



To NAWMP Partnership members:

On behalf on the North American Waterfowl Management Plan Committee (Plan Committee) and the NAWMP Update Steering Committee (USC) we are pleased to provide you with a link to a draft 2024 NAWMP Update.

This Update process started early in 2023 and included surveys of the NAWMP partner community and waterfowl professionals across the continent. These surveys were delivered to organizations and individuals active in NAWMP and waterfowl management, Joint Venture staff and Flyway Councils and Technical Committees.

At this time, we are reaching out once again to the above groups for review of the 2024 Update draft, the product of deliberations of the USC, three Update working groups (Populations, Habitat and People), outreach to many NAWMP groups, and a preliminary review by the Plan Committee. While the contact list we used for the surveys and this announcement is extensive and is updated regularly, feel free to pass on this email to others in the NAWMP community that may have been missed.

You will also find a link to a [supporting technical report](#), which captures the entire body of work of the three working groups. While we are not seeking review of the technical report, you may find it a useful reference, as it lays out in more detail the rationale for many recommendations contained in the Update.

An [online webform is provided for you to submit your feedback](#). We have established a deadline of Friday, May 3 for comments.

Thank you for your time and consideration.

Regards,

TOM MOORMAN
U.S Co-Chair
Update Steering Committee

TIM SOPUCK
Canadian Co-Chair
Update Steering Committee

1 [COVER]

2



North American Waterfowl
Management Plan

Plan nord-américain de
gestion de la sauvagine

Plan de Manejo de Aves
Acuáticas de Norteamérica

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2024

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North American Waterfowl Management Plan Update

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*Expanding the Partnership through Multiple Waterfowl Habitat
Conservation Benefits*

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11 **PC Comments and Signatory Page – Spanish**

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53 Executive Summary

54 The North American Waterfowl Management Plan (NAWMP) began as a response to declining waterfowl
55 populations in Canada, the United States and Mexico in the mid-1980s and has subsequently served as
56 the foundation for continental conservation of waterfowl and their habitat for nearly 4 decades. The
57 NAWMP has been adaptive and extraordinarily successful in conserving waterfowl habitat and sustaining
58 populations across the continent. However, the landscapes that sustain waterfowl are not static – they
59 change, sometimes dramatically, and often in response to anthropogenic influences, including
60 agricultural intensification, urban and industrial development, increased demands for water, and many
61 other factors. Collectively, these factors degrade landscapes that support waterfowl, and they disrupt
62 the ecosystem services that support people and their communities. Climate change also introduces
63 great uncertainty and will exacerbate challenges encountered as NAWMP works to sustain habitat that
64 supports waterfowl and other species of birds and wildlife.

65 **PULLOUT BOX: The fundamental issue facing waterfowl remains loss of habitat across North America.**
66 **For example, Across the Great Plains of Canada, the United States and Mexico, which includes the most**
67 **important breeding habitat for mid-continental waterfowl, combined historical grassland losses**
68 **approach 70%, with 32 million acres of grasslands have been lost since 2012, with 1.6 acres of loss**
69 **occurring in 2021 alone (World Wildlife Fund 2023). Perhaps nowhere is this challenge more acute than**
70 **in the Northern Great Plains where the vast majority of waterfowl are produced annually, with rates of**
71 **annual loss in the Prairie Pothole/Prairie Habitat Joint Ventures estimated at 0.23% annually. Over the**
72 **next 10 years, estimated rates of loss of undisturbed grassland will be ~7-25 times faster than rates of**
73 **protection (Fields and Barnes 2019). Regarding wetlands, a recent study of the status and trends in the**
74 **United States reported a 50% increase in loss from 2009-2019 compared to the previous 10-year**
75 **period. Approximately 670,000 acres of palustrine vegetated wetlands were lost during the period,**
76 **including substantial losses of prairie pothole wetlands (Lang et. al 2024). The NAWMP partnership**
77 **must seek innovative means to increase the rate and scale of habitat not only in the Great Plains, but**
78 **across the continent, and it must do so rapidly to sustain waterfowl populations at desired levels.**

79 Factors degrading the ability of landscapes to support waterfowl and provide other important ecosystem
80 services are more prevalent than ever and present the greatest challenges and threats to waterfowl
81 today. In most landscapes important to waterfowl across North America, the challenge remains to
82 deliver habitat conservation at a rate and scale that halts or reverses ongoing habitat losses and ensures
83 that waterfowl populations, which will always fluctuate, do so in a manner that does not result in a net
84 decline in populations over the long term. The value of the NAWMP partnership and its continental
85 efforts to conserve wetlands and waterfowl are as important today as ever.

86 Since the beginning, the NAWMP has implicitly acknowledged that people fundamentally value
87 waterfowl, wetlands, and ecosystem services that wetlands and associated habitats provide. The
88 NAWMP has never wavered in its focus on waterfowl and wetlands conservation, though it continues to
89 be challenged to conserve habitat at a rate and scale that eliminates or offsets losses. A unique
90 opportunity exists to conservation activities under the NAWMP via leveraging the ecosystem services
91 resulting from its conservation work to engage broader audiences, and attract more and diverse
92 partners, supporters and resources that arise from its habitat conservation accomplishments.

93 **PULLOUT BOX: NAWMP habitat conservation seeks to sustain continental waterfowl populations, but**
94 **also provides multiple other ecosystem services and benefits to people, including improved water**

95 **quality and quantity, flood attenuation, nutrient sequestration, and places for people to recreate and**
96 **enjoy nature. NAWMP partners should seek to quantify these non-waterfowl benefits, and through**
97 **outreach and marketing, work to attract new supporters and partners to engage in conservation**
98 **activities and public policy efforts. Such a business strategy can increase supporters and partners,**
99 **funding, and support public policy efforts geared toward increasing the rate and scale of conservation**
100 **achievements under NAWMP. This strategy ultimately can help reverse wetland and associated**
101 **habitat losses and contribute toward sustainable waterfowl populations and communities of people**
102 **that share landscapes with them.**

103 Some NAWMP partners already communicate the multiple benefits that accrue from waterfowl habitat
104 conservation, and developed business or conservation strategies that include ecosystem services. This
105 approach is being recognized by policy makers, funders, and other conservation interests. Some
106 examples include large-scale wetland protection or restoration to reduce flooding, and nitrogen and
107 phosphorous entering waterways in Iowa (Janke and Shannon 2023 [https://nawmp.org/content/nawmp-](https://nawmp.org/content/nawmp-webinar-series)
108 [webinar-series](https://nawmp.org/content/nawmp-webinar-series)) and the Prairie Habitat Joint Venture region (Pattison-Williams et al. 2018); identification
109 of wetland and floodplain restoration projects to reduce the impacts of floods and droughts on
110 communities along the Mississippi River and provide critical migratory and wintering habitat on the
111 Mississippi Flyway (Herbert 2023 <https://nawmp.org/content/nawmp-webinar-series>); strategically
112 restoring wetlands to recharge groundwater to support both agriculture and increase drinking water
113 supplies in the Playa Lakes Joint Venture region (<https://pljv.org/playas/tomorrows-water/>); working with
114 ranchers to maintain or restore forage in flood-prone areas to benefit cattle production and waterfowl
115 and other wildlife in the Rainwater Basin Joint Venture ([Wetland Management - Rainwater Basin Joint](http://dumac.org/en/dimensiones-humanas/)
116 [Venture \(rwbjv.org\)](http://dumac.org/en/dimensiones-humanas/)); and provision of wastewater treatment technology to people sharing landscapes
117 with waterfowl to improve water and habitat quality in wetlands (Ducks Unlimited de Mexico
118 <http://dumac.org/en/dimensiones-humanas/>).

119 **PULLOUT BOXES: (Will provide 1-2 examples per country).**

120 Using multiple benefits as a means to achieve conservation goals is not a new concept. Some examples
121 of NAWMP partners following this strategy to achieve waterfowl habitat conservation goals include:

- 122
- 123 a. **Improving Quality of Life for People, and Quality of Habitat for Waterfowl in Mexico**
124 Mexico has long been a leader in espousing multiple benefits of waterfowl habitat conservation.
125 NAWMP programs in Mexico often seek to simultaneously solve problems for waterfowl and
126 communities of people. NAWMP partner Ducks Unlimited de Mexico has worked with partners
127 to improve water quality in Cuitzeo Lake by preventing raw sewage from entering the wetland
128 via provision of low-maintenance chemical dry toilets to people in surrounding communities.
129 This improves water quality in the lake, supporting recovery and growth of emergent plants that
130 provide food and habitat for waterfowl, and importantly, improving the hygiene and health, and
131 enhancing the dignity of the people in local communities who previously lacked such facilities.
132
 - 133 b. **Conserving Waterfowl and Wetlands in Manitoba through Science and Communication**
134 In Canada, wetland protection regulations fall under provincial authority. For the Prairie Habitat
135 Joint Venture, evaluation identified ongoing wetland loss as the greatest threat to achievement
136 of NAWMP goals. In response, the PHJV, led by Ducks Unlimited Canada, initiated an integrated
137 program of science and communication to encourage wetland protection in Manitoba. Scientific
138 investigation quantified how loss of wetlands higher in the watershed resulted in increased

139 flooding, and reduced sequestration of both greenhouse gases and contaminants (specifically
140 sediments, and fertilizer components phosphorous and nitrogen) in rivers, stream-courses, and
141 downstream lakes. The results of this research were communicated through multiple media
142 outlets and drew defensible connections between wetland loss and increased algal blooms in
143 Lake Winnipeg. Annually, these blooms were responsible for the closing of popular beaches
144 around the lake during peak summer vacation season. Simultaneously, scientists and policy
145 experts were engaged with senior provincial bureaucrats, politicians, and other stakeholder
146 groups to draft new wetland protection regulations. These efforts resulted in new stringent
147 wetland regulations signed into law.

148

149 c. Conserving Habitat through Sustainable Water Supply

150 The Intermountain West Joint Venture spans a broad range of semi-arid habitats across the
151 western United States. Sustaining waterfowl populations and local communities in this region
152 depend on sustainable supplies of clean water. In 2019, the IMWJV established its Water 4
153 comprehensive conservation effort geared toward sustaining valuable wetlands and irrigated
154 agricultural lands essential to sustain migrant waterfowl populations as well as other wildlife,
155 fisheries, and people in local communities. The Water 4 conservation approach uses
156 conservation easements, modernization of flood irrigation infrastructure, restoration of
157 hydrology, and improved management on public lands wetlands to increase the rate and scale
158 of habitat conservation across the IMWJV to sustain populations of migratory waterfowl while
159 simultaneously benefiting people whose livelihoods depend on the health of this landscape.

160

161 d. Indigenous Led Conservation Areas in the Canadian Boreal Forest

162 DUC's National Boreal Program works with National and Territorial governments and local
163 stewards and stakeholders, including Indigenous communities, to ensure a positive impact on
164 the region's wetlands and waterfowl habitat. It is currently working with the Deninu Kų́ First
165 Nation and the Fort Resolution Métis Government in the Northwest Territories to establish an
166 Indigenous Protected and Conserved Area in the Slave River Delta and Taltson Watershed, a
167 NAWMP priority area in the Prairie Habitat Joint Venture's Western Boreal Forest region. The
168 goal is to establish an Indigenous Protected and Conserved Area that would span hundreds of
169 thousands of acres and include breeding habitat for green-winged teal, mallard, scaup and other
170 waterfowl, as well as many waterbirds, shorebirds and landbirds.

171

172

173 Waterfowl and their habitats will always be the core focus of the NAWMP. However, given the NAWMP's
174 formal recognition of the importance of people interested in wetlands conservation in 2012, unique
175 opportunities exist to extend discussions with, and engage new supporters and partners. This dialogue
176 will be supported by more effective evaluation of the multiple benefits of NAWMP's conservation
177 outcomes. Effective communication and focused outreach based upon demonstrated multiple benefits
178 of NAWMP conservation efforts can and will bring additional partners and resources to enable the
179 NAWMP to increase the scale and rate of work to meet the difficult challenges faced by and pressures on
180 North America's wetland and waterfowl habitat. The NAWMP is one of the best examples of the delivery
181 of nature-based solutions to address environmental challenges on a broad, landscape-level scale. The
182 ability of the NAWMP Joint Ventures (hereafter Joint Ventures) to incorporate such opportunities into

183 their business models can accelerate progress toward NAWMP objectives as well as important
184 conservation objectives valued by people across North America.

185 The potential for new partners and supporters is significant and may include Indigenous Peoples, local or
186 regional governmental agencies interested in reducing flooding or improving quality and quantity of
187 their water supply to sustain their communities, or private landowners seeking sustainable approaches
188 to manage working lands. Further, many corporations and foundations seek opportunities to support
189 delivery of nature-based solutions to ecological issues faced by people and their communities across
190 North America. Indeed, whether new partners join the NAWMP partnership , or the NAWMP reaches
191 out and collaborates with other entities engaged in conservation efforts aimed at non-waterfowl
192 objectives, but which are still beneficial to waterfowl habitats and populations, significant opportunities
193 exist to increase the scale and accelerate the rate of NAWMP habitat conservation work to halt or
194 reverse factors that degrade important waterfowl landscapes.

195 Simply stated, the future success of waterfowl conservation depends on the degree to which the
196 NAWMP is successful in growing and diversifying its partnership base. Expanding the NAWMP umbrella,
197 by listening to and to engaging new and diverse partners, is a timely and logical step to secure additional
198 resources – to put more fuel in the tank – to achieve the NAWMP vision and goals for waterfowl
199 populations and habitat, and people.

200 Plan Committee Co-Chair Acknowledgements

201 Work began on the 2024 North American Waterfowl Management Plan Update in December 2022. We
202 are grateful for the work of many individuals in Canada, the United States and Mexico that contributed
203 time, knowledge, and ideas during the development of this update. The 2024 Update reflects their
204 contributions to assess achievements since the 2018 Update, and importantly, identifies adjustments
205 and course corrections for NAWMP to remain adaptive and focused to sustain waterfowl populations
206 across the continent.

207 On behalf of the North American Waterfowl Management Plan Committee, we gratefully acknowledge
208 all who have contributed their time and insights to committees, work groups, and other teams in the
209 preparation of this Update. These individuals are listed in Appendix A. We apologize to any contributors
210 to this effort we may have unintentionally omitted.

211 The Individuals listed below served on the Update Steering Committee and deserve special recognition.

212 Dean Smith, Mark Vrtiska, Barry Wilson, Mike Brasher, Shaun Oldenburger, Dave Howerter, Mike
213 Anderson, Jacey Scott, Kyle Spragens, Diane Eggeman, Jennifer Tolley, Jacey Scott, Leonel Urbano, Miguel
214 Flores, and Carlos Piedragil.

215 Tony Roberts and Dave Gordon of the USFWS and Jacey Scott of ECCC were instrumental in providing
216 support and guidance throughout the development of the Update.

217 Critical secretariat support was provided throughout the Update process by DJ Case and Associates. Rick
218 Clawson provided coordination support for Update committees and working groups. Cindy Longmire led
219 the design implementation, and analysis of surveys of Plan partners and professionals. Dave Case, who
220 has participated in NAWMP Updates since the Plan's inception, provided invaluable perspectives that
221 come from a deep knowledge of NAWMP.

222 NAWMP has guided continental waterfowl conservation for 38 years, an accomplishment that is only
223 possible because of the dedication and commitment of those who have given their time and expertise
224 since the inception of this remarkably successful plan. We also wish to acknowledge the continued work
225 and support of the long-standing NAWMP support teams including the Integration Steering Committee,
226 Human Dimensions Public Engagement Team, the NAWMP Science Support Team, the Harvest
227 Management Work Group, and the Plan Committee for their ongoing commitment to the North
228 American Waterfowl Management Plan.

229

230 Introduction

231 The North American Waterfowl Management Plan has guided continental waterfowl conservation for 38
232 years. Over that time, the Plan has been both remarkably adaptive and successful because of the strong
233 and lasting commitment of its partners, who continue to find innovative solutions to complex
234 conservation challenges across the continent. Indeed, international collaboration, cooperation and
235 commitment among federal, provincial, state, and local governments, and non-governmental
236 organizations in Canada, the United States and Mexico, to achieve common objectives for North
237 American waterfowl and people has set a precedent for wildlife conservation throughout the world.

238 The Plan has remains as relevant today as it was when it began in 1986, largely because the
239 organizations and individuals engaged in its implementation embraced a cycle of adaptive reviews and
240 updates to ensure it remains responsive to evolving values and priorities in the NAWMP community and
241 beyond. Previous updates have focused on expanding the scope of habitat objectives and bringing
242 Mexico into the Plan (1994); expanding partnerships and focusing on landscape-scale conservation
243 (1998); and strengthening the biological foundation of its science (2004).

244 The Plan underwent a major revision in 2012, when far-reaching consultations with partners resulted in
245 re-visioning to address both current and future challenges. While the Plan was remarkably successful up
246 to this time, the 2012 Revision greatly strengthened the Plan foundation by establishing fundamental
247 goals and establishing them as highly inter-related. Inter-related goals were established for populations,
248 habitat, and people – but importantly – the Plan acknowledged that future success hinged on increasing
249 and diversifying the number of Plan supporters. Essentially, the Plan explicitly recognized that successful
250 conservation is dependent upon the values people place on the natural world, hence, the Plan must seek
251 to strengthen and increase the connections people have with nature.

252 Plan partners responded by embracing and engaging in the science of human dimensions, seeking to
253 understand the values and desires of both current and prospective supporters. Progress toward that
254 understanding, along with a renewed commitment to the application of social science was the focus of
255 the 2018 Update.

256 Today, the commitment to advancing toward the three fundamental goals is strong, and Plan partners
257 continue to embrace human dimensions science and grow both supporters and partners. This Update of
258 the Plan seeks to expand the rate and scale of conservation by conveying the multiple benefits that
259 waterfowl habitat provides to people. Ultimately, people conserve what they value, and, while retaining
260 its focus on waterfowl conservation, the Plan must continue to demonstrate the multiple values of its
261 conservation work to continue to strengthen and grow supporters. Expanding the Plan partnership will
262 increase the rate and scale of conservation needed to meet continuing challenges across the continent
263 that degrade waterfowl habitat.

264 The Update is the responsibility of the North American Waterfowl Management Plan Committee (Plan
265 Committee), the most senior body in NAWMP's continental governance structure. It delegated
266 responsibility for the Update to an ad hoc, continental group, the 2024 Update Steering Committee
267 (USC), which was established in January 2023. Three working groups were also established under the
268 USC. These working groups aligned with NAWMP's three core objective categories: Waterfowl
269 Populations, Habitat and People. The membership of the USC and the working groups reflected, to the
270 extent possible, NAWMP's geography and the diversity of the NAWMP partnership.

271 These groups were tasked with examining current NAWMP activities and the development of
272 recommendations to assist NAWMP in meeting current and future issues and opportunities. As part of

273 their reviews, the Populations and Habitat working groups conducted surveys of NAWMP Habitat Joint
274 Ventures on key questions in their respective responsibility areas, while the People Working Group was
275 able to take advantage a recent survey of Joint Venture human dimensions activities to support its
276 deliberations. To ensure integration of activities and recommendations across the working groups, a
277 Working Group Co-Chairs committee also met regularly.

278 In addition to the activities of the working groups, two comprehensive surveys were undertaken by DJ
279 Case and Associates focused on perceptions of the Plan among NAWMP partners and perceptions of
280 waterfowl management professionals. These surveys paralleled surveys undertaken for 20218 Update
281 and help to form a long-term assessment of attitudes to NAWMP among key stakeholders.

282 Each working group has prepared technical reports that are the basis for the 2024 Update. The technical
283 reports were combined into a single report ([Howerter et al. 2024](#)).

284 Throughout the Update’s development, several meetings were held with key NAWMP committees,
285 including the NAWMP Integration Steering Committee and the Human Dimensions Planning and
286 Evaluations team. Sessions were also held with key external audiences, including flyway councils and
287 technical committees, the AFWA Waterfowl Working Group, the 9th Waterfowl Symposium and Joint
288 Venture coordinators.

289 A small writing team, consisting of some members of the USC was established to develop draft
290 documents that were reviewed internally among the working groups, the USC, and the Plan Committee
291 in advance of review by the NAWMP community. In addition to discussions with key stakeholders, a
292 more formal, open comment period was available for interested parties.

293 After final review and acceptance by the Plan Committee, the document was submitted to the
294 governments of Mexico, Canada, and the United States for formal acceptance prior its release.

295 NAWMP Objectives – Waterfowl Populations, Habitat, and People

296 The 2012 NAWMP Revision (hereafter 2012 Revision) presented a new strategic direction that challenged
297 the waterfowl conservation community to expand support from people, especially hunters and other
298 conservation-minded citizens, to achieve interrelated goals for populations, habitat, and people. The
299 2012 Revision clearly articulated three fundamental goals for waterfowl populations, habitat, and
300 people. Goals for populations and habitat were revised, and objectives for increasing the number of
301 people supporting waterfowl conservation were then developed (NAWMP 2014; hereafter 2014
302 Addendum).

303 The 2018 Update reaffirmed these fundamental goals and summarized progress on incorporating human
304 dimensions science to advance understanding of people’s preferences and perspectives around
305 waterfowl and wetland conservation. Importantly, the 2018 Update set up the groundwork required to
306 incorporate an understanding of people’s values about and relationship with nature into the North
307 American waterfowl conservation enterprise. It also gave excellent examples of achievements by Plan
308 partners that integrated people into waterfowl conservation efforts (NAWMP 2018).

309 The 2024 Update began with formation of an Update Steering Committee with representation from
310 across the continent, including individuals from Joint Ventures, Flyways, states and provinces, and non-
311 governmental organizations in an effort to represent the diverse NAWMP partnership. Surveys of
312 NAWMP partners and professionals were completed to ascertain perceptions and assess opinions about
313 the current state of NAWMP. Results of surveys were used to inform preparation of the Update. Along
314 the way, substantial efforts were made to communicate and inform Plan partners regarding the status
315 and theme of the 2024 Update.

316 Waterfowl hunters have been the among the most important and strongest supporters of the NAWMP
317 since its start in 1986, and they remain so today. The support of hunters for conservation of North
318 American waterfowl conservation has been prominent since the early 1900s and remains steadfast
319 today. More recently, it is increasingly clear that waterfowl hunters and many other people appreciate
320 and value the ecosystem services provided by habitats conserved under the NAWMP. The ongoing
321 support of waterfowl hunters is still critical, while the growing interest of other people in the ecosystem
322 benefits of waterfowl habitat conservation offers an opportunity to further strengthen the NAWMP
323 support base. Measuring, communicating, and using the ecosystem services provided by NAWMP
324 conservation activities presents a compelling business strategy to increase and diversify supporters,
325 partners, and resources to increase the scale and rate at which we conserve waterfowl habitat. The
326 expanded supporter base that results from successful execution of this strategy will include people and
327 their communities that are dependent upon the ecosystem services of wetlands, including clean and
328 abundant water supplies, flood mitigation, conservation of biodiversity, places to connect with nature,
329 and many others.

330 ***The following definition will be in a pullout text box: ECOSYSTEM SERVICES. Ecosystem services are the***
331 ***benefits people obtain from ecosystems. These include provisioning services such as food, water,***
332 ***timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality;***
333 ***cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services***
334 ***such as soil formation, photosynthesis, and nutrient cycling. The human species, while buffered***
335 ***against environmental changes by culture and technology, is fundamentally dependent on the flow of***
336 ***ecosystem services (Hassan et al. 2005).***

337 Waterfowl Populations

338 ***The fundamental goal will be stated in a text box pullout: GOAL “Abundant and resilient waterfowl***
339 ***populations to support hunting and other uses without imperiling habitat” (NAWMP 2012). OBJECTIVE***
340 ***“Maintain long-term average populations of breeding ducks [1955-2014 in the Traditional Survey Area***
341 ***(TSA) and 1990-2014 in the Eastern Survey Area (ESA)] and periodically, 40 million or more total breeding***
342 ***ducks and 2.7 million or more breeding ducks in the TSA and ESA, respectively.” (NAWMP 2014).***

343
344 Waterfowl populations are a product of the landscapes within which they exist, as are other ecosystem
345 services important to people. Many complex and interacting factors diminish the ability of landscapes to
346 sustain waterfowl populations, including wetland loss and degradation, loss of wetland-associated
347 uplands that provide nesting habitat, and water quantity and quality issues that impact habitats on
348 important migration and winter areas. Many of these factors also degrade ecosystem services and affect
349 people and their communities, including reduced water quantity and quality, loss of biodiversity,
350 increased flooding, and many others. The NAWMP efforts over the past 38 years have conserved 13
351 million acres of the some of the best waterfowl habitat in North America, yet the scale and rate of
352 habitat loss remains high. As such, the NAWMP must increase the scale and rate of conservation work to
353 sustain waterfowl populations at levels desired by hunters and other supporters.

354 Quantitative population objectives have been the foundation of the Plan since its inception. These
355 objectives rely on operational monitoring programs and provide common benchmarks for assessing
356 conservation needs and guiding habitat and population management decisions. Foundational population
357 objectives should not be changed without compelling reasons for doing so, but each Plan Update offers
358 an opportunity to ensure that objectives remain based on the most current information available.

359
360 In keeping with the 2018 NAWMP Update recommendation to review population objectives every 10
361 years, a thorough review of the 2014 *Revised Objectives – An Addendum to the 2012 North American*
362 *Waterfowl Management Plan* was completed. Critical information including updates to the Waterfowl
363 Breeding Population and Habitat Survey (WBPHS) Traditional (TSA) and Eastern Survey Area (ESA)
364 estimates, and new information from the Sea Duck and Arctic Goose Joint Ventures, were evaluated to
365 assess whether adjustments to existing objectives, or development of new objectives were warranted
366 for previously excluded species or areas based on new data (see Appendix B in [Howerter et al. 2024](#)). A
367 survey of the NAWMP Habitat Joint Ventures was also completed to assess their current approaches to
368 linking habitat objectives to NAWMP population goals, their frequency of conservation planning
369 iterations, their use of dual objectives and more (see Appendix A in [Howerter et al. 2024](#)).

370
371 Additionally, recent efforts to review and update the NAWMP species prioritization based on perceived
372 management needs is incorporated into this Update (Appendix F and Roberts et al. 2023). The NAWMP
373 first prioritized waterfowl species in terms of perceived management need given habitat conditions and
374 importance in harvest (NAWMP 2004). The latest revision builds upon earlier iterations by considering
375 additional biological and social data that are now available, along with the broadened goals of the 2012
376 Plan (Roberts et al. 2023).

377 For the following recommendations, additional detail and context is provided in ([Howerter et al.](#)
378 [2024](#)).

379

380 *Priority Population Recommendations*

381 *Ducks*

382

383 1) *The NAWMP Committee should recommend adjusting the period used for Traditional Survey Area*
384 *objectives by (1) choosing 1974 instead of 1955 as the starting year, and (2) adding data from*
385 *2015–2023 to the data used in 2014, thus making 1974–2023 the basis for long-term averages.*
386

387 A careful analysis of the changing survey design and protocols during the earliest years of the WBPHS TSA
388 indicates that the 1974–2023 time series is more appropriate for determining LTA objectives ([Howerter et](#)
389 [al. 2024](#)). Survey effort increased significantly from 1955 to 1974, transect locations changed, and
390 stratum boundaries were redrawn over existing transects. Another significant protocol change occurred
391 in 1974 when observers stopped recording unidentified ducks, leading to increases in the number of
392 identified birds of some species. Lack of detailed documentation for some of these changes limits our
393 ability to accommodate the early data using model-based analytical approaches. Therefore, the 1974–
394 2023 time series represents a consistent period of survey effort and allocation, better documentation of
395 survey design changes, and is sufficiently long (50 years) to represent a wide range of habitat conditions
396 and waterfowl populations. Using the later start date results in a minor change in the NAWMP LTA
397 objectives for most species, and those species previously below goal levels in 2014 would remain below
398 the new recommended goal levels (Appendix B; also see [Howerter et al. 2024](#)).

399 2) a. *For mallards and black ducks in the Eastern Survey Area, the NAWMP objectives should*
400 *include waterfowl from all Eastern North America, an expanded region beyond the Eastern Core*
401 *Survey Area that includes state and provincial surveys, and an extended period 1998–2023 for*
402 *calculating the LTA and 80th percentile objectives.*

403 b. *For black ducks a 1:1 breeding pair correction for population estimation is recommended, as it*
404 *is currently being used in the black duck adaptive harvest management framework. For other*
405 *duck species in the east, it is recommended that population objectives on ducks from the entire*
406 *WBPHS eastern survey area ([Howerter et al. 2024](#)).*

407 c. *Consider inclusion of surveyed areas beyond the TSA, especially surveys for western waterfowl*
408 *populations. This has already been done for the ESA with added utility for both Joint Venture*
409 *habitat conservation planning and harvest management.*

410 The eastern survey area expansion would produce higher NAWMP population objectives than the 2014
411 Addendum and 2018 Update but represents a more comprehensive estimate of the true population size
412 in the eastern continent (Appendix B; also see [Howerter et al. 2024](#)). In addition, these revised eastern
413 objectives will inform more habitat Joint Venture planning areas compared to previous coverage.
414 Additional information and context supporting this recommendation is in [Howerter et al. 2024](#).

415 3) *The NAWMP Committee, prior to the next Update, should ask the NSST to form a working group*
416 *to review how populations objectives are formulated, and specifically to (1) consider the utility of*
417 *the current scale of NAWMP objectives for conservation planning, (2) assess the capacity of*
418 *current monitoring frameworks to provide information needed by the Joint Ventures for effective*
419 *objective setting, and identify gaps that should be filled; (3) undertake the analytical work, if*
420 *necessary, to derive new population objectives that are useful at local geographies, but that can*
421 *be integrated to the continental scale; and 4) clarify the dual population concept put forward in*
422 *the Revised Objectives – An Addendum to the 2012 North American Waterfowl Management*
423 *Plan (NAWMP 2014). This effort will ensure that the NAWMP population objectives remain*
424 *relevant and useful for setting habitat objectives and assessing conservation progress. Clarify*
425 *the dual population concept put forward in the Revised Objectives – An Addendum to the 2012*
426 *North American Waterfowl Management Plan (NAWMP 2014).*

427 A primary purpose of dual objectives articulated in 2014 was to encourage conservation planners to
428 recognize the variation inherent in ecosystem systems when envisioning landscape conditions necessary
429 to support LTA waterfowl populations, and that occasional exceptional conditions are needed to offset
430 inevitable periods of poor conditions. Population or habitat objectives are not static values to be
431 achieved annually, but rather are the desired long-term product of the variation inherent in ecosystems
432 plus Joint Venture management actions. Based on diverse experiences of the habitat Joint Ventures
433 since 2014, application of dual planning targets is likely to make sense for some Joint Ventures but not
434 for all. The decision about whether or when to plan for average conditions (LTA population objectives)
435 or exceptional circumstances (80th percentile), and whether to collaborate with adjacent Joint Ventures
436 to plan for and accommodate desired populations under either planning scenario, is best left to the
437 experienced planners in each Joint Venture. Further, the NAWMP population objectives used to inform
438 Joint Venture conservation planning should include survey information from all monitored breeding
439 populations relevant to individual Joint Ventures, and methods of Fleming et al. (2019) should be used
440 to step down such inclusive objectives for Joint Ventures managing nonbreeding and stopover habitat.

441 4) *A critical examination of how the NAWMP population objectives is formulated is needed to*
442 *ensure that they are based on the best available data and modern analytical techniques and*
443 *provide relevant and useful benchmarks for setting habitat objectives and gauging conservation*
444 *success. We encourage collaboration among federal technical staff, the NSST, and other*
445 *researchers to resolve uncertainties and differences in estimates produced from different data*
446 *sources and techniques.*

447 From the beginning, the NAWMP has been distinguished by its commitment to evidence-based
448 management, built on a solid foundation of scientific monitoring. Annual monitoring of waterfowl
449 breeding populations by the WBPHS, and other breeding surveys has provided valuable long-term
450 information on population abundance, distribution, and variation. These surveys also provide vital
451 benchmarks for measuring NAWMP management success at the continental and regional levels.

452 Increasingly, waterfowl managers are using other biological data and analytical techniques that provide
453 additional information about populations. Band recoveries and harvest estimates have long been used to
454 estimate survival or account for mortality in population models, and Bayesian estimation frameworks are

455 now commonly used in integrated population and mark-recapture models that combine these data
456 streams. Some NAWMP population objectives are based on these model outputs already (e.g., Eastern
457 survey area estimates, some goose population objectives).

458 Evidence from recent banding analyses has challenged some of the assumptions of population surveys,
459 leading to potentially divergent conclusions about continental waterfowl population trends. Given the
460 importance of these population data to planning and evaluating success in the NAWMP, we recommend
461 that the waterfowl management community undertake a critical assessment of waterfowl population
462 estimation, including an evaluation of assumptions and potential biases of different methods and data
463 sources. This assessment should involve collaboration among federal technical staff, the NSST, and other
464 researchers.

465 In addition, the Plan Committee should ask the NSST, who are well suited and have the technical capacity
466 to do this work, to form a working group to (1) consider the utility of the current scale of the NAWMP
467 objectives for conservation planning, (2) assess the capacity of current monitoring frameworks to provide
468 information needed by the Joint Ventures for effective objective setting, and identify gaps that should be
469 filled; and (3) undertake the analytical work, if necessary, to derive new population objectives that are
470 useful at local geographies, but that can be integrated to the continental scale. Two specific questions
471 include what data that might best be used to inform habitat conservation planning for Western-breeding
472 mallards and other ducks, and the potential utility of incorporating State survey estimates for
473 conservation planning by mid-continent Joint Ventures.

474 5) *The NAWMP Committee should formalize review of population objectives every 10 years,*
475 *consistent with the recommendation in the 2018 Update. This schedule is compatible with the*
476 *Joint Venture schedules to update their conservation plans and would allow them to incorporate*
477 *any changes during their plan update processes.*

478 Western Gulf Coast Mottled Ducks

479 The Western Gulf Coast mottled duck population objective with a NAWMP breeding survey-based
480 objective of 212,000 individuals. The current West Gulf Coast mottled duck population status as it
481 pertains to the recommended objective is 126,000 and is the average of the 2011–2021 surveys
482 (Appendix C and [Howerter et al. 2024](#)).

483 Sea Ducks

484 Sea duck populations recommendations were developed in consultation with the Sea Duck Joint
485 Venture. Some recommendations for adjustment to population objectives, species status, and species
486 monitoring are suggested. Additional supporting information and discussion may be found in [Howerter](#)
487 [et al. 2024](#) and in Appendix C.

488 a. *The SDJV Continental Technical Team (CTT) considered new information available since the*
489 *last update and recommended numeric objectives for Hudson Bay common eider and*
490 *bufflehead.*

491 b. *Only a small number of Steller's eiders nest in North America, but a large portion of the*
492 *Pacific Steller's eider population uses Alaska during molt, winter, and spring staging periods*
493 *and may be a better management unit to highlight in the NAWMP.*

- 494 c. Status and population objective adjustments for the Northern common eider (NCOEI)
495 metapopulation and Eastern harlequin duck are recommended.
496 d. Broadly, while progress has been made in sea duck monitoring, it would be helpful if more
497 resources could be directed towards acquiring information on sea duck population status.
498 Specific recommendations are to continue currently operational surveys, including: WBPHS,
499 Central Arctic Canada Pacific Common Eider Breeding Survey, Parts Collection Survey, Puget
500 Sound Assessment and Monitoring Program, Arctic Coastal Plain Survey, and
501 Quebec/Newfoundland Common Eider Winter Survey.
502 e. Apply the results of CWS's experimental scoter survey work to improve the current WBPHS
503 survey for late-nesting sea ducks through design revisions or augmentation.
504 f. Continue the Pacific black scoter Breeding Survey, last conducted in 2018.
505 g. Lastly, we recommend incorporation of Sea Duck Key Habitat Sites into coastal Habitat JOINT
506 VENTURE planning (including the Great Lakes), as well as marine spatial planning and
507 environmental assessments, would help direct habitat conservation to the most important
508 sites for sea duck populations.
509

510 Geese and Swans

511
512 Goose and Swan population objectives are summarized in Appendix D and E, respectively. After
513 consultation with Flyways and the Arctic Goose Joint Venture, no changes in population objectives were
514 deemed necessary in this Update. Per the recommendation regarding population monitoring, the last
515 range-wide survey of trumpeter swans happened in 2015, the survey was not flown in 2020 and has
516 been suspended indefinitely, thus data are not available to update Trumpeter Swan status estimates. It
517 is clear from a few State surveys that the Interior Population has continued to grow. The three eastern
518 Flyways are presently reviewing the Interior Population management plan.

519 Other Recommendations

520
521 The NAWMP Committee should encourage strong communication and collaboration among all the
522 species and habitat Joint Ventures. As a science-driven conservation partnership, the NAWMP depends
523 on adaptive collaboration between scientists and managers both within and among its various
524 administrative parts.

525
526 Also, the NAWMP Committee should seek a status review of the Northern Pintail Action Group and
527 Scaup Action Team. While not formal species Joint Ventures, the Northern Pintail Action Group and the
528 Scaup Action Team were less formal science teams created after the 2007 Continental Assessment with
529 a similar mission to encourage research and extend what they learn to both habitat and harvest
530 management authorities.

531 Habitat

532
533 ***This will be a text box pullout: GOAL “Wetlands and related habitats sufficient to sustain waterfowl***
534 ***populations at desired levels, while providing places to recreate and ecological services that benefit***
535 ***society” (NAWMP 2012) OBJECTIVE “Conserve a habitat system with the capacity to maintain long-term***
536 ***average waterfowl population levels, to periodically support abundant populations, and to consistently***
537 ***support resource users at objective levels” (NAWMP 2014).***

538
539 The scale and rate of loss of wetlands, grasslands, and other habitats is the greatest, most urgent
540 challenge faced by the NAWMP partners to sustain waterfowl populations to meet desires and values of
541 NAWMP supporters. The ability to achieve and sustain NAWMP population objectives is a direct
542 function of a habitat base resilient to variable environmental conditions that supports waterfowl
543 populations throughout their annual cycle. While habitat loss directly influences efforts to sustain
544 waterfowl populations, it also causes loss and degradation of many ecosystem services that are
545 important and highly valued by people and communities.

546 To meet large-scale challenges to habitat, the NAWMP must grow and diversify its numbers of
547 supporters and partners to garner increased capacity to address challenges at relevant joint venture
548 scales. This includes increased numbers of hunters and birders and attracting supporters and partners
549 that value non-waterfowl benefits of NAWMP conservation efforts. Successful conservation of habitat
550 at the scale and rate required to sustain waterfowl populations across North America hinges on building
551 an informed and engaged citizenry that values not only waterfowl and their habitats, but also the
552 important ecosystem services provided by NAWMP habitat conservation efforts that provide critical
553 societal benefits.

554 To achieve NAWMP habitat objectives, Joint Ventures have developed specific goals and objectives for
555 their geographies. Continental population objectives (NAWMP 2014) are stepped down to individual
556 Joint Venture geographies or sub-geographies (Fleming et al. 2017, Fleming et al. 2019). For this
557 Update, Wilson et al. (2024) surveyed Joint Ventures to evaluate their progress towards habitat goals
558 and assess implications of evaluating the multiple benefits accruing to ecosystems and people from
559 waterfowl habitat conservation were also analyzed.

560 About half of Joint Ventures have quantified habitat objectives and have sufficient habitat assessment
561 systems to enable reporting on their progress. Some JOINT VENTURE’s reported significant progress
562 towards their habitat goals (Appendix G). Many Joint Ventures can report on the Plan Committee’s new
563 metric, “proportion of stepped-down NAWMP population goal that is that is currently supported the
564 Joint Venture landscape”. However the survey highlighted some challenges underlying reporting, which
565 are discussed in [Howerter et al. 2024](#).

566 Priority Habitat Recommendations

- 567 1. *The Plan Committee should continue support and provide guidance to ensure habitat objectives*
568 *articulated in Joint Venture Implementation Plans are linked to NAWMP habitat goals;*
- 569 2. *The Plan Committee should provide support and guidance to Joint Ventures to ensure that*
570 *geographic prioritization is articulated at spatial scales adequate to inform partner actions;*

- 571 3. *The Plan Committee should ensure that all Joint Ventures develop the ability to assess progress*
572 *toward their habitat objectives and reiterate its expectation that Joint Ventures be able to*
573 *populate the Plan Committee’s new metric of “Proportion of the stepped down NAWMP*
574 *population objective supported by the Joint Venture landscape.”;*
575 4. *The Plan Committee should continue to promote information sharing and advancements among*
576 *Joint Ventures relative to planning, evaluation, and adaptation, such that the best methods and*
577 *processes become widely adopted;*

578 Climate Change and Waterfowl

579 There is a growing body of evidence that there are substantial, ongoing, and increasing threats from
580 climate change to waterfowl habitats (NAWMP 2012, Hagy et al. 2014). A literature review by [Howerter](#)
581 [et al. 2024](#) indicated most major waterfowl regions and populations in North America face existing or
582 emerging detrimental impacts that can be linked either directly or indirectly by climate change, though
583 there are a few species whose habitats and populations may accrue benefits. NAWMP accomplishments
584 mitigate climate change effects through preventing release and increased carbon sequestration
585 reduction of impacts of extreme weather such as flooding, and conservation of water where supplies
586 become at risk related to warming, drying conditions. These consequences should be proactively
587 communicated and marketed.

588 Climate change is a large-scale, complex, daunting challenge that will exacerbate existing ongoing
589 habitat conservation issues. The Plan Committee and partners will need to consider and address
590 capacity issues to ensure that the NAWMP is responsive to emerging climate change information, and
591 nimble enough to adjust conservation planning strategies and program implementation at appropriate
592 scales. Ultimately, the Plan committee must ensure that climate change science is factored into
593 waterfowl conservation planning, especially at Joint Venture scales, to ensure effects on populations,
594 habitat and supporters are understood, and appropriate adaptation responses are developed to support
595 waterfowl and NAWMP supporters.

596 Climate Change Recommendations

- 597 1. *The NAWMP Committee should encourage and support Joint Venture and/or NSST efforts to*
598 *review, synthesize and incorporate rapidly advancing climate science conservation and human*
599 *dimension planning at appropriate scales;*
600 2. *The NAWMP partners must work to support, retain, or achieve strong wetland policy to conserve*
601 *wetlands and associated habitats for provision of ecosystem services that help waterfowl and*
602 *people adapt to climate change effects;*
603 3. *The NAWMP partners should continue to evaluate and integrate waterfowl habitat conservation*
604 *with nature-based climate adaptation strategies and agricultural-based climate adaption*
605 *strategies that benefit waterfowl populations, habitat, and people;*
606 4. *The NAWMP partners should assess and develop strategies to address human dimension*
607 *challenges (including funding from license sales) from waterfowl distributional changes related*
608 *to climate and land use change.*

609 People

610 ***This will be a text box pullout: GOAL “Growing numbers of waterfowl hunters, other conservationists***
611 ***and citizens who enjoy and actively support waterfowl and wetlands conservation” (NAWMP 2012).***

612 *OBJECTIVE* “Increase waterfowl conservation support among various constituencies to at least levels
613 experienced during the last two decades” (NAWMP 2014)”.
614

615 People conserve that which they value. The NAWMP was created because people value waterfowl,
616 values that have powerfully driven NAWMP success for nearly four decades. During that time, the
617 degree of understanding of the key role of wetlands and associated habitats in provision of ecosystem
618 services has improved dramatically and is reflected by increased value placed on wetlands by people.
619 However, waterfowl continue to face challenges related to large-scale loss of habitat at alarming rates,
620 and over several decades, decline of critically important supporters (especially hunters). Consequently,
621 the NAWMP partnership must find new ways to keep existing supporters, and importantly, increase and
622 diversify its support base by attracting new supporters and partners.

623
624 Since 1986, the NAWMP has recognized that, in addition to waterfowl and waterfowl habitat, current
625 and potential supporters appreciate and value other ecosystem services provided via habitat conserved
626 by the NAWMP, including increased water supply, improved water quality, reduced flooding, increased
627 biodiversity, carbon sequestration, food, and many others. Thus, while the NAWMP focuses on its
628 fundamental goals and objectives for waterfowl populations, habitat, and people, a unique and
629 important opportunity exists to develop a business strategy of marketing and outreach based on
630 multiple conservation benefits of NAWMP habitat conservation. This strategy supports objectives to
631 retain existing supporters and partners and attract new and diverse supporters and partners. More and
632 diverse supporters and partners will increase resources and the rate and scale of waterfowl habitat
633 conservation and associated ecosystem services are provided to increase the quality of life of people and
634 their communities.

635
636 The 2012 NAWMP revision included a fundamental goal for people as a key element of the North
637 American Waterfowl Management Plan, which laid the foundation for new initiatives to better
638 understand the needs and desires for wetland and waterfowl conservation among North American
639 hunters, birdwatchers, landowners, and other potential supporters. Subsequently, the 2014 Addendum
640 and 2018 Update explicitly stated objectives for people and underscored the critical need to embrace
641 human dimensions science to achieve Plan objectives to increase and diversify supporters and partners.

642 Despite substantial progress to date, questions and uncertainty remain among NAWMP partners
643 whether people are a truly co-equal fundamental objective with those for waterfowl populations and
644 habitat. Interviews conducted with Joint Venture staff revealed that, consistent with the findings of
645 Soulliere et. al (2022), many Joint Ventures continue to question whether the NAWMP objectives for
646 people are truly co-equal fundamental objectives with those for waterfowl populations and habitat. This
647 contrasts with a near ubiquitous understanding that Joint Ventures consider people, either implicitly or
648 explicitly, as a critical means objective toward accomplishing waterfowl population and habitat
649 objectives (Howerter et al. 2024). People fuel the economic and political engine that drives habitat
650 conservation activities for waterfowl in North America. As such, people are certainly a means of
651 achieving waterfowl habitat goals, while reaffirming people as fundamental objectives seems to also
652 resonate with NAWMP stakeholders. In fact, stakeholder input strongly suggests that people should be
653 considered as both fundamental and means objectives for the NAWMP (see Appendix C in NAWMP
654 2012). Given the uncertainty among Joint Ventures, further discussion and clarification is needed
655 because the treatment of people as fundamental and/or means objectives has significant implications on
656 how people-based objectives are formed and stated.

657 The NAWMP community has invested significant resources over the past decade in learning about the
658 key constituent groups, and how to use social science to support and advance wetland conservation. In
659 2022, the Unified Science Team and the NAWMP Science Support Team reported on the status of
660 integrating human dimensions into Joint Ventures (Soulliere et al. 2022). The Joint Ventures
661 acknowledged the importance of social science for achieving their goals and objectives, noting that
662 social science can help them better understand the major social and environmental changes occurring
663 across North America. Not unexpectedly, there are different levels of social science engagement across
664 Joint Ventures. These range from not using social science, to using available data and literature to target
665 conservation, develop models, or learn about landowner decision-making, to collecting data with
666 existing staff or through support from outside researchers, and finally, using the results in conservation
667 decisions. Social science capacity across the Joint Ventures is also highly variable. Integration of social
668 science into conservation planning also varied widely across Joint Ventures (Soulliere et al. 2022,
669 [Howerter et al. 2024](#)).

670 There are several perceived barriers to social science engagement and integration, including Joint
671 Venture staff capacity; traditions and culture; partnership composition; regional landscape
672 characteristics; and the stage of updating implementation/conservation plans (Soulliere et al. 2024).
673 More recently, [Howerter et al.](#) (2024) found the lack of a proactive NAWMP communication plan has
674 limited the circulation of information about outdoor recreation opportunities and societal benefits of the
675 NAWMP. There is little evidence to illustrate how the hunter, birdwatcher, or public survey data has
676 been used to directly inform or influence people to support waterfowl conservation. The NAWMP
677 Communications Committee undertook a Marketing Assets Inventory that indicated less than 10 percent
678 of the identified marketing assets directly message about the NAWMP. Most assets identified in the
679 study were informational, did not use persuasive language, and were often limited to background
680 information on the creation and adoption of the NAWMP.

681 The path forward to achieve the fundamental goals for waterfowl populations, habitat, and people,
682 requires that the NAWMP community better understand what barriers and motivations exist among
683 people or communities to participate in wetland conservation and to support policies to facilitate
684 conservation of the ecosystem benefits of wetlands and the associated uplands. Learning how to use
685 social science to inform conservation program delivery and to promote positive conservation attitudes
686 and behaviors is critical to the success of the NAWMP. Ultimately the NAWMP must move beyond
687 learning to investing in resources and governance processes to ensure social science and
688 people/community priorities are embedded in our conservation enterprise. Collectively, the NAWMP
689 community must develop, expand, and in some cases, reimagine conservation, communication,
690 marketing, and outreach initiatives and tools to successfully engage more diverse participants and build
691 relevance to a larger, more diverse suite of partners.

692 [NAWMP Professional Development](#)

693 The 2018 Update indicated a need to bolster training programs for future waterfowl management
694 professionals. This included an objective to encourage universities and colleges to maintain and build
695 waterfowl management training programs. As a result, the North American Waterfowl Professional
696 Education Plan (NAWPEP) was created to engage universities, colleges, and NAWMP partners to
697 establish, sustain, and enhance academic and experiential programs in waterfowl science and
698 management. The NAWPEP encourages the development of professionals reflecting human diversity
699 from across North America to sustain professional capacity and excellence of future waterfowl science

700 and management. The NAWPEP assessed the supply of graduates with waterfowl-related training from
701 college and university programs and the demand for such graduates by employers. To inform education
702 and training programs, NAWPEP developed a summary of professional qualifications and attributes
703 desired by employers. The NAWPEP steering committee engaged waterfowl professors in ongoing
704 communication to better understand needs and provide information and support.

705 Expanding the NAWMP Community

706 Consistent with its fundamental goal to grow and diversify its support base (NAWMP 2012), the NAWMP
707 must seek to inspire and support the conservation community in embracing the richness of diverse
708 cultures, individuals, experiences, and perspectives. The NAWMP encourages efforts to grow and engage
709 a diverse suite of practitioners, partners, and supporters to increase the NAWMP's relevance to the
710 broader community within which it works. This is another element of the business strategy of expanding
711 NAWMP supporters and partners by communicating the ecosystem services the NAWMP provides in the
712 communities and landscapes within which it conserves waterfowl and their habitats.

713 There are opportunities to gain experience and diversify NAWMP practitioners, supporters, partners by
714 expanding engagement with culturally diverse communities in conservation planning, policy, and
715 decision-making, and through collaboration with community-based organizations. Community outreach
716 can be expanded to groups outside the historical conservation community. For example, a key
717 opportunity lies in meaningful engagement with Indigenous Peoples, who have historically not been part
718 of the discussion and decision-making surrounding NAWMP planning and projects. The NAWMP success
719 in sustaining waterfowl populations is in part dependent upon including and engaging all people that
720 share landscapes with waterfowl, and value not only waterfowl, but the important ecosystem services
721 and benefits provided by the wetlands and related habitats on which they depend.

722 Priority People Recommendations

723 1. *The NAWMP Committee should appoint a task force to develop a strategic plan to guide human*
724 *dimensions efforts related to NAWMP work. The desired outcome would be to better inform,*
725 *guide, and facilitate integration of human dimensions into population and habitat plan*
726 *implementation among Joint Ventures and across the NAWMP enterprise. This could entail*
727 *facilitated workshops, with some suggested important topics to include:*

728 1.1. *Determination and clarification regarding people as a fundamental and/or means*
729 *objective(s) to inform Joint Venture planning, to include articulation of key assumptions.*

730 1.2. *Review and assessment of the current people-related objectives given the experiences,*
731 *results, and achievements since the 2012 Revision through 2024 Update, with*
732 *modification recommended if necessary.*

733 1.3. *Consistent with periodic updates to habitat and population goals the NAWMP Committee*
734 *should recommend scheduled updates/reviews of the fundamental goal and means*
735 *objectives for people (NAWMP 2012), to include consideration of existing and potential*
736 *partners.*

737 1.4. *Identification of information gaps (including a relevant literature review), critical*
738 *questions, actions, and measures of progress to facilitate achievement of goals;*

739 1.5. *Review and assessment of barriers to integration of people objectives into the NAWMP*
740 *and Joint Venture population and habitat goals, and identification of actions to eliminate*
741 *barriers.*

- 742 1.6. *Review and assessment of integration of population and habitat planning with people*
743 *goals and metrics, including processes for consideration of potentially competing criteria.*
744 1.7. *Identification desired fundamental NAWMP-related societal benefits and how supporters*
745 *perceive and value those benefits in the context of NAWMP conservation effort.*
746 1.8. *Development of strategies and resources for Joint Ventures to engage broader segments*
747 *of society in the waterfowl enterprise, which may include through*
748 *quantifying/articulating relevant “multiple benefits”.*
- 749 2. *The NAWMP Committee should encourage and support strategic investments in regional-scale*
750 *knowledge gathering that quantifies key ecosystem service benefits from actions targeted to*
751 *improve conditions for waterfowl.*
- 752 3. *The NAWMP Committee should continue to provide support and guidance for the NAWPEP*
753 *Committee to implement its strategic plan.*
- 754 4. *The NAWMP Committee should encourage Joint Ventures and/or NAWMP partners engaged in*
755 *program planning and implementation, especially at regional and local scales, to seek wider*
756 *engagement of practitioners, supporters, and partners in the NAWMP that better reflects the*
757 *communities in which it operates.*

DRAFT

758 Integration

759 The 2012 Revision of the North American Waterfowl Management Plan identified 3 co-equal
760 fundamental goals, with specific objectives articulated in the 2014 Addendum. These objectives are
761 anchored in the goals to (1) sustain waterfowl populations and population fluctuations at historic levels,
762 (2) conserve habitats at levels sufficient to satisfy life cycle requirements of waterfowl and the desires of
763 those who support waterfowl conservation, and (3) increase the number of supporters through a variety
764 of activities. Additionally, the 2018 Update advocated for integrating across the three objectives.
765 Specifically, practitioners were urged to *“Consider the impact of specific management decisions on all*
766 *objectives and learning about the effects of those actions on the attainment of multiple objectives*
767 *through monitoring and evaluation.”*

768 The 2018 Update also indicated that most decisions relevant to NAWMP implementation occur at
769 regional or local scales, and that integration should be most successful at regional (state, provincial, or
770 Joint Venture scales). Toward that end, Krainyk et al. (2019) undertook an innovative research project to
771 develop a decision support tool to spatially integrate the biological and social objectives of the NAWMP.
772 The tool allows customization such that it can be used by national, regional, and province/state-level
773 wildlife professionals to aid their decisions in targeting waterfowl habitat conservation. Such tools hold
774 great promise and support efforts by the NAWMP to advance on integration.

775 As part of the Update 2024 review process, a survey of Joint Ventures was completed that revealed
776 advancements in the use of social sciences to inform decision-making, but that Joint Ventures are
777 viewing human dimensions science primarily as a tool to help achieve biological objectives, rather than
778 to support people objectives as an end result ([Howerter et al. 2024](#)). Examples of how conservation
779 approaches seeking benefits to both waterfowl and other ecosystem services have paid dividends for
780 Joint Ventures were also reviewed to understand opportunities to engage broader audiences by
781 demonstrating broader societal benefits that come from waterfowl habitat conservation ([Howerter et al.](#)
782 [2024](#)).

783 During interviews with individual Joint Ventures, it became clear that there has been considerable
784 progress on integrating waterfowl population and habitat objectives (Appendix G). Of the 23 Joint
785 Ventures interviewed, 15 indicated they had quantified habitat objectives integrated with NAWMP
786 population objectives. On the other hand, only 2 of 23 interviewed Joint Ventures indicated that they
787 had incorporated priorities for people into their geographic priorities for waterfowl habitat, and 0 of 23
788 Joint Ventures had quantified waterfowl population objectives integrated with NAWMP people
789 objectives ([Howerter et al. 2024](#))

790 Relatively slow progress on formal integration of people objectives with waterfowl population and
791 habitat objectives should not be interpreted as a lack of interest in human dimensions by the Joint
792 Ventures, but instead it illustrates the uncertainty surrounding this process. This is not surprising given
793 that this important aspect of the NAWMP only began with the 2012 Revision. The NAWMP practitioners
794 had much to digest and learn during the intervening period. In fact, it is highly encouraging that many
795 Joint Ventures indicated that their partnerships have invested substantially in better understanding
796 socio-economic factors influencing habitat conservation. These investments took many forms but
797 included better quantification and communication of the range of ecosystem services provided by the
798 restoration and conservation of waterfowl habitat, designing and developing programs that
799 simultaneously benefit waterfowl and landowners, efforts to provide actionable science to inform policy

800 debates, and extensive gathering of waterfowl hunter and other recreationist motivation, satisfaction,
801 and demographic data (Patton 2018, Cole 2022).

802 An interesting outcome of the interviews with Joint Venture staff, consistent with the findings of
803 Soulliere et al. (2022), is that Joint Ventures seem to question whether the NAWMP objectives for
804 people are truly co-equal fundamental objectives with those for waterfowl populations. This contrasts
805 with a near ubiquitous understanding that Joint Ventures consider people, either implicitly or explicitly,
806 as a critical means objective toward accomplishing waterfowl population and habitat objectives.
807 Because the treatment of people as fundamental and/or means objectives has significant implications
808 on how people-based objectives are formed, we suggest additional discussion and reflection by the
809 NAWMP Committee. People fuel the economic and political engine that drives habitat conservation
810 activities for waterfowl in North America. As such, people seem certainly a means of achieving
811 waterfowl habitat goals, while reaffirming people as fundamental objectives seems to also resonate
812 with NAWMP stakeholders. In fact, the supporting figure of Appendix C in the 2012 NAWMP Revision,
813 based on stakeholder input, strongly suggests that people should be considered as both fundamental
814 and means objectives for NAWMP (NAWMP 2012).

815 If the desire is to retain three coequal fundamental goals with strong integration, additional support and
816 guidance is required to help Joint Ventures focus conservation efforts more effectively. For example, if
817 sustaining waterfowl populations is fundamental to support waterfowl hunters for the sake of
818 waterfowl hunting itself, then Joint Ventures and/or flyways may need additional guidance regarding
819 integration among habitat and harvest management efforts, hunter R3 efforts, and similar efforts that
820 have not traditionally been Joint Venture foci. Quantitatively integrating across 3 coequal goals remains
821 both conceptually and mathematically difficult. Nevertheless, we've seen real progress since the 2012
822 Revision and the 2018 Update in breaking the problem into more formal pairwise integration of 2 goals
823 at a time. Below are examples of that progress:

824 [Habitat and Waterfowl Populations](#)

825 The science that relates waterfowl population growth with habitat conditions continues to strengthen.
826 Increasingly, population models that can quantify the contribution to population growth at each life-
827 cycle stage have been completed for several species with diverging life-history strategies (Stearns 1992,
828 Hoekman et al. 2002, Flint et al. 2006, Coluccy et al. 2008, Johnson 2009, Amundson et al. 2011, Wilson
829 et al. 2012, Howerter et al. 2014, Koons et al. 2014, Arnold et al. 2017, Zhao et al. 2020) With
830 additional investment in these models, the NAWMP community should be able to increase spatial
831 targeting of resources to geographies that drive population growth rates. Also, with nearly 4 decades of
832 experience delivering NAWMP habitat programs, we have extensive knowledge of how relative habitat
833 delivery costs vary by program and geography.

834 With these pieces of information, for a fixed set of resources available to invest in habitat, the ability to
835 optimize operational efficiency of habitat delivery investments (where to invest, but also what types of
836 programs to implement in each geography) to maximize impacts on populations. Although there
837 certainly will be political and operational constraints to achieving this optimum, formalizing this process
838 would be a substantial step forward with information already in-hand.

839 The Central Hardwoods Joint Venture (CHJV) stood out as an exciting and somewhat unexpected
840 example of habitat and population integration. The CHJV was established primarily for its continental
841 importance to landbirds, yet they embraced an elaborate population-based planning effort for migrating
842 and wintering waterfowl (see Fleming et al. 2019) that steps down NAWMP continental waterfowl
843 objectives to habitat objectives for their geography. They further used available landcover to assess the

844 state of their landscape relative to desired conditions for waterfowl. This provides a useful model for
845 other Joint Ventures that have not yet integrated waterfowl population and habitat objectives.

846 Habitat and People

847 Habitat potentially can influence conservation supporters through access to places to enjoy nature or via
848 growing recognition of ecosystem services. Similarly, there is increasing understanding of factors that
849 engage or motivate groups of supporters. Finally, relative costs of programmatic- and geography-
850 specific costs of habitat delivery can be modelled with increasingly high confidence. Therefore, it should
851 be possible to do the same type of optimization to maximize impact of habitat programs on people
852 given a fixed set of resources.

853 People and Waterfowl Populations

854 The relationships between waterfowl populations, their management, and people are important.
855 However, ability to quantitatively evaluate and model relationships currently is in the initial stages. One
856 relationship of interest is between hunting participation and waterfowl populations. The long-held view
857 is that larger waterfowl populations, which are not independent of hunting regulations, increase hunting
858 satisfaction and participation. In Canada and the United States, this correlation has weakened in recent
859 decades. Recent surveys of waterfowl hunters, birdwatchers, and the broader public in the United
860 States and Canada offer additional insights. Specifically, the surveys measured hunter rankings for the
861 relative importance of large duck populations to hunting satisfaction and shed light on the effects of
862 waterfowl populations and expected harvest on hunters' predicted participation. Similarly, birdwatcher
863 surveys measured effects of bird numbers, species numbers, and rarity of birds on their predicted
864 participation.

865
866 Recently, human dimensions science has examined hypotheses about the relationship between
867 participation in waterfowl hunting or viewing and conservation behaviors and advocacy for appropriate
868 public policy. Hypotheses about effects of harvest regulations, a function of waterfowl populations, on
869 hunting participation have been debated and hypothesized for decades. A United States scale research
870 effort is underway to develop a new model of integrating waterfowl hunting regulations and their
871 effects on hunter participation and harvest into existing population and habitat models. The goals are to
872 create a foundation for understanding hunter dynamics, integrate them into existing modeling
873 frameworks, and reduce uncertainties ideally to incorporate a social component into decision tools for
874 setting regulations and managing harvest.

876 Habitat, People and Populations

877 With the above pieces in-hand, it is possible to understand where there are efficiencies in delivering
878 habitat for both duck populations and supporters and where there are trade-offs. This approach falls
879 short of formal integration of the 3 goals, but it links all three in a common framework and is both
880 computationally and conceptually tractable. As proof of concept, Krainyk et al. (2019), Palumbo et al.
881 (2021), and Devers et al. (2017) have developed spatial planning tools at the international, regional, and
882 state scales, respectively, that incorporate considerations for habitat delivery to meet both waterfowl
883 population and social concerns. These powerful tools provide tangible guidance for NAWMP/NAWCA
884 investments across multiple scales and generate hypotheses that could be adaptively evaluated through
885 time.

886 Existing examples provide powerful opportunities for extension:

- 887 1. The quantification of ecosystem services conferred by waterfowl habitat resources continues.
888 Further work to understand the spatial and temporal flow of these multiple benefits and

889 continuing to include these in planning tools will enhance NAWMP partner's ability to engage
890 broader segments of society in conserving the many values associated with waterfowl habitats.

891 2. Designing efficient conservation programs requires consideration of the benefits and costs of
892 delivering various conservation alternatives. Incorporating relative costs into planning tools is an
893 important antecedent to understanding the trade-offs among conservation choices.

894 3. When deciding among conservation alternatives, it is important to consider the rate at which
895 benefits accrue. Generally, in instances where habitat interventions are designed to restore
896 ecosystem function, benefits begin to accrue as soon as the restoration is complete, but it may
897 take time for full ecosystem function to recover. Alternatively, for options that conserve
898 existing ecosystem function, the benefits will accrue at the rate they would have been lost
899 without conservation action (Possingham et al. 2015). Therefore, investing resources to
900 conserve habitat at low risk of conversion may yield poor returns.

901 4. The sensitivity of waterfowl population to habitat changes varies across the annual cycle.
902 Incorporating information from recent Integrated Population Models could help focus resources
903 on life-cycle events that are most impactful for meeting NAWMP goals.

904 Incorporating these components into new or existing planning tools will facilitate engaging new
905 supporters while delivering more efficient conservation programs and avoiding substantial opportunity
906 costs currently present within funding allocations.

907 Integration Recommendations

908 1. *The NAWMP Committee should encourage and support Joint Ventures to develop strategies to*
909 *engage broader segments of society in the waterfowl enterprise that are based on strategic*
910 *investments in regional-scale science that quantifies key ecosystem service benefits from actions*
911 *targeted to improve conditions for waterfowl.*

912
913 2. *The NAWMP Committee should support and encourage the NSST, HD-PET, and Joint Venture*
914 *science and planning staff to build on existing tools (e.g., Krainyk et al. 2019) and apply them at*
915 *local, regional, and international scales to ensure biological and social integration and to allow*
916 *examination of trade-offs of management alternatives associated with incorporation of different*
917 *sets of fundamental objectives. Efforts should be made to extend these tools to incorporate*
918 *landscape-specific risks to waterfowl productive capacities, contributions to waterfowl*
919 *population growth, and relative costs of conservation delivery.*

920 3. *The NAWMP Committee should support, encourage, and engage the NSST, HDPET, or other*
921 *relevant advisory groups to explore approaches and develop planning tools that can be applied*
922 *at local, regional/Joint Venture, and international scales to incorporate a greater suite of*
923 *ecosystem services that include econometrics and support Joint Ventures in refining their*
924 *conservation plans. In part, funding for such work may be available from entities (and*
925 *prospective partners) who seek ecosystem services and outcomes and may be willing to*
926 *collaborate to achieve desired tools and outcomes.*

927

928 **Summary**

929 The NAWMP remains strong because it is adaptive and has a diverse, growing number of partners that
930 share a commitment and vision to sustain waterfowl populations in North America. The Plan also has
931 among the most committed supporters for any wildlife conservation effort in the world – waterfowl
932 hunters. Hunters have carried the burden of waterfowl conservation for decades and continue to do so
933 today. Unfortunately, daunting challenges continue to erode waterfowl habitat and threaten future
934 sustainability of populations. Such large-scale challenges point to the need for the conservation
935 community to grow and diversify its support base.

936 The Plan will always focus on waterfowl and their habitat – but the traditional partnership base is not
937 sufficient to increase the rate and scale of conservation work to halt and reverse large-scale losses of
938 habitat. Ultimately, the Plan must increase the number of supporters, partners, and resources to
939 achieve conservation that sustains waterfowl populations in the face of forces that degrade ecosystems
940 that are their life support. Indeed, these same ecosystems provide critical life-support functions to
941 people.

942 Waterfowl conservation, in addition to conserving habitat and sustaining populations of these
943 magnificent birds, provides many important ecosystem services to people. Clean and abundant water,
944 food, biodiversity, nutrient sequestration to improve soil and mitigate climate change, and places to
945 connect with nature. The NAWMP, in addition to sustaining waterfowl populations, provides these
946 services valued by people. The NAWMP can grow and diversify its supporters and partners by
947 communicating the values of its work, and through effective focused outreach, inform engage, and
948 ultimately develop a legion of inspired, motivated conservationists who appreciate, and value waterfowl
949 and all the benefits derived from conservation that improve quality of life in their communities. That is
950 the opportunity. The NAWMP community should be proud of its success, appropriately concerned about
951 existing conservation challenges, and excited about opportunities to adapt, grow and rise to the
952 challenges to sustain North America’s waterfowl and the attendant ecosystem services that, collectively,
953 are valued by people.

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1060 **Appendices**

1061 **Appendix A. Working Groups Involved in the 2024 Update**

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1107 **Appendix B. Revised NAWMP population objectives (Long-term average population size;**
1108 **in 1,000s) for select duck species.** Objectives and 80th percentile values are sourced from the 2018
1109 Update via the *“Revised Objectives: An Addendum to the 2012 North American Waterfowl Management*
1110 *Plan (September 2014)”* and are based upon long-term average populations estimates (TSA: 1955-2014).
1111 Adjusted NAWMP Population Objectives reflect adjustments proposed in the 2024 Update including (1)
1112 calculation of long term-average populations using survey data from 1974-2022; (2) inclusion of
1113 additional surveys to expand geography and include surveyed population in Eastern NA.

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2024 Update

2018 Update

Traditional Survey Area				Traditional Survey Area			
Species	Long-term Average ^a	80th percentile ^a	Population Size ^b	Species	Long-term Average	80th percentile	Population Size
Mallard	7,773,000	9,451,000	9,731,000	Mallard	7,726	9,297	9,965
Western mallards ^f			987,000				
Mid-continent mallards ^f			9,831,000				
Gadwall	2,434,000	3,258,000	3,386,000	Gadwall	1,921	2,977	3,449
American Wigeon	2,523,000	2,888,000	2,678,000	American Wigeon	2,596	3,048	2,660
Green-winged Teal	2,401,000	3,019,000	3,272,000	Green-winged Teal	2,059	2,631	3,473
Blue-winged Teal	5,479,000	6,700,000	7,225,000	Blue-winged Teal	4,949	6,329	7,794
Northern Shoveler	2,994,000	4,095,000	4,149,000	Northern Shoveler	2,515	3,592	4,434
Northern Pintail	3,149,000	3,538,000	2,717,000	Northern Pintail	4,003	5,722	3,235
Redhead	819,000	1,051,000	1,107,000	Redhead	701	918	1,187
Canvasback	605,000	712,000	699,000	Canvasback	581	691	689
Scaup	4,673,000	5,582,000	4,244,000	Scaup	5,026	5,984	4,425
TSA Total	32,850,000	40,294,000	50,026,000	TSA Total	32,077	41,189	41,311
Eastern North America				Eastern Survey Area			
Species	Long-term Average ^f	80th percentile ^f	Population Size ^b	Species	Long-term Average	80th percentile	Population Size
Mallard ^c	1,449,000	1,556,000	1,358,000	Mallard	409	426	1,156
American Black Duck ^{csd}	756,000	802,000	722,000	American Black Duck	628	648	701
Green-winged Teal ^e	357,000	394,000	334,000	Green-winged Teal	263	281	382
Ring-necked Duck ^e	699,000	731,000	682,000	Ring-necked Duck	515	529	682
Goldeneyes ^e	665,000	733,000	616,000	Goldeneyes	433	449	559
Mergansers ^e	778,000	832,000	807,000	Mergansers	436	462	594
ESA Total	4,704,000	5,048,000	4,519,000	ESA Total	2,685	2,783	4,074

^a The population objectives in the TSA are represented by the survey time series of 1974-2023. The years 1955-1973 were excluded due to modifications in stratification, survey design, and protocols during this period (E. Silverman, Appendix A)

^b The population size was calculated as the average of the last 10 survey years, 2012-2023 (due to COVID, the WBPHS was not conducted in 2020-21) in the TSA of the WBPHS, strata 1-18, 20-50, 75-77

^c The population objectives for mallard and American black duck in the ESA represent the population of the entire eastern area of North America, i.e. the entire WBPHS Eastern Survey Area (USFWS strata 51-53, 56, 62-72, and CWS helicopter strata 71 and 72), the Atlantic Flyway Northeastern Plot Survey, and the Southern Ontario Waterfowl Plot Survey

^d The American black duck population estimate was calculated assuming an updated 1.0 male:female pair ratio (i.e., all 'unknown' observed pairs are treated as drake-hen pairs).

^e The population objectives for American green-winged teal, ring-necked duck, goldeneyes, and mergansers represent the population of the entire WBPHS Eastern Survey Area (WBPHS strata 51-53, 56, 62-72 and CWS helicopter strata 71 and 72).

^f The population objectives for species in the ESA are based on the average of the period 1998-2023.

^g Population size estimates are provided as the 2012-2023 average for the western mallard stock, consisting of birds from Alaska and the southern Pacific Flyway (WBPHS strata 1-12 and British Columbia, California, Oregon, and Washington surveys), and mid-continent stock, consisting of birds from TSA strata 12-19, 21-50, 75-77 and state surveys of Michigan, Minnesota and Wisconsin (U.S. Fish and Wildlife Service 2023). Combined western and mid-continent stocks does not equal the TSA mallard estimate because it does not include state or provincial surveys.

1115 **Appendix C.** Objectives and estimates for North American duck populations other than
1116 those provided in Appendix B. Objectives and mean population size estimates are for total birds in
1117 spring or early summer unless otherwise noted.

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Species/Subspecies/Subpopulation	Objective	Population Size	Species/Subspecies/Subpopulation	Objective	Population Size
Mottled duck, Florida	42,000	53,000 ^a	Mottled duck, Florida	42,000	53,000
Mottled duck, Western Gulf Coast	212,000 ^b	126,000 ^c	Mottled duck, Western Gulf Coast	106,000	68,000
Mexican duck		56,000	Mexican duck		56,000
Hawaiian duck	2,000	947 ^d	Hawaiian duck	2,000	900
Laysan duck	Recovery ^e	1,700 ^f	Laysan duck	1,800	700
Cinnamon teal		380,000 ^g	Cinnamon teal		
Wood duck, Eastern		949,000 ^h ; 3,882,500 ⁱ	Wood duck, Eastern		
Wood duck, Western		86,700 ⁱ	Wood duck, Western		
Muscovy Duck		30,000	Muscovy Duck		30,000
Fulvous whistling duck			Fulvous whistling duck		
Black-bellied whistling duck			Black-bellied whistling duck		
Ring-necked duck		2,986,000 ^j	Ring-necked duck		2,024,000
Ruddy duck		859,000 ^k	Ruddy duck		751,000
Masked duck		6,000	Masked duck		6,000
Harlequin duck, Eastern	10,000 ^l	5,700 ^l	Harlequin duck, Eastern	3,000	4,000
Harlequin duck, Western		^m	Harlequin duck, Western		250,000
Harlequin duck, total		^m	Harlequin duck, total		254,000
Long-tailed duck		^m	Long-tailed duck		1,000,000
King eider, Eastern		200,000 ⁿ	King eider, Eastern		200,000
King eider, Western		400,000 ^o	King eider, Western		400,000
King eider, total		^m	King eider, total		600,000
	105,000 breeding pairs			165,000 breeding pairs	
Common eider, American		300,000 ^p	Common eider, American		250,000
Common eider, Northern	400,000	260,000 ^q	Common eider, Northern	400,000	260,000
Common eider, Hudson Bay	300,000 ^q	260,000 ^r	Common eider, Hudson Bay	275,000	260,000
Common eider, Pacific		150,000 ^s	Common eider, Pacific		150,000
Common eider, total		^m	Common eider, total		1,100,000
Steller's eider ^t	Recovery from threatened status	500	Steller's eider	Recovery from threatened status	1,000
Spectacled eider ^u	Recovery from threatened status	20,000	Spectacled eider	Recovery from threatened status	20,000
Black scoter, Eastern		200,000 ^v	Black scoter, Eastern		200,000
Black scoter, Pacific	^m	220,000 ^w	Black scoter, Pacific	160,000	300,000
Black scoter, total		420,000	Black scoter, total		500,000

2024 Update		2018 Update			
Species/Subspecies/Subpopulation	Objective	Population Size	Species/Subspecies/Subpopulation	Objective	Population Size
Surf scoter, east		150,000 ^x	Surf scoter		700,000
Surf scoter, west		^m			
White-winged scoter, east		60,000 ^x			
White-winged scoter, west		^m	White-winged scoter		400,000
Common goldeneye ^y		1,301,000 ^j	Goldeneyes		1,239,000
Barrow's goldeneye, Eastern	7,500	8,500	Barrow's goldeneye, Eastern	7,500	8,500
Barrow's goldeneye, Western		^m	Barrow's goldeneye, Western		260,000
Bufflehead	984,000 ^z	1,278,000 ^j	Bufflehead		1,306,000
Mergansers		1,601,000 ^j	Mergansers		1,331,000
Hooded merganser			Hooded merganser		
Red-breasted merganser			Red-breasted merganser		
Common merganser			Common merganser		

^a Florida mottled duck population estimate from 2008 aerial survey; Florida Fish and Wildlife Conservation Commission plans a spring 2024 drone survey (A. Fanning, personal communication)

^b Western Gulf Coast mottled duck population objective represents an aspirational goal consistent with the historic long-term average and stakeholder desires (Wilson 2007, Lancaster et al. 2023)

^c Western Gulf Coast mottled duck population estimate is the 2011-2021 average estimate from the Western Gulf Coast breeding mottled duck survey (<https://fws.gov/library/collections/mottled-duck-population-status-reports>).

^d Hawaiian duck population estimate from 2016 (<https://bioone.org/journals/waterbirds/volume-44/issue-4/063.044.0404/Distribution-and-Trends-of-Endemic-Hawaiian-Waterbirds/10.1675/063.044.0404.full>)

^e Laysan duck population objective from USFWS revised recovery plan: recovery for downlisting to threatened, 2,300 birds; recovery for delisting: 3,000 birds (https://ecos.fws.gov/docs/recovery_plan/090922.pdf)

^f Laysan duck population estimate from 2021-2022 summer and winter surveys on Laysan and Midway atolls (J. Plissner, Midway Atoll NWR, USFWS, personal communication)

^g Cinnamon teal population estimate from Avian Conservation Assessment Database (ACAD) global estimate (<https://pif.birdconservancy.org/avian-conservation-assessment-database>)

^h Eastern wood duck population estimate is the 2014-2023 average from the BBS/northeast U.S. plot survey composite model for the U.S. Atlantic Flyway (Zimmerman Eastern and western population estimates of wood ducks (divided by 106° longitude), 2013-2022 average, from Lincoln estimates based on band recoveries and harvest data (R. Allsauskas, unpublished data)

ⁱ Continental estimate is the average of the sum of TSA and ESA estimate for the period 2012-2023

^k Population estimate is the average from the TSA for the period 2012-2023

^l Updated objective recommended by CTT based on recent Canadian winter surveys. Updated Canadian population estimate projected from Canadian winter surveys (Gutowski et al. 2022); U.S. wintering population estimate may be available in 2 years (SDIV CTT).

^m Insufficient information currently exists to calculate a reliable population estimate or objective

ⁿ Population estimate based on Greenland winter survey last conducted in 2017

^o Population estimate based on index from Point Barrow migration survey (McGuire et al. 2019)

^p Population estimate is minimum modelled estimate based on the number of birds detected in the CBCs in the USA and the winter elder surveys in Canada (Gutowski

^q Population estimate for wintering northern common elders in Canada. An additional 500,000 birds winter in Greenland; some of these may breed in North America (<https://natur.gl/arter/common-elder/?lang=en>)

^r Estimate and objective from winter survey conducted in 2006 (S. Gilliland, unpublished data)

^s Estimate derived from a compilation of data from different regions (U.S. Fish and Wildlife Service 2006)

^t Population objective from recovery plan (U.S. Fish and Wildlife Service 2019). Population estimate represents North American breeding population from Arctic Coastal Plain, foot surveys near Utqiagvik, and aerial survey in Barrow Triangle; winter population estimate 50,000.

^u Population objective from recovery plan (U.S. Fish and Wildlife Service 2021). Population estimate represents global population of spectacled elders, including breeding populations from Alaska and Russia, which winter in the northern Bering Sea south of St. Lawrence Island. Results from aerial winter survey in March 2023 are not yet available, but based on previous surveys conducted in 2009 and 2010

^v Winter population estimate from USFWS winter survey 2008-2011 (Silverman et al. 2012). NOTE: James/Hudson Bay Molting survey (Badzinski et al. 2013) reports approx. 300,000 male black scoters, suggesting a much higher value, but it is not clear how this relates to total birds or breeding birds. SDIV CTT recommends revision of this number in the next update using this information and data on sex/age ratios from photo surveys.

^w Breeding population estimate from USFWS breeding survey (USFWS unpublished data).

^x Population estimate from Atlantic winter survey (Silverman et al. 2012)

^y Combined goldeneye estimate from sum of TSA and ESA is mostly common goldeneye. Population objective based on LTA of sum of TSA and ESA (1998-2023)

^z Population objective recommended by SDIV CTT is the long-term average of the TSA (1974-2023)

1121 [Appendix D. Objectives and estimates for North American goose populations.](#) Objectives
1122 and mean population size estimates are for total birds in spring or early summer unless otherwise noted.

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Species and Populations	Survey Description	Population Size		Management Plan	Notes - Objective
		Most Recent 10-yr Ave	Last year (or years) included in 10-yr ave		
Canada Goose					
Atlantic	Ungava spring survey, breeding pairs	152,002	2023	225,000	
Atlantic Flyway Resident	Atlantic Flyway Breeding Waterfowl survey, breeding adults	1,012,314	2023	650,000	
North Atlantic	Eastern composite survey (WBPHS + CWS helicopter), indicated pairs	51,463	2023	50,495	2001-05 survey average (estimated from 2023 survey)
Southern Hudson Bay	West Hudson survey, breeding adults	120,366	2016-2022	Stable population	
Mississippi Flyway Giant	State/Provincial surveys, breeding adults	1,452,167	2023	1,200,000 – 1,400,000	
Western Prairie/Great Plains	WBPHS, spring index	1,360,151	2023	Not yet established	
HI-Line	WBPHS, spring index	384,330	2023	150,000 – 350,000	
Pacific Flyway Western	WBPHS + State/Provincial, spring index	413,157	2023	200,000	Replaces RMP and Pacific Canada goose 2023
Lesser	WBPHS, spring index	5,710	2022	Not yet established	
Vancouver		No estimate		Not yet established	
Dusky	Copper River Delta survey, spring index	14,003	2023	20,000	
Cackling Goose					
Cackling/minima	YKDCZS with fall expansion, fall index	254,616	2023	250,000	
Aleutian	Mark-resight survey, fall-winter estimate	175,390	2023	60,000	
Midcontinent	Adult Lincoln estimate	3,096,423	2019	1,000,000	
Taverner's	WBPHS+YKDCZS+AACP, spring index	43,124	2023	Not yet established	
Snow Goose					
Greater Snow Goose	Spring staging survey, spring index	775,625	2023	500,000 – 750,000	
Mid-continent	Adult Lincoln estimate	12,519,275	2019	5,000,000	
Wrangel Island	Ground survey, spring index	428,130	2022	120,000	
Western Arctic	Photo-inventory survey (Egg River, Anderson River, Kendall Island)	432,682	2002, 2007, 2009, 2013	200,000	
Ross's Goose	Adult Lincoln estimate	1,781,795	2019	355,000	New Objective/Lower threshold 355,000; MP (MF) updated in 2021
White-fronted Goose					
Mid-continent	Adult Lincoln estimate	2,863,644	2021	1,200,000	New Objective/Lower threshold 1.2 Million; MP updated in 2023
Tule	Mark-resight survey, fall-winter estimate	12,538	2022	10,000	
Pacific Flyway	YKDCZS+WBPHS with fall expansion, fall index	607,629	2023	300,000	
Brant					
Atlantic Brant	Midwinter Survey, winter index	136,037	2023	150,000	
Pacific Brant	Midwinter Survey, winter index	147,199	2023	162,000	
Eastern High Arctic Brant	Fall staging survey, fall index	32,000	2014; CAFF report	Not yet established	
Emperor Goose	YKDCZS, spring index	28,856	2023	34,000	
Hawaiian Goose	Various counts/surveys conducted throughout Hawaiian Islands	3,862	2022 estimate (USFWS webpage)	Recovery from T&E status	Downlisted from endangered to threatened in 2019

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1125 [Appendix E. Objectives for North American swan populations.](#)

Species and population	Objective	Population Size
Tundra swan		
Eastern population	80,000 total birds	105,800 total birds
Western population	60,000 total birds	113,000 total birds
Trumpeter swan		
Pacific Coast population	25,000 total birds	31,793 total birds*
Rocky Mountain population	10,000 adults and subadults	11,721 adults and subadults*
Interior population	2,000 total birds	27,055 adults and subadults*

1126 *TRUS estimates are from the last range-wide survey conducted in 2015. The Interior Population is
 1127 believed to have at least doubled since then, based on state surveys.

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1129 Appendix F. North American Waterfowl Management Plan species priorities from Roberts
 1130 et al. 2023.
 1131

	Plan Objective	Population Trend/Size	ACAD Threat	ACAD Breeding	ACAD Nonbreeding	Total	Rank
Canada Goose Populations							
Atlantic	3	4		2	2	9	High
Lesser	2	2		2	2	6	Low
Dusky	3	5		2	2	10	High
Southern							
Hudson Bay	1	2		2	2	5	Low
North Atlantic	1	3		2	2	6	Low
Vancouver	2	4		2	2	8	Med
Pacific	3	1		2	2	6	Low
Rocky Mountain	3	1		2	2	6	Low
Atlantic Flyway	3						
Resident		1		2	2	6	Low
Mississippi Flyway	1	1		2	2	4	Low
Giant							
Western Prairie/Great Plains	3	3		2	2	8	Med
Hi-Line	1	1		2	2	4	Low
Cackling Goose Populations							
Cackling	1	4		2	2	7	Med
Aleutian	3	2		2	2	7	Med
Taverner's	2	2		2	2	6	Low
Midcontinent	3	3		2	2	8	Med
Lesser Snow Goose Populations							
Wrangel Island	3	1		4	2	7	Med
Mid-continent	3	3		4	2	9	High
Western Arctic	3	1		4	2	7	Med
Greater Snow Goose	1	4		4	2	8	Med
Ross's Goose	3	3		4	2	9	High
Greater White-fronted Goose							
Mid-continent	3	3		3	2	8.5	Med
Pacific Flyway	3	4		3	2	9.5	High
Tule White-fronted Goose	3	3		3	2	8.5	Med

Brant Populations						
Pacific Brant	1	2	4	3	6.5	Med
Western High Arctic Brant	1	2	4	3	6.5	Med
Eastern High Arctic Brant	2	4	4	3	9.5	High
Atlantic Brant	1	2	4	3	6.5	Med
Emperor Goose						
Hawaiian Goose	4	4	4	4	12	High
Tundra Swan Populations						
Eastern	3	4	3	2	9.5	High
Western	3	2	3	2	7.5	Med
Trumpeter Swan Populations						
Rocky Mountain	1	4	4	3	8.5	Med
Interior	3	4	4	3	10.5	High
Pacific Coast	3	4	4	3	10.5	High

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1133 Appendix G. Results of survey of Joint Ventures to assess species prioritization, objectives
 1134 integration, and habitat accomplishments.

Joint Venture	Waterfowl Habitat Geographic Prioritization	Integration of People Goals	Quantified Habitat Objectives	Habitat Objective Integration with NAWMP Population Objectives	Year of NAWMP Population Objective	Habitat Objective Integration with NAWMP People Objectives	Habitat Objective Attained ¹	NAWMP Population Goal Supported ¹
Atlantic Coast	Y	N	Y	Y	2014-18	N	UNK	UNK
Appalachian Mountains	N	N	N	N	NA	N	NA	NA
Central Hardwoods	N	N	Y	Y	2014-18	N	100%	100%
Canadian Intermountain	Y	N	Y	N	NA	N	UNK ⁶	NA
Central Valley Habitat	Y	N	Y	Y	2014-18	N	88%	NA ⁶
East Gulf Coastal Plain	N	N	N	N	NA	N	NA	NA
Eastern Habitat	Y	Y	Y	N	NA	N	UNK	UNK
Gulf Coast	Y	N	Y	Y	2014-18	N	92%	93%
Intermountain West	Y	N	Y	Y	2004-12	N	100% ²	100% ²
Lower Mississippi Valley	Y	N	Y	Y	2004-12	N	76% ³	76% ³
Northern Great Plains	Y	N	N	N	NA	N	NA	NA
Oaks and Prairies	N	N	N	N	NA	N	NA	NA
Pacific Birds Habitat	Y	N	Y ⁴	N	NA	N	UNK ⁶	UNK
Prairie Habitat	Y	N	Y	Y	2014-18	N	26%	97%
Prairie Habitat-Boreal	Y	N	Y	Y	2014-18	N	18%	~100%
Playa Lakes	Y	Y ⁵	Y	Y	2014-18	N	79% ⁵	79% ⁵
Prairie Pothole	Y	N	Y	N	NA	N	40%	NA
Rainwater Basin	Y	N	Y	Y	2004-12	N	59%	45%
Rio Grande	N	N	N	N	NA	N	NA	NA
San Francisco Bay	Y	N	Y	N	NA	N	UNK	UNK
Sonoran	Y	Y	N	N	NA	N	NA	NA
Up. Mis. River / Great Lakes	Y	Y	Y	Y	2014-18	N	UNK	UNK
Affirmative/Total	17/22	4/22	16/22	11/22	NA	0/22	NA	8/22

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