

Species Status Summary and Information Needs

Sea Duck Joint Venture, June 2015

Red-breasted Merganser (*Mergus serrator*)

Population Size and Trends: The North American population is estimated at 400,000 individuals (NAWMP 2012), but size and trends of populations in North America are not reliably known because most aerial surveys do not differentiate between Red-breasted and Common Mergansers, and because large portions of their range are not surveyed. Furthermore, this is a late-breeding species, so most of the regular waterfowl surveys occur too early to provide appropriate estimates of population size. However, considering these shortcomings, the NAWMP continental estimation is believed to be very low since Quebec's population has been calculated to be roughly 390,000 individuals based on various breeding surveys (Lepage 2013). Data from the Waterfowl Breeding Population and Habitat Survey indicate that merganser populations (Red-breasted and Common combined) in the mid-continent and Alaska regions increased from the early 1970s to mid-1980s and have been relatively stable since (Bowman et al. 2015) while in the eastern region breeding numbers have been variable between 1990 and 2013 with no apparent trend since 1996 (CWS Waterfowl Committee 2013). Using the same data, Flint (2012) examined the influence of oceanic regime shifts on sea duck population counts. In this analysis, merganser populations showed immediate, large increases following a 1977 regime shift followed by a period of slow decline until the 1998 shift, which again resulted in an immediate increase in population size. In northern Alaska, breeding Red-breasted Mergansers have steadily increased at a growth rate of 1.060 (Stehn et al. 2013). In the Strait of Georgia, British Columbia, there was no significant trend in abundance during the non-breeding periods of 1999-2011 (Crewe et al. 2012) and there was a non-significant increase of 80.7% for birds wintering in Puget Sound, Washington between 1978-1980 and 2003-2005 (Bower 2009).

Priority Information Needs:

1. Design effective surveys for annually estimating population size in major wintering areas as an index of population status and trends.
2. Obtain appropriate and reliable estimates of population size at important breeding areas.
3. Evaluate the potential of using surveys at key molting sites as a tool to monitor trends.

Population Delineation: Little is known about the different populations, but initial genetic data suggest little if any population differentiation across North American breeding areas. Red-breasted Mergansers breed and winter along the Atlantic, Pacific and Arctic coastlines as well as inland. It is possible that some of the birds wintering in Greenland breed in Canada, as do Harlequin Ducks and King Eiders. Despite a relatively low level of genetic variability among birds breeding throughout North America, there is some indication that birds wintering on the east and west coasts are genetically distinct and may be from separate subpopulations; further research is needed to determine possible population boundaries in breeding range (Pearce et al. 2009). Fine-scale genetic differentiation among islands within a nesting colony indicated that females returned to breed on their natal island (Fishman et al. 2011).

Priority Information Needs:

1. Obtain information on migratory pathways and linkages between breeding, moulting and winter areas; identify potential major concentration/use areas during these periods.
2. Continue analysis on whether there are morphometric and genetic differences between east and west coast birds, between birds breeding in the north versus the south and between Canadian and Greenland birds.

Population Dynamics: In North America, only a few local studies have estimated reproductive parameters and survival for Red-breasted Merganser. At Tern Islands in New Brunswick, apparent nest success was 57%, although it was slightly lower for nests initiated very early in the season (Craik and Titman 2009). Nest loss was more likely to occur during the laying period than during incubation, and on average, 2.9 ducklings hatched per nest (Craik and Titman 2009). Annual survival for adult females nesting in New Brunswick averaged 81%, 2002-2013 (Craik et al. 2015).

Priority Information Needs:

1. Determine adult, sub-adult and juvenile survival rates throughout the year, particularly during the breeding season, in different geographic locations.
2. Determine reproductive parameters, such as clutch size, hatch success, nest success, hen success, breeding propensity, fledging success, etc., in various habitats (e.g., salt water, brackish, freshwater) and geographic locations.
3. Obtain estimate of age and sex ratios at various staging and wintering areas.

Population Ecology: Only a few studies have been done on the breeding and wintering ecology of the species. Brood amalgamation is frequent in this species. The causes and function of this behavior are unknown, but it likely affects survival of young. At Tern Islands, New Brunswick, nest predation was uncommon (3 of 156 nests), but > 40% of nests were abandoned, possibly due to intraspecific nest parasitism, harassment of females by conspecifics and by Common Terns, and/or investigator disturbance (Craik and Titman 2009). Avian predation rates on Red-breasted Merganser nests were lower for nests within a Common Tern colony than for nests on nearby islands without terns and nests were located on islands with no mammalian predators (Craik and Titman 2009). During fall migration at Lake Erie, Red-breasted Mergansers fed almost exclusively on fish, particularly gizzard shad (*Dorosoma cepedianum*), emerald shiner (*Notropis atherinoides*) and round goby (*Neogobius melanostomus*) (Bur et al. 2008). There is a need for comprehensive biology studies in North America throughout the complete annual cycle (breeding, molting, wintering, and migration).

Priority Information Needs:

1. Characterize breeding locations and identify areas of concentration; compare breeding ecology of coastal and inland breeding birds.
2. Identify major factors affecting reproductive success.
3. Quantify the diet of mergansers throughout the year.

Habitat requirements: Relatively little is known regarding seasonal habitat use, selection and requirements of Red-breasted Mergansers. In the boreal forest of Quebec, breeding birds selected nearshore areas of lakes, connected ponds, and open wetlands and avoided offshore

areas of lakes; they were more likely to use wetlands with area > 8 ha (Lemelin et al. 2010). At a breeding colony in eastern New Brunswick, almost all nests were in dense stands of Marram Grass (*Ammophila breviligulata*), and nest sites had greater concealment, vegetation density and vegetation height than random locations (Craik and Titman 2009). After hatching, females with broods moved from the nesting islands to mainland brood-rearing areas, which were in estuarine intertidal and subtidal, tidal stream, and saltmarsh habitats but not tidal river or marine habitats (Craik and Titman 2008). Broods used shallow (51 cm), nearshore (47 m) waters, frequently in areas with submergent eelgrass (*Zostera marina*) (Craik and Titman 2008). Anticosti Island in the Gulf of St. Lawrence is an important molting location for male Red-breasted Mergansers, with over 3,000 individuals using this area (Craik et al. 2011). They used clear, shallow waters (≤ 12 m depth), near shore (< 850 m), over sand-rock substrate with rockweed (*Fucus* spp.) and kelp (*Laminaria* spp.); this habitat provides concentrations of prey fish such as Grubby (*Myoxocephalus aeneus*) and sandlance (*Ammodytes* spp.) (Craik et al. 2011). While foraging, flocks used shallower (< 4 m depth) subtidal and intertidal areas while non-foraging flocks were found further from shore (Craik et al. 2011). A study of wintering sea duck habitat selection in southeast Alaska found that mergansers (Red-breasted and Common) were more likely to be present in areas closer to streams and with rocky shoreline and less likely to be in areas with more exposed shoreline and wider intertidal area (Gunn 2009).

Priority Information Needs:

1. Identify habitat types and quantify their use/selection by birds at areas throughout their breeding range.
2. Identify habitat types and quantify their use/selection by birds at major moulting sites.
3. Identify habitat types and quantify their use/selection by birds at major wintering sites.
4. Identify habitat types and quantify their use/selection by migrant birds at major areas used during both spring and fall migration.

Harvest Assessment: Harvest of mergansers occurs across the continent, and in most areas is regulated under general duck hunting seasons and bag limits, rather than under special sea duck rules (Rothe et al. 2015). Mergansers are not often specifically targeted by most hunters and are mostly harvested opportunistically during hunts for diving and/or dabbling ducks (Rothe et al. 2015). Despite generally liberal bag limits in most jurisdictions, mergansers constitute only a small proportion of waterfowl killed annually. From 1999-2008, the estimated sport harvest averaged 14,376 birds in the US, 65% of which occurred in Atlantic Flyway, and 5,253 birds were harvested in Canada (Baldassare 2014). For birds harvested during 2002-2011, adult sex ratios (males:females) were 2.71 in Canada and 1.41 in the US and age ratios (immatures of both sexes:adult females) were 6.05 in Canada and 2.17 in the US (Rothe et al. 2015). Data on harvest rates and age ratios indicate that productivity is high enough to sustain current levels of hunting (Rothe et al. 2015). Few data are available on subsistence harvest and illegal shooting, but subsistence harvests are likely small (e.g., < 1,000 mergansers/year in northern Canada, 185 mergansers/year in Nunavut and Northwest Territories, and 1,558 mergansers/year in Alaska) (Rothe et al. 2015).

Priority Information Needs:

1. Improve sport harvest surveys to provide more precise estimates of harvest.
2. Improve information on subsistence harvest levels.

Parasites, Disease, Contaminants: Few data are available for this species. Renal coccidia, caused by unicellular parasites and *Leucocytozoon simondi* and *Hemoproteus* sp. infections have been detected in this species, as well as deaths due to avian botulism (Hollmén and Franson 2015). Most contaminant studies have been done in the Great Lakes. Because they are fish-eating birds high in the food chain, they are one of the most vulnerable sea ducks to contaminants. This also makes them an excellent indicator species for certain contaminants. From 1977-1978 to 1990, and then again from 1990 to 2002, concentrations of polychlorinated biphenyls (PCBs) and organochlorine pesticides declined in eggs from Red-breasted Mergansers nesting on Lake Michigan (Heinz and Stromberg 2009). PCB concentrations > 1.0 mg/kg were found in Red-breasted Mergansers collected from the James Bay, Great Whale and Ungava Bay areas of Quebec and mercury was detected in all mergansers sampled, but was mostly less than 1 mg/kg (Braune and Malone 2006).

Priority Information Needs:

1. Determine if major breeding, molting and wintering areas are associated with high levels of contaminants and trace elements.

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