BBS is to estimate population changes for songbirds (Sauer et al. 2005, http://www.mbr-pwrc.usgs.gov/bbs.html). We relied heavily on these data to determine the status, abundance, and population trends of many of Maine's bird species.

Northern Atlantic Regional Shorebird Plan

This is a regional plan for the North Atlantic Region, which includes two Bird Conservation Regions, the North Atlantic Coastal Plain, and the Northern Forests (Clark and Niles 2000). The plan covers regional species priorities, regional population and habitat goals and objectives, management objectives, management coordination and monitoring needs, research and education goals, and identifies funding needs to meet regional goals.

North American Waterbird Conservation Plan

This plan, the product of an independent partnership called the Waterbird Conservation for the Americas, provides a continental-scale framework for the conservation and management of 210 species of waterbirds in 29 nations associated with the Americas (Kushlan, et al. 2002, http://www.waterbirdconservation.org/pubs/ContinentalPlan.cfm). A portion of this document "stepped down" to the regional scale (Mid Atlantic, Northeast, Maritimes: MANEM) was used as supporting information in setting priorities and identifying conservation strategies (http://www.fws.gov/birds/waterbirds/MANEM/).

North America Waterfowl Management Plan

The first North American Waterfowl Management Plan was a joint effort by the U.S. Fish and Wildlife Service (USFWS) and the Canadian Wildlife Service (CWS) (USFWS and CWS 1986, http://www.fws.gov/birdhabitat/NAWMP/images/NAWMP.pdf). The plan reflects what wildlife managers in the U.S. and Canada believe to be appropriate waterfowl population goals to meet

public demand, and actions needed to achieve those goals. The plan was expanded in 1994 (USFWS et al. 1994, http://www.fws.gov/birdhabitat/NAWMP/images/NAWMP1994.pdf) and Mexico joining the U.S. and Canada as a partner. The plan was updated again in 1998 (USFWS et al. 1998, http://www.fws.gov/birdhabitat/NAWMP/images/NAWMP1998.pdf) and finally in 2004 (USFWS et al. 2004, http://www.fws.gov/birdhabitat/NAWMP/images/NAWMP2004.pdf).

Partners in Flight (PIF)

In January 2004, Partners in Flight published the North American Landbird Conservation Plan, which reviewed the status of 448 landbird species and developed the PIF Watch List of 100 landbirds (Rich, et al. 2004). Partners in flight also produced a document identifying priority species and setting population and habitat objectives specifically for Maine (Rosenberg 2004). This, and other PIF related documents, helped us prioritize birds and identify threats (Carter et al. 2000, Detmers and Rosenberg 2000, Hodgman and Rosenberg 2000, Rosenberg and Hodgman 2000).

U. S. Shorebird Conservation Plan

The U.S. Shorebird Conservation Plan is described as a partnership of organizations throughout the U.S. that are committed to conservation of shorebirds (Brown et al. 2001, http://www.fws.gov/shorebirdplan/). The plan includes regional, national, and global management goals, and highlights critical habitat, research, and education and outreach needs.

11.1.3 HERPETOFAUNA

Maine Amphibians and Reptiles

This is a synopsis of Maine's Amphibian and Reptile Atlasing Project (MARAP), a 5-year effort conducted by over 250 volunteers and 5 organizations and completed in 1992. It was updated in 1999 with more recent information from additional surveys and volunteer observations (Hunter et al. 1999).

11.1.4 INVERTEBRATES

Conservation status of freshwater mussels of the United States and Canada

We referred to this publication when determining the status of freshwater mussels (Williams et al.1993).

"The Freshwater Mussels of Maine"

This publication is the culmination of a statewide survey of freshwater mussels by the Maine Department of Inland Fisheries and Wildlife from 1992 to 1997 (Nedeau et al. 2000).

The Maine Damselfly and Dragonfly Survey (MDDS)

The MDDS is a multi-year, citizen scientist atlasing initiative designed to improve MDIFW's knowledge of the distribution, status, and habitat relationships of damselflies and dragonflies statewide. The sixth and final field season was recently completed, with final results exceeding expectations. Over 200 volunteers participated and submitted 17,264 records, including two new U. S. species records, nine new state species records, and 297 records for state rare, Endangered, and Threatened species (deMaynadier 2004). The atlas will be published in 2007 (deMaynadier and Brunelle, in prep.).

Atlas and Assessment of Maine's Butterflies

MDIFW contracted with Dr. Reginald Webster from New Brunswick, Canada to assemble a baseline atlas and conservation assessment of Maine's 114 butterfly species. Data were drawn from published literature and specimen records from museums and amateur collections throughout the Northeast. Recently completed, the results are summarized in *A Baseline Atlas and Conservation Assessment of the Butterflies of Maine* (Webster and deMaynadier 2005).

"Mayflies of Maine: An Annotated Faunal List"

This publication (Burian and Gibbs 1991) summarizes what was known at the time of publication for the distribution and occurrence of Ephemeroptera species in Maine. It includes a historical review of published records from both the literature and museum specimens, as well as the results of intensive statewide collecting efforts in 1986.

11.1.5 INLAND FISH

"Fishes of Maine"

Publications on the *Fishes of Maine* first became available through the efforts of Dr. W.C. Kendall in 1914 and later by Dr. W. Harry Everhart (1950, 1958, 1961, and 1966). The most recent version of this publication (MDIFW 2004) describes the life histories of major sport fishes in Maine.

11.1.6 MARINE

"Maine Endangered and Threatened Wildlife"

This book summarizes basic information about each of Maine's Endangered and Threatened wildlife species (McCollough et al. 2003).

11.2 SOURCES FOR HABITAT STATUS, ABUNDANCE, AND DISTRIBUTION

"An Ecological Characterization of Coastal Maine"

This 5-volume set is perhaps the most comprehensive assessment of Maine's coast. It covers a broad array of biotic and abiotic factors that affect Maine's coast, and contains sections on rare flora, fauna, and unique communities (Fefer and Schettig 1980).

"Biological Diversity in Maine"

Biological Diversity in Maine (Gawler et al. 1996) is an assessment of the status and trends in the terrestrial and freshwater landscape in Maine, which was prepared for the Maine Forest Biodiversity Project. The appendices include information on mammals, breeding birds, herpetofauna, and invertebrates of Maine.

Forest Inventory

In 1995, the USDA Forest Service and the Maine Forest Service of the Maine Department of Conservation completed a full forest inventory in Maine. These same partners instituted an annual inventory in 1999 that measures 20% of a statewide sample of Maine's forests every year (Laustsen et al. 2003). The inventory is structured so that annual inventories (dataset panels) can be aggregated to provide a moving average of the most recent 5-years of data. These summaries provide estimates of forest area; species, number, and size of trees; volume; and components of change.

ME-GAP

The Maine Gap Analysis Project (ME-GAP) was initiated in 1992. Part of its objectives was to describe distributions of native species of terrestrial vertebrate species, and to identify land cover types and vertebrate species that currently are not represented, or are under-represented, in areas managed for long-term maintenance of biodiversity. The Maine Gap Analysis Vertebrate Data – Part I and Part II provided information on the distribution and habitat availability for the various vertebrate species we were prioritizing (Boone and Krohn 1998a,b).

National Wetland Inventory (NWI)

The National Wetland Inventory provided information on the characteristics, extent, and status of Maine's wetlands (Cowardin et al. 1979, http://wetlands.fws.gov/).

"The Northern Forest Lands Study of New England and New York"

This report to the Congress of the United States is the culmination of a study of changes in landownership and land use in the Northern Forest of New York, Vermont, New Hampshire, and Maine, by the U.S. Forest Service and The Governor's Task Force (Harper et al. 1990).

USDA Agriculture Census Data

Data on the amount of farmland and its uses in Maine were obtained from the U.S. Department of Agriculture (USDA) agriculture census data (USDA 2004, http://www.nass.usda.gov/census/).