2024

North American Waterfowl Management Plan Update

Expanding the Partnership

Top left: Northern pintail in Seedskadee National Wildlife Refuge in Wyoming (Tom Koerner, USFWS)

Top right: William L. Finley National Wildlife Refuge in Oregon (George Gentry, USFWS)

Bottom left: A double rainbow at National Key Deer Refuge in Florida (USFWS)

Bottom right: Redhead duck drake in the Huron Wetland Management District in South Dakota (Sandra Uecker, USFWS)

NAWMP PARTNERSHIP
PNAGS PARTENARIAT
PMAAN ASOCIACIÓN

NAWMP staff standing in front of a NAWMP wetland restoration project in the Minnedosa pothole region of Manitoba.
Tim Sopuck

Bufflehead.
Grayson Smith, USFWS

Dear NAWMP Community,

For nearly four decades, the North American Waterfowl Management Plan (NAWMP or "the Plan") has exemplified the success a shared commitment to conservation can bring. Since 1986, when the first Joint Ventures were established, the NAWMP has continued to build partnerships to achieve the conservation of waterfowl and the wide array of habitats that sustain them. The collaboration between the United States, Mexico and Canada, numerous regional and local governments, and a diverse group of non-governmental organizations (NGOs) has demonstrated that significant social, economic and environmental achievements are possible when people unite for a common conservation cause. The NAWMP has secured millions of acres for conservation and has improved management on millions more. We commend all groups for their individual and collective achievements.

The NAWMP has definitively demonstrated that the conservation of waterfowl and wetlands will safeguard biological diversity overall, with healthy ecosystems yielding broad benefits to people, including improved water management and water quality, climate change adaptation and spectacular recreational opportunities. The NAWMP connects us all a little more closely to the lands and waters that support us. The governments and NGOs involved recognize the importance of these considerations to people, and through the NAWMP they have the opportunity to address ongoing habitat losses by expanding and diversifying its partnerships. Listening to and engaging with new and diverse partners is crucial to achieve the NAWMP's vision and goals for waterfowl populations, habitats and people.

Engaging local communities is a hallmark of successful conservation initiatives worldwide, and the NAWMP was among the first to take this approach. By forging strong connections with local communities and forming partnerships that better reflect the communities in which it operates, the NAWMP can amplify its conservation efforts and create more and lasting positive impacts for land, water, wildlife and people.

As the NAWMP approaches four decades of conservation success, we extend our gratitude to those who made it all possible. Your dedication and commitment have been instrumental in advancing a shared vision for the conservation of waterfowl, wetlands and the many environmental benefits that accrue to people.

Sincerely,

Secretary of the Environment and Natural Resources

Mexico

Secretary of the Interior

United States

Minister of Environment and Climate Change Canada

Canada

Spotted sandpiper on the Severn River, Ontario.
Mhairi McFarlane

Chers membres de la communauté du Plan nord-américain de gestion de la sauvagine,

Cela fait presque quatre décennies que le Plan nord-américain de gestion de la sauvagine (PNAGS) témoigne de ce qui peut être accompli dans le cadre d'un engagement commun à l'égard de la conservation. Depuis 1986, année de création des premiers plans conjoints, des partenariats sont établis au titre du PNAGS pour assurer la conservation de la sauvagine et de la grande diversité de milieux dont elle dépend. La collaboration entre les États-Unis, le Mexique, le Canada, de nombreuses administrations régionales et locales et diverses organisations non gouvernementales a démontré que d'importantes réalisations sociales, économiques et environnementales sont possibles quand tous s'unissent pour appuyer la conservation. Le PNAGS a permis de protéger des millions d'acres d'habitat et il a aussi contribué à améliorer la gestion de plusieurs millions d'acres de terres. Nous félicitons tous les groupes pour leurs réalisations individuelles et collectives.

Le PNAGS a définitivement démontré que la conservation de la sauvagine et des milieux humides contribue à la protection de la biodiversité et à la santé des écosystèmes qui procurent des avantages considérables aux humains, y compris l'amélioration de la gestion et de la qualité de l'eau, l'adaptation aux changements climatiques et des activités récréatives spectaculaires. Le PNAGS contribue aussi à renforcer les liens qui nous unissent aux terres et aux eaux qui assurent notre subsistance. Les organisations non gouvernementales et les gouvernements participants reconnaissent l'importance de ces considérations pour la population, et le PNAGS leur offre l'occasion d'élargir et de diversifier leurs partenariats pour s'attaquer à la perte continue d'habitat. Il est essentiel de consulter et de mobiliser des partenaires nouveaux et diversifiés pour concrétiser la vision et atteindre les objectifs du PNAGS relatifs aux populations de sauvagine, à l'habitat de la sauvagine et la communauté.

La mobilisation des collectivités locales est un gage de succès pour les initiatives de conservation menées partout dans le monde, et le PNAGS a été un précurseur dans ce domaine. L'établissement de liens solides avec les collectivités locales et de partenariats mieux adaptés aux collectivités dans lesquelles les activités du PNAGS sont menées permet d'amplifier les efforts de conservation et de multiplier les résultats positifs durables pour les terres, l'eau, les espèces sauvages et les communautés.

Pour souligner près de quatre décennies de succès dans le domaine de la conservation, nous tenons à remercier toutes les personnes qui ont participé au PNAGS. Par votre dévouement et votre engagement, vous avez contribué à la promotion d'une vision commune de la conservation de la sauvagine et des milieux humides, ainsi que des nombreux avantages environnementaux dont les gens peuvent profiter.

Cordialement,

Secrétaire à l'Environnement et aux Ressources naturelles

Mexique

Secrétaire de l'Intérieur

États-Unis

Ministre de l'Environnement et du Changement climatique du Canada

Canada

Red-necked phalarope.
Marcel Gahbauer

Querida comunidad del PMAAN:

Durante casi cuatro décadas, el Plan de Manejo de Aves Acuáticas de Norteamérica (el PMAAN o Plan) ha dado muestras del éxito que puede traer el compromiso compartido con la conservación. Desde 1986, año en que se crearon los primeros Grupos Operativos Regionales, el PMAAN ha creado incesantemente alianzas para la conservación de las aves acuáticas y la amplia gama de hábitats que las sustentan. La colaboración entre Estados Unidos, México y Canadá, numerosos gobiernos regionales y locales y un variado grupo de organizaciones no gubernamentales (ONG) ha demostrado que es posible alcanzar importantes logros sociales, económicos y ambientales cuando la gente se une por una causa común de conservación. El PMAAN ha garantizado la conservación de millones de hectáreas y ha mejorado el manejo de aún más millones de hectáreas. Felicitamos a todos los grupos por sus logros individuales y colectivos.

El PMAAN ha demostrado definitivamente que la conservación de las aves acuáticas y los humedales preservará la diversidad biológica en general, y que tener ecosistemas sanos tendrá amplios beneficios para las personas, entre ellos, mejor manejo y calidad del agua, adaptación al cambio climático y espectaculares oportunidades recreativas. El PMAAN nos conecta a todos un poco más estrechamente con las tierras y aguas que nos sustentan. Los gobiernos y las ONG participantes reconocen la importancia de estas consideraciones para la gente, y a través del PMAAN tienen la oportunidad de abordar las pérdidas de hábitat en curso ampliando y diversificando sus alianzas. Escuchar a socios nuevos y diversos y lograr su participación es crucial para alcanzar la visión y las metas del PMAAN para las poblaciones de aves acuáticas, los hábitats y la gente.

La participación de las comunidades locales es una característica distintiva de las iniciativas de conservación exitosas a nivel mundial, y el PMAAN fue una de las primeras en adoptar este enfoque. Al forjar conexiones sólidas con las comunidades locales y formar alianzas que reflejen mejor a las comunidades en las que opera, el PMAAN puede amplificar sus esfuerzos de conservación y tener más impactos positivos y duraderos para la tierra, el agua, la vida silvestre y la gente.

A medida que el PMAAN se acerca a las cuatro décadas de éxito en materia de conservación, hacemos extensiva nuestra gratitud a todos aquellos que lo han hecho posible. Su dedicación y compromiso han sido decisivos para promover una visión compartida con respecto a la conservación de las aves acuáticas, los humedales y los numerosos beneficios ambientales que tienen para las personas.

Atentamente,

Secretaria de Medioambiente y Recursos Naturales
México

Secretario del Interior
Estados Unidos

Ministro de Medioambiente y Cambio Climático de Canadá
Canadá

A female Laysan duck, one of the most critically endangered ducks in the world, looks over her ducklings on Midway Atoll.
Percy Ulsamer, USFWS

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A pair of common mergansers.
Christine Lepage

Cackling geese in the Yukon-Kuskokwim Delta, Alaska.
Chris Nicolai

Executive Summary

The North American Waterfowl Management Plan (NAWMP or "the Plan") began as a response to declining waterfowl populations and has served as the foundation for continental conservation of waterfowl and their habitats for nearly four decades in Canada and the United States, and for three decades in Mexico. The NAWMP partnership has been adaptive and extraordinarily successful in its efforts. Much of the NAWMP's work is conducted by regional Joint Ventures (JVs) in the United States and Canada. Two JVs also operate in Mexico, but much of the work there is conducted in Management Units for Wildlife Conservation (UMAs; see Appendix A for a map of existing JVs and UMAs). In Mexico, the federal government owns all waterbodies; naturally, these are critical for accomplishing NAWMP goals.

This 2024 NAWMP Update reviews the progress made toward achieving the goals outlined in the 2012 Revision, as detailed in the 2014 Addendum (NAWMP 2014) and further refined in the 2018 Update. It also offers recommendations for decision-makers within the waterfowl management community that address changing conditions and new opportunities for conservation success. The NAWMP has an unprecedented opportunity to engage current and potential new partners and ramp up its efforts to achieve goals for waterfowl populations, habitats and people.

Despite the success of the NAWMP and relatively high current population numbers, waterfowl habitat losses continue at scales and rates that challenge the NAWMP's goal to sustain continental waterfowl populations. The landscapes that support waterfowl are not static; they change dramatically through natural wet/dry cycles and are increasingly affected by human influences, such as agricultural intensification, urban and industrial development, and increased demands for water. Additionally, climate change introduces both known (e.g., sea-level rise) and less understood impacts that may exacerbate the challenges the NAWMP faces in sustaining habitats for waterfowl, other bird species and overall biodiversity.

Wetland loss remains a pervasive threat. A recent study of the status and trends in the United States reported a 50% increase in loss from 2009 to 2019 compared to the previous 10-year period. Approximately 670,000 acres of palustrine vegetated wetlands were lost during the period, including substantial losses of prairie pothole wetlands (Lang et al. 2024). In Canada, many jurisdictions lack comprehensive legislation for wetland protection, and recent judicial rulings in the United States will likely weaken protections there. The NAWMP partnership must seek innovative means to increase the rate and scale of habitat conservation and restoration across the continent, and it must do so rapidly to sustain waterfowl populations at desired levels.

Perhaps nowhere is the challenge of habitat loss more acute than in the Northern Great Plains, where a significant proportion of continental waterfowl are produced annually. Across the Great Plains, grassland loss approaches 70%, with 32 million acres lost since 2012, and 1.6 million acres lost in 2021 alone (World Wildlife Fund 2023). Loss of grasslands in the Prairie Pothole and Prairie Habitat Joint Ventures has been estimated to occur at an alarming rate of 0.23% annually. Over the next decade, undisturbed grassland is projected to be lost at a rate 7 to 25 times faster than rates of protection (Fields and Barnes 2019).

Factors impairing the ability of landscapes to support waterfowl and other wildlife also affect the provision of a wide array of ecosystem services and other benefits. Since the beginning, the NAWMP has acknowledged that people fundamentally value waterfowl, wetlands and the multiple benefits that wetlands provide. Given the multiple benefits provided by the NAWMP's conservation work—support for biological diversity, watershed management, flood reduction, carbon sequestration, cultural practices and recreation to name a few—a unique opportunity exists to more effectively communicate these outcomes in order to increase the rate and scale of conservation. By focusing on the multiple benefits of their wetland conservation efforts, NAWMP partners potentially can engage a broader and more diverse group of partners and a greater diversity of funding opportunities.

For example, in addition to groups that have traditionally supported waterfowl conservation efforts through the NAWMP, such as hunters and birders, potential new NAWMP partners and supporters may include Indigenous communities seeking to improve opportunities to engage in traditional activities, local or regional governments interested in reducing flooding or improving their water supplies, or farmers and ranchers seeking more sustainable approaches to manage agricultural lands. Additionally, many corporations and foundations are eager to support nature-based solutions to ecological challenges affecting communities across North America. Strategic communication of the benefits of conserving waterfowl habitats can greatly assist NAWMP partners as they pursue stronger wetland protection policies.

Whether new partners join the NAWMP, or existing partners reach out and engage with other groups focused on broader objectives, significant opportunities exist to enhance the NAWMP's efforts to halt or reverse habitat degradation or loss in key waterfowl landscapes. Broader engagement is also a key to achieving the NAWMP objective of partnerships, supporters and practitioners evolving to better reflect the communities in which the NAWMP operates.

In instances where NAWMP partners already communicate the multiple benefits that accrue from conserving waterfowl habitat, the increased engagement has been both impressive and encouraging, attracting new supporters and substantial new financial resources that contribute to NAWMP objectives for wetlands and waterfowl.

The goal of NAWMP habitat conservation is to sustain continental waterfowl populations. Waterfowl habitat conservation also provides numerous ecosystem benefits to people, including improved water quality and quantity, flood attenuation, climate mitigation, nutrient sequestration and recreational spaces. By identifying and quantifying these benefits, NAWMP partners can communicate the Plan's multiple advantages and engage with potential new supporters for wetland conservation, increased funding and public policy advancement. Ultimately, communication of the multiple benefits of NAWMP conservation may lead to expanded partnerships that can help reverse wetland and other habitat losses, contributing to sustainable waterfowl populations and the communities that share landscapes with them.

The future success of waterfowl conservation hinges on the NAWMP's ability to grow and diversify its partnership base, achieving conservation at a scale that reverses habitat loss. Expanding the NAWMP umbrella by listening to and engaging with new and diverse partners is a timely and logical step to secure the additional resources needed to fulfill the NAWMP vision and goals for waterfowl populations, habitat and people.

The three fundamental goals of the North American Waterfowl Management Plan are:

- **"Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat";**
- **"Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels, while providing places to recreate and ecological services that benefit society"; and**
- **"Growing numbers of waterfowl hunters, other conservationists and citizens who enjoy and actively support waterfowl and wetlands conservation." (NAWMP 2012)**

A male Steller's eider with a pair of spectacled eiders at the edge of a tundra pond.
Peter Pearsall, USFWS

Plan Committee Co-Chair Acknowledgements

Work began on the 2024 North American Waterfowl Management Plan Update in December 2022. The 2024 Update assesses achievements since the 2018 Update and, importantly, identifies adjustments and course corrections that could be taken to ensure the NAWMP remains adaptive and focused on sustaining waterfowl populations across the continent.

We are grateful for the efforts of many individuals in Canada, the United States and Mexico who contributed time, knowledge and ideas during the development of the 2024 Update. These individuals are listed in Appendix B. We apologize to any contributors to this effort we may have unintentionally omitted.

These individuals served on the 2024 Update Steering Committee and deserve special recognition:

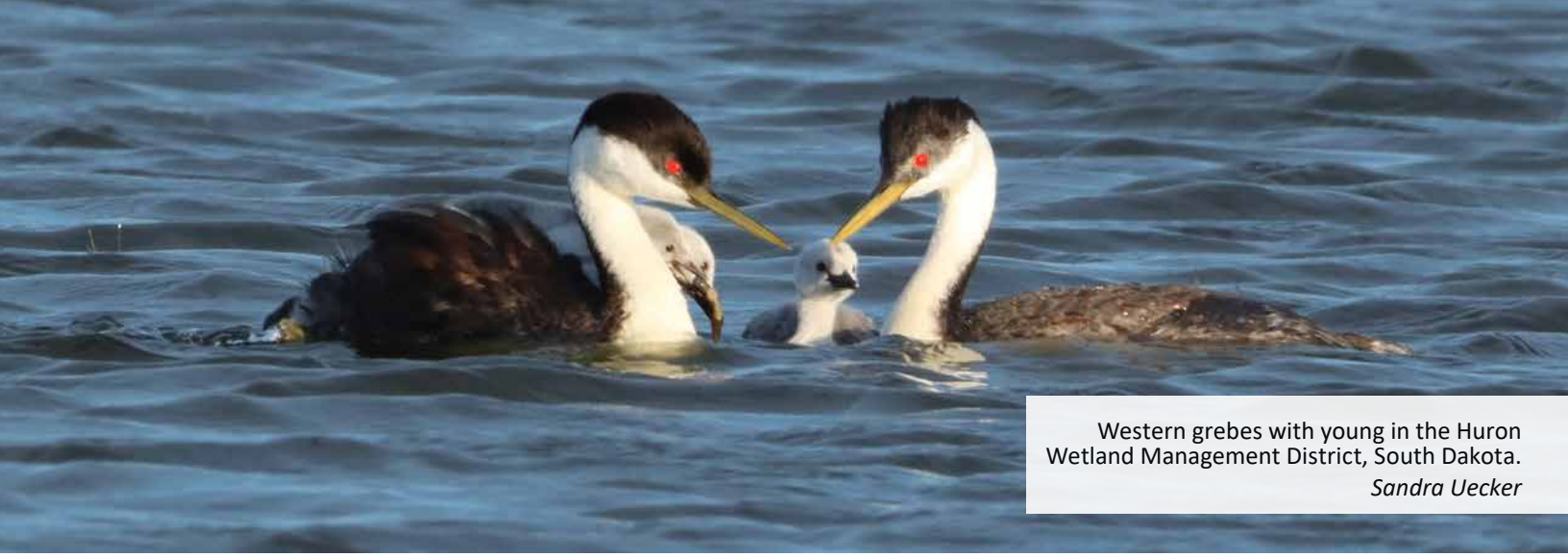
Tim Sopuck (Canadian Co-Chair), Tom Mormon (U.S. Co-Chair), Dean Smith, Mark Vrtiska, Barry Wilson, Mike Brasher, Kathy Fleming, Shaun Oldenburger, Dave Howerter, Mike Anderson, Jacey Scott, Kyle Spragens, Diane Eggeman, Jennyfer Tolley, Leonel Urbano, Miguel Flores and Carlos Piedragil.

Tony Roberts and Dave Gordon of the United States Fish and Wildlife Service and Jacey Scott and Lisa Bidinosti of Environment and Climate Change Canada were instrumental in providing support and guidance throughout the development of the 2024 Update.

Critical secretariat support was provided throughout the 2024 Update process by DJ Case and Associates. Rick Clawson provided coordination support for 2024 Update committees and working groups. Cindy Longmire led the design, implementation and analysis of surveys of Plan partners and professionals. Dave Case, who has participated in NAWMP updates since the Plan's inception, provided invaluable perspectives that come from a deep knowledge of the NAWMP.

The NAWMP has guided continental waterfowl conservation for 38 years, a testament to the dedication and commitment of those who have contributed their time and expertise since the inception of this remarkably successful plan. We also wish to acknowledge the continued work and support of the long-standing NAWMP support teams and other waterfowl management groups, including the Flyway Councils, Integration Steering Committee, Human Dimensions and Public Engagement Team, the NAWMP Science Support Team, the North American Waterfowl Professional Education Plan Committee and the Plan Committee for their ongoing commitment to the North American Waterfowl Management Plan.

Cinnamon teal male and female in Seedskadee National Wildlife Refuge, Wyoming.
Tom Koerner, USFWS



Western grebes with young in the Huron Wetland Management District, South Dakota.
Sandra Uecker

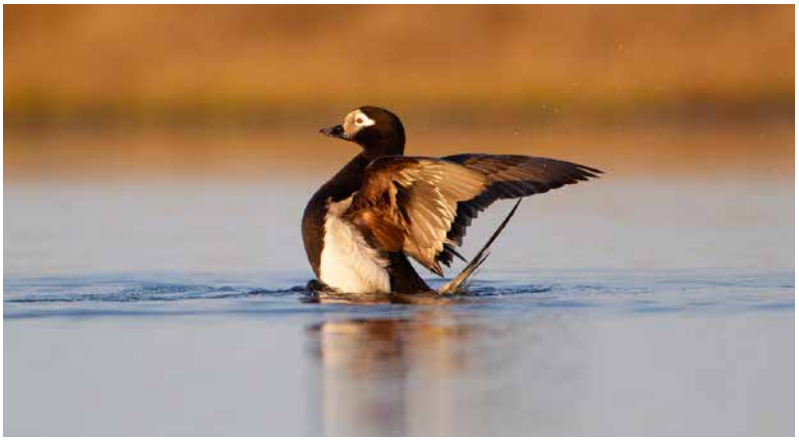
Glossary

Human Dimensions: The various aspects of human behavior, society and culture that interact with or influence environmental and natural resource management. This includes understanding how people perceive, value and interact with the environment, as well as the social, economic and institutional factors that shape human interactions with natural resources and ecosystems.

Multiple Benefits: The benefits that people obtain from ecosystems. These can include the provision of resources such as food, water and timber; services such as climate change mitigation, flood control and disease regulation; cultural services such as spiritual and recreational benefits (e.g., hunting or canoeing); and supporting services such as nutrient cycling and soil formation.

Waterfowl Habitat: Waterfowl are wonderfully diverse, as are the habitats waterfowl require to fulfill their life cycle needs. Wetland types, including marshes, swamps, fens, lakes and bogs, make up waterfowl habitat, as do riparian areas, coastal estuaries and nearshore marine habitats. Additionally, many species also use nearby uplands for feeding and nesting. In this document, "waterfowl habitat" represents the range of wetlands and upland cover types necessary to sustain waterfowl populations.

Seven members of the Coquille Indian Tribe paddle into the newly restored Ni-les'tun Marsh, Oregon, in a ceremonial canoe.
Roy W. Lowe, USFWS



Long-tailed duck.
Peter Pearsall, USFWS

Stittsville marsh in Ontario.
Marcel Gahbauer

Introduction

The North American Waterfowl Management Plan (NAWMP or "the Plan") has guided continental waterfowl conservation for 38 years. Over that time, the Plan has been successful because of the strong and lasting commitment of its partners. The NAWMP has set a global precedent for wildlife conservation through its strong international collaboration. Federal, provincial/territorial, state and local governments and non-governmental organizations in Mexico, Canada and the United States have all cooperated to implement effective conservation strategies and share knowledge and resources across jurisdictions to achieve common objectives for waterfowl and people of North America.

The NAWMP remains as vibrant and relevant today as it was when it began in 1986.

The NAWMP remains as vibrant and relevant today as it was when it began in 1986, largely because the organizations and individuals engaged in its implementation have embraced cycles of reviews and updates to ensure it adapts to evolving science, values and priorities in the NAWMP partnership and beyond. Previous updates have focused on expanding the scope of habitat objectives and bringing Mexico into the NAWMP (1994); expanding partnerships and focusing on landscape-scale conservation (1998); and strengthening the biological foundation of its science (2004).

In 2012, far-reaching consultations with partners resulted in a major re-visioning of the NAWMP to address current and future challenges. The 2012 Revision greatly strengthened the NAWMP's foundation by formalizing fundamental, interrelated goals for populations, habitat and people. Importantly, the NAWMP acknowledged that future success hinged on increasing and diversifying Plan supporters. Essentially, the NAWMP explicitly recognized that successful conservation depends on the value people place on the natural world. Hence, the NAWMP must seek to strengthen and increase the connections people have with nature.

NAWMP partners responded by engaging in social sciences, seeking to understand the values and desires of both current and prospective supporters. Progress toward that understanding, along with a renewed commitment to the application of social sciences, was the focus of the 2018 Update.

Today, the commitment to advancing the Plan's three fundamental goals remains strong, with NAWMP partners continuing to embrace social sciences to increase the numbers of both supporters and partners. The 2024 NAWMP Update aims to enhance the rate and scale of conservation by highlighting the multiple benefits that waterfowl habitats provide to people. Ultimately, people conserve what they value, and if the Plan is to strengthen and grow supporters, it must continue to demonstrate the multiple benefits of its conservation work, while retaining its focus on waterfowl conservation. Expanding the Plan partnership will increase the rate of conservation to what is needed to meet the challenges that continue to degrade waterfowl habitat across the continent.

The 2024 Update is the responsibility of the North American Waterfowl Management Plan Committee (hereafter Plan Committee), the most senior body in the NAWMP's continental governance structure. After providing a recommended structure and guiding principles for a revitalized Update

in May 2022, the Plan Committee delegated responsibility to an ad hoc continental group, the 2024 Update Steering Committee (USC), which was established in January 2023. Three working groups were established under the USC which aligned with the NAWMP's three core goals: Waterfowl Populations, Habitat and People. The membership of the USC and the working groups reflected, as much as possible, NAWMP geography and the diversity of the NAWMP partnership.

These working groups were asked to examine current NAWMP activities and develop recommendations to assist the NAWMP in addressing current and future issues and opportunities. As part of their reviews, the Populations and Habitat Working Groups conducted surveys of NAWMP Habitat Joint Ventures (JVs) on key questions about their respective responsibility areas, while the People Working Group took advantage of a recent survey of JV human dimensions activities to support its deliberations.

In addition to the working group activities, DJ Case and Associates undertook two comprehensive surveys, focused on perceptions of the Plan among NAWMP partners and among waterfowl management professionals. These surveys paralleled studies undertaken for the 2018 Update that helped form a long-term assessment of attitudes toward the NAWMP among key stakeholders.

Each working group has prepared technical reports that are the basis for the 2024 Update. The technical reports were combined into a single report (*Howerter et al. 2024*; hereafter referred to as the 2024 Update Technical Report).

Throughout the 2024 Update's development, several meetings were held with key NAWMP committees, including the NAWMP Integration Steering Committee and the Human Dimensions and Public Engagement Team. Sessions were also held with key external audiences, including Flyway Councils and Technical Committees, the Association of Fish and Wildlife Agencies Waterfowl Working Group, the 9th North American Duck Symposium, the Canadian Wildlife Directors Committee and the JV coordinators. We're grateful for the feedback we received through these interactions.

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

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

Black tern in the J. Clark Salyer National Wildlife Refuge in North Dakota.
Sandra Uecker, USFWS

Gadwalls at Seedskadee National Wildlife Refuge in Wyoming.
Tom Koerner, USFWS

NAWMP Objectives—Waterfowl Populations, Habitat and People

The 2012 NAWMP Revision (hereafter 2012 Revision) presented a new strategic direction that challenged the waterfowl conservation community to expand support from people, especially hunters, birders and other conservation-minded citizens, to achieve interrelated goals for populations, habitat and people. The 2012 Revision clearly articulated three fundamental goals for waterfowl populations, habitat and people. Two years later, goals for populations and habitat were revised, and objectives for increasing the number of people supporting waterfowl conservation were developed (NAWMP 2014).

The 2018 Update reaffirmed these fundamental goals and summarized progress on incorporating social sciences to advance understanding of people's preferences and perspectives about waterfowl and wetland conservation (NAWMP 2018). Importantly, the 2018 Update set the groundwork required to incorporate an understanding of people's values for and relationship with nature into the North American waterfowl conservation enterprise. It also provided excellent early examples of achievements by NAWMP partners that integrated people into waterfowl conservation efforts.

Waterfowl hunters have been among the most important and strongest supporters of the NAWMP since its inception, and they remain so today. In fact, hunters were prominent and steadfast supporters of conservation of North American waterfowl since the early 1900s. The roots of waterfowl hunting in North America run deep. Hunting was a fundamental element of Indigenous livelihoods, cultures and traditions long before the arrival of Europeans. For instance, in Mexico, waterfowl hunting was a source of food and raw material for the nomadic groups of the north as well as for the cultures established in Mesoamerica. The harvest of free-living waterfowl remains important in Mexico due to the potential this activity represents for nature-based economic development and diversification in rural and Indigenous communities. Further, Indigenous communities across the continent have long been strong advocates for land, water and wildlife conservation, and are valued partners in waterfowl co-management.

It is increasingly clear that hunters and many other people also appreciate the social, cultural and ecological benefits provided by waterfowl habitats conserved under the NAWMP. The ongoing and critical support of waterfowl hunters, along with the growing interest of other conservationists, offers an opportunity to further strengthen the NAWMP support base. Measuring, communicating and engaging new audiences with the narrative of multiple benefits provided by NAWMP conservation activities presents a compelling strategy to increase and diversify supporters, partners and resources to increase the scale and rate at which we conserve waterfowl habitat. The expanded supporter base resulting from successful execution of this strategy will include people and their communities that are dependent on the multiple benefits of wetlands, including clean and abundant water supplies, flood mitigation, conservation of biodiversity, resources available for subsistence and medicinal uses, customs and traditions, and many other outcomes.

Green-winged and cinnamon teal in Seedskadee National Wildlife Refuge, Wyoming. *USFWS*

Waterfowl Populations

GOAL "Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat." (NAWMP 2012)

OBJECTIVE "Maintain long-term average populations of breeding ducks [1955–2014 in traditional survey area (TSA) and 1990–2014 in eastern survey area (ESA)]." (NAWMP 2014)

Waterfowl populations are a product of the landscapes within which they exist, as are other ecosystem benefits important to people. Many complex and interacting factors diminish the ability of landscapes to sustain waterfowl populations. These factors include wetland loss and degradation, loss of wetland-associated uplands that provide nesting habitat, and water quantity and quality issues that impact habitats in important migration and wintering areas. Many of these factors also affect people and their communities, including reduced water quantity and quality, loss of biodiversity and increased flooding. NAWMP efforts over the past 38 years have positively affected millions of acres of priority waterfowl habitats in North America, yet the scale and rate of habitat loss remains high. This means the NAWMP must increase the pace of conservation work to sustain waterfowl populations at desired levels.

Quantitative population objectives have been the foundation of the Plan since its inception. These objectives provide common benchmarks to assess conservation needs and guide habitat and population management decisions, and they rely on the maintenance of robust operational monitoring programs. Foundational population objectives should not be changed without compelling reasons for doing so, but each Plan Update offers an opportunity to ensure that objectives are still based on the best information available.

In keeping with the 2018 Update recommendation to review population objectives every 10 years, a thorough review of the 2014 Addendum was completed for 2024. Information, including updates to the Waterfowl Breeding Population and Habitat Survey (WBPHS) estimates for the Traditional Survey Area (TSA) and Eastern Survey Area (ESA), was evaluated, and new information from the Sea Duck and Arctic Goose Joint Ventures was used to assess whether adjustments to existing objectives or development of new objectives was warranted (see Appendix B in the *2024 Update Technical Report*). NAWMP Habitat Joint Ventures were surveyed to assess their current approaches to linking habitat objectives to NAWMP population goals and their frequency of conservation planning iterations, among other questions (see Appendix A in the *2024 Update Technical Report*).

Additionally, recent efforts to review and revise NAWMP species prioritization based on perceived management needs (Appendix G and Roberts et al. 2023) were incorporated into this 2024 Update. The NAWMP first prioritized waterfowl species in terms of perceived management need given habitat conditions and importance in harvest (NAWMP 2004). The latest revision builds on earlier iterations by considering additional biological and social data that are now available, along with the broadened goals of the 2012 Plan (Roberts et al. 2023).

Priority Population Recommendations

Ducks

1. The Plan Committee will adjust the period used for Traditional Survey Area objectives by (1) choosing 1974 instead of 1955 as the starting year, and (2) adding data from 2015–2023 to the data used in 2014, thus making 1974–2023 the basis for long-term averages (LTAs).

A careful analysis of the changing survey design and protocols during the earliest years of the WBPHS TSA indicates that the 1974–2023 time series is more appropriate for determining LTA objectives (*2024 Update Technical Report*). Survey effort increased significantly from 1955 to 1974, transect locations changed and stratum boundaries were redrawn over existing transects. Another significant protocol change occurred in 1974, when observers stopped recording unidentified ducks, leading to an increase in the number of identified birds of some species. Lack of detailed documentation for some of these changes limits our ability to accommodate the early data using model-based analytical approaches. Therefore, the 1974–2023 time series represents a consistent period of survey effort and allocation, with better documentation of survey design changes. It is also long enough (50 years) to represent a wide range of habitat conditions and waterfowl populations. Using the later start date results in a minor change in NAWMP LTA objectives for most species, and those species that were below goal levels in 2014 remain below the new recommended goal levels (Appendix C; also see the *2024 Update Technical Report*).

Female mallard.
Marcel Gahbauer

2. a. For mallards and American black ducks in the Eastern Survey Area, NAWMP objectives will include estimates from all of eastern North America, an expanded region beyond the eastern core survey area that includes state and provincial surveys, and an extended period 1998–2023 for calculating the LTA and 80th percentile objectives.

   b. For American black ducks a 1:1 breeding pair correction for population estimation is recommended, as it is currently being used in the American black duck adaptive harvest management framework. For other duck species in the east, it is recommended that population objectives include ducks from the entire WBPHS Eastern Survey Area (*2024 Update Technical Report*).

The ESA expansion will produce higher NAWMP population objectives than the 2014 Addendum and 2018 Update, but it represents a more comprehensive estimate of the true population size in the eastern continent (Appendix C; also see the *2024 Update Technical Report*). In addition, these revised eastern objectives will inform more Habitat Joint Venture planning areas compared to previous coverage.

3. The Plan Committee, prior to the next Update, will ask the NAWMP Science Support Team (NSST) to review how population objectives are formulated, specifically to (1) consider the utility of the current scale of NAWMP objectives for conservation planning, (2) assess the capacity of current monitoring frameworks to provide information needed by the Joint Ventures for effective objective setting, and identify gaps that should be filled; (3) undertake the analytical work, if necessary, to derive new population objectives that are useful at local geographies, but that can be integrated to the continental scale. Two specific questions are: What data might best be used to inform habitat conservation planning for western-breeding mallards and other ducks (see Appendix D)? What is the potential utility of incorporating state survey estimates for conservation planning by mid-continent Joint Ventures?

The first duck population objectives were anchored to the mid-continent TSA and, after 2014, to both the TSA and the ESA of the annual WBPHS. However, growth in the number of operational breeding waterfowl surveys and advances in analytical techniques have provided a more comprehensive

American black duck.
Michael Schramm, USFWS

accounting of continental waterfowl populations. Harvest management frameworks increasingly use more population information (e.g., provincial and state surveys for western and mid-continent mallards) to focus harvest strategies at relevant population scales. Using these same more inclusive data sources for NAWMP population objectives might improve alignment with planning regions and close the gap between the spatial bases for habitat and harvest management objectives, improving the coherence of these management systems. This effort will ensure that NAWMP population objectives remain relevant and useful for setting habitat objectives and assessing conservation progress.

4. The decision about whether or when to plan for average conditions (LTA population objectives) or exceptional circumstances (80th percentile), and whether to collaborate with adjacent Joint Ventures to plan for and accommodate desired populations under either planning scenario, is best left to the experienced planners in each Joint Venture with guidance from the NSST. Joint Ventures managing nonbreeding and migration stopover habitat should employ methods of Fleming et al. (2019) to step down preferred objectives to their local geographies.

Joint Ventures (JVs) should have the flexibility to employ dual continental objectives and methods in order to step down, or adapt, these objectives to relevant spatial scales. A primary purpose of dual objectives, first articulated in the 2014 Addendum, was to encourage conservation planners to recognize the variation inherent in ecosystems when envisioning the landscape conditions needed to support LTA waterfowl populations, and to acknowledge that occasional exceptional conditions are needed to offset inevitable periods of poor conditions. Thus, population or habitat objectives are not static values to be achieved annually, but rather are the desired long-term product of the variation inherent in ecosystems plus JV management actions. Based on diverse experiences of the Habitat Joint Ventures since 2014, application of dual planning targets will make sense for some JVs but not for all. Likewise, JVs that include nonbreeding and migratory stopover habitat require flexibility to interpret continental objectives in terms of their unique geographies as well as the waterfowl life cycle period they support. Accordingly, the NSST is encouraged to examine the formulation of these joint objectives and to help with cross-JV planning to ensure that a suitable level of habitat redundancy occurs among JVs to support expected bird populations during both population highs and lows. The NSST has refined and endorsed a consistent framework (Fleming et al. 2019) for stepping down NAWMP population objectives to regional scales, allowing JVs to customize objectives to their specific planning needs.

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

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

Since the 2018 Update, Mexico has restarted monitoring programs to document the distribution, abundance and species

composition of waterfowl. This represents the first national, systematic monitoring carried out by Mexican technical staff, fostering the interaction of the government with civil society. The new monitoring data will allow managers to assess conservation status of waterfowl, identify critical habitats, develop management policies and strategies, monitor environmental impacts and threats, foster education and awareness platforms, and support scientific research.

Increasingly, waterfowl managers are using other biological data and analytical techniques that provide additional information about populations. Band recoveries and harvest estimates have long been used to estimate survival or account for mortality in population models, and Bayesian estimation frameworks are now commonly used in integrated population and mark-recapture models that combine these data streams (Alisauskas et al. 2013). Some NAWMP population objectives are based on these model outputs already (e.g., Eastern Survey Area estimates; some goose population objectives).

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

6. The Plan Committee will formalize review of population objectives every 10 years, consistent with the recommendation in the 2018 Update. This schedule is compatible with the frequency with which most Joint Ventures update their conservation plans and would allow them to incorporate any changes during their routine update processes.

Western Gulf Coast Mottled Ducks

The current Western Gulf Coast mottled duck population objective derived from breeding surveys is an aspirational 212,000 individuals. The current population status as it pertains to the recommended objective is 126,000 and is the average of the 2011–2021 surveys (Appendix D and *2024 Update Technical Report*).

Sea Ducks

Sea duck population recommendations were developed in consultation with the Sea Duck Joint Venture (SDJV). The SDJV Continental Technical Team considered new information available since the 2018 Update and recommended numeric objectives for Hudson Bay common eider and bufflehead, and adjustments to population size estimates for several other sea duck species. Insufficient information exists to calculate population estimates or objectives for many sea duck species. Additional supporting information and discussion may be found in the *2024 Update Technical Report* and in Appendix D.

7. Broadly, while progress has been made in sea duck monitoring, more resources should be directed to acquiring information on sea duck population status.

8. Continue current operational surveys, including WBPHS, Central Arctic Canada Pacific Common Eider Breeding Survey, Parts Collection Survey, Puget Sound Assessment and Monitoring Program, Arctic Coastal Plain Survey, Quebec/Newfoundland Common Eider Winter Survey, the Yukon-Kuskokwim Delta Aerial Survey and the Pacific Black Scoter Breeding Survey.

9. Apply the results of CWS's experimental scoter survey work to improve the current WBPHS for late-nesting sea ducks through design revisions or augmentation.

10. Improve estimates and the ability to discriminate between goldeneye and merganser species in aerial surveys by analyzing/modeling sources of error in the existing WBPHS merganser and goldeneye data.

11. Incorporate the Sea Duck Key Habitat Sites Atlas into coastal habitat Joint Venture planning (including the Great Lakes), as well as marine spatial planning and environmental assessments, to help direct habitat conservation to the most important sites for sea duck populations.

Black scoters in Izembek National Wildlife Refuge, Alaska.
Kristine Sowl, USFWS

Geese

Goose population objectives are summarized in Appendix E. After consultation with Flyways and the Arctic Goose Joint Venture, goose population estimates were updated, and objectives for some populations were revised to reflect thresholds in updated harvest management plans. Population objectives for geese must achieve a balance: maintaining numbers that support liberal hunting opportunities for licensed hunters and Indigenous harvesters, while also preventing overabundance that could harm natural habitats and sympatric species and create conflicts with people. Two other recommendations address information needs for goose populations:

12. Devote more resources to ensure robust, long-term monitoring programs for Arctic- and subarctic-nesting geese, primarily annual banding programs, national harvest surveys and aerial surveys. Additionally, devote more resources to evaluate biases and representativeness of Lincoln estimates, harvest estimates and band-recovery data to ensure accurate population status monitoring.

13. Support research to understand population and harvest dynamics of light geese (Ross's and snow geese) and their impacts on habitats and other species. Research is also needed on hunter and public attitudes to/perceptions of light geese. Support investigations to better understand demographic rates and habitat usage of geese throughout the annual cycle, particularly maritime goose species such as brant and emperor geese.

Canada goose and goslings.
Marcel Gahbauer

Swans

Swan population objectives are summarized in Appendix F. After consultation with the Flyways, no changes were recommended to tundra swan objectives, but recent population estimates were updated.

The last range-wide survey of trumpeter swans happened in 2015. Thus, recent data are not available to update trumpeter swan status estimates. It seems clear from a few state surveys that the Interior population has continued to grow, as have all trumpeter swan breeding segments other than the U.S. portion of the Rocky Mountain population (Vrtiska et al., in press).

The three eastern Flyways are presently reviewing the Interior population management plan. The Pacific Flyway trumpeter swan subcommittee is also revising the management plan for the Pacific Coast population, incorporating a new monitoring protocol using data from the annual WBPHS in Alaska (Strata 1, 2, 3, 4, 6 and 7). Past coverage in British Columbia would be missing, but the Alaska data would enable trend monitoring for most of the Pacific Coast population.

Trumpeter swans in Seedskadee National Wildlife Refuge, Wyoming.
Tom Koerner, USFWS

Boreal forest wetland near Kapuskasing, Ontario.
Shawn Meyer

Habitat

GOAL "Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels, while providing places to recreate and ecological services that benefit society." (NAWMP 2012)

OBJECTIVE "Conserve a habitat system with the capacity to maintain long-term average waterfowl population levels, to periodically support abundant populations, and to consistently support resource users at objective levels." (NAWMP 2014)

The scale and rate of loss of habitats is the greatest barrier to sustaining waterfowl populations at levels that meet desires and values of the NAWMP partnership. Despite efforts by NAWMP partners and other international efforts (e.g., Association of Fish and Wildlife Agencies' Fall Flights program), habitats continue to be lost to and degraded by agricultural expansion, urbanization, industrial development, climate change, pollution, invasive species and other anthropogenic impacts. The ability to achieve and sustain NAWMP population objectives is a direct function of a habitat base resilient to variable environmental conditions, and which supports waterfowl populations throughout their annual cycle. Habitat loss directly influences efforts to sustain waterfowl populations and causes loss and degradation of many other benefits that are highly valued by people. Since inception, the single largest NAWMP expenditure has been habitat conservation and restoration. The global socio-environmental phenomena we have been experiencing in recent years necessitate ongoing updates and the identification of alternative approaches for the conservation of waterfowl and wetlands. The loss of habitat and the valuation of economic benefits provide compelling reasons for both the government and society to recognize the need for contemporary policies ensuring the sustainable use of these resources.

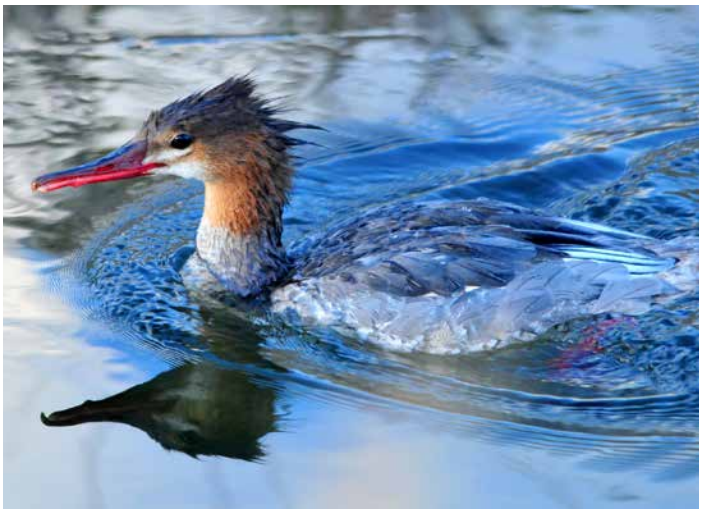
King eider nest.
Lisa Hupp, USFWS

Conserving Habitat on Irrigated Lands

The Intermountain West Joint Venture (IWJV) spans a broad range of semi-arid habitats across the western United States. Sustainable water supplies are at the heart of conserving waterfowl habitats and supporting local communities. In 2019, the IWJV established its Water 4 initiative to conserve wetlands and "water for" irrigated agriculture, wildlife and fisheries habitat, groundwater recharge and landscape resiliency in ways that matter to people. This approach is rooted in conserving wetland habitat through a lens of relevancy. The IWJV's spatial analysis shows significant wetland drying over the last 40 years, and some of the most resilient habitats are flood-irrigated grass-hay meadows used for forage production. Irrigation of these wet meadows provides multiple benefits to people. Water 4 uses conservation easements, modernization of flood irrigation infrastructure, and other practices to benefit waterfowl populations while sustaining rural agricultural communities and the people whose livelihoods depend on the health of this landscape. Working with ranchers to sustain these irrigated lands conserves resilient, important waterfowl habitats for reasons other than birds—importantly, with new sources of funding—and builds relationships with agricultural producers with the most senior water rights.

Wind River Reservation, Wyoming.
Angela Burgess, USFWS

Common merganser.
Tom Koerner, USFWS



Conserving Waterfowl and Wetlands in Manitoba through Science and Communication

In Canada, regulations to protect wetlands fall under provincial authority. For the Prairie Habitat Joint Venture (PHJV), evaluation identified ongoing wetland loss as the greatest threat to achievement of NAWMP goals. In response, the PHJV, led by Ducks Unlimited Canada, initiated an integrated program of science and communication to encourage wetland protection in Manitoba. Scientific investigation quantified how loss of wetlands higher in the watershed resulted in increased flooding and reduced sequestration of both greenhouse gases and contaminants (specifically sediments and fertilizer components phosphorous and nitrogen) in rivers, stream-courses and downstream lakes. The results of this research were communicated through multiple media outlets and drew defensible connections between wetland loss and increased algal blooms in Lake Winnipeg. Annually, these blooms were responsible for the closure of popular beaches around the lake during peak summer vacation season. Simultaneously, scientists and policy experts were engaged with senior provincial bureaucrats, politicians and other stakeholder groups to draft new wetland protection regulations. These efforts resulted in new stringent wetland regulations signed into law.

Successful conservation of habitat at the pace required to sustain waterfowl populations across North America hinges on attracting informed and engaged supporters. To meet large-scale habitat challenges, the NAWMP must grow and diversify its supporters and partners to garner increased capacity to address challenges at relevant JV scales. This means drawing on increased numbers of hunters and birders, and attracting supporters and partners who value the non-waterfowl benefits of NAWMP conservation efforts. Many supporters will value not only waterfowl and their habitats but also the multiple benefits provided by NAWMP habitat conservation efforts. This might include conservation of habitat for some species of grassland birds, secretive marsh birds and shorebirds whose populations are in sharp decline.

Because many waterfowl nest on private lands, engaging farmers, ranchers and other private landowners is crucial for achieving Plan goals. New initiatives to engage these key stakeholders are underway and show great promise. These strategies aim to balance agricultural productivity with waterfowl habitat conservation. These efforts include:

- Improving cattle watering options to support a profitable beef industry while enhancing waterfowl habitat. *www.ducks.ca/resources/landowners/grazing-clubs/*
- Using advanced geospatial technologies to identify areas within croplands that would be more profitable and beneficial if converted to waterfowl-friendly land covers. *www.ducks.ca/resources/landowners/marginal-areas-program/*

To achieve NAWMP habitat objectives, JVs have developed specific goals and objectives for their geographies. Continental population objectives (NAWMP 2014) are stepped down to individual JV geographies or sub-geographies (Fleming et al. 2017, 2019). For this 2024 Update, Habitat Joint Ventures were surveyed to evaluate their progress toward habitat goals and to assess the level to which goals for supporters had been formally incorporated into JV implementation plans. About half of JVs have quantified habitat objectives and have sufficient habitat assessment systems to enable reporting on their progress. Some JVs reported significant progress toward their habitat goals (Appendix H). Many JVs can report on the Plan Committee's new metric: "proportion of stepped-down NAWMP population goal that is currently supported by the JV landscape." However, the survey highlighted some challenges underlying reporting, which are discussed in the *2024 Update Technical Report*.

Autumn view in the Prairie Pothole Region of the Kulm Wetland Management District in North Dakota.
Krista Lundgren, USFWS

Priority Habitat Recommendations

1. The Plan Committee will actively support and guide efforts to align habitat objectives in Joint Venture implementation plans with NAWMP habitat goals. The Plan Committee will actively support and guide Joint Ventures to ensure that geographic prioritization is articulated at spatial scales adequate to inform partner actions.
2. The Plan Committee will ensure that all Habitat Joint Ventures develop the ability to assess progress toward their habitat objectives and reiterates its expectation that Joint Ventures be able to consistently populate the Plan Committee's new metric of "proportion of stepped-down NAWMP population goal that is currently supported by the Joint Venture landscape."
3. The Plan Committee will continue to promote information sharing and advancements among Joint Ventures relative to planning, evaluation and adaptation, such that the best methods and processes become widely adopted.

Amanda Horvath releasing a banded adult male blue-winged teal.
USFWS

People

GOAL "Growing numbers of waterfowl hunters, other conservationists and citizens who enjoy and actively support waterfowl and wetlands conservation." (NAWMP 2012)

OBJECTIVE "Increase waterfowl conservation support among various constituencies to at least the levels experienced during the last two decades." (NAWMP 2014)

The NAWMP was created because people strongly value waterfowl, and this remains a key factor driving NAWMP success after nearly four decades. As the NAWMP has grown and matured, knowledge of the multiple benefits of wetlands and other waterfowl habitats has improved dramatically, and this is reflected in the increased value placed on wetlands by wider audiences. Hunters remain passionate supporters of NAWMP activities, but hunter numbers are in decline. Consequently, the NAWMP partnership must find new ways to retain its existing supporters and, importantly, increase and diversify its support base by attracting new supporters and partners.

Since 1986, the NAWMP has recognized that, in addition to waterfowl and waterfowl habitat, current and potential supporters appreciate multiple ecological and cultural benefits that result from habitat conserved by the NAWMP. These benefits include increased water supply, improved water quality, reduced flooding, increased biodiversity, carbon sequestration, provision of food and many others. Furthermore, the connection between human physical and mental health and access to natural areas has been increasingly well-documented (see the U.S. Centers for Disease Control's One Health website at *www.cdc.gov/one-health/about/*).

While the NAWMP remains focused on its fundamental goals and objectives for waterfowl populations, habitat and people, there is a unique and important opportunity to develop strategies centered on marketing, economics and engagement. These strategies should emphasize the multiple benefits that NAWMP habitat conservation provides to society. This approach aims to retain existing supporters and partners while engaging new and diverse ones.

Some NAWMP partners already communicate the multiple benefits that accrue from waterfowl habitat conservation and have developed conservation strategies that include multiple benefits. This approach is being recognized by policy makers, funders and conservation interests focused on water quality and quantity, biodiversity, climate change and related issues. Examples include:

- Large-scale wetland protection or restoration to reduce flooding and to reduce nitrogen and phosphorous entering waterways in Iowa (Janke and Shannon 2023; *www.youtube.com/watch?v=juwRXYdRglQ*) and the Prairie Habitat Joint Venture region (Pattison-Williams et al. 2018)
- Identification of wetland and floodplain restoration projects to reduce the impacts of floods and droughts on

communities along the Mississippi River and to provide critical migratory and wintering habitat along the Mississippi Flyway (Herbert 2023; *www.youtube.com/watch?v=uKHTH6pdM8U*)

- Strategic restoration of wetlands to recharge groundwater to support agriculture and increase drinking water supplies in the Playa Lakes Joint Venture region (Playa Lakes Joint Venture 2024; *pljv.org/playas/tomorrows-water/*)
- Work with ranchers to maintain or restore forage in flood-prone areas to benefit cattle production, waterfowl and other wildlife in the Rainwater Basin Joint Venture (Rainwater Basin Joint Venture 2024; *www.rwbjv.org/wetland-management/*)
- Provision of wastewater treatment technology to people sharing landscapes with waterfowl to improve water and habitat quality in wetlands (Ducks Unlimited de Mexico 2024; *dumac.org/en/dimensiones-humanas/*)

Expanding the number and diversity of supporters and partners will strengthen the NAWMP's support base and increase the resources available to enhance the rate and scale of waterfowl habitat conservation. The resulting ecological benefits will, in turn, improve the quality of life for people and their communities.

Wetland in Minatitlán, Mexico.
Marcel Gahbauer

Improving Quality of Life for People and Quality of Habitat for Waterfowl in Mexico

Mexico has long been a leader in espousing multiple benefits of waterfowl habitat conservation. NAWMP programs in Mexico often seek to solve problems for waterfowl and communities of people simultaneously. NAWMP partner Ducks Unlimited de Mexico has worked with partners to improve water quality in Cuitzeo Lake, preventing raw sewage from entering the wetland by providing low-maintenance chemical dry toilets to people in surrounding communities. This improves water quality in the lake, supports recovery and growth of emergent plants that provide food and habitat for waterfowl and, importantly, improves the hygiene and health of the people in local communities who previously lacked such facilities.

The 2012 NAWMP revision introduced a fundamental goal focused on people, laying the foundation for new initiatives that aimed to understand the needs and desires for wetland and waterfowl conservation among North American hunters, birdwatchers, landowners—including farmers and ranchers—and other potential supporters. The 2014 Addendum and 2018 Update further articulated objectives for engaging people, emphasizing the critical need to incorporate social sciences to achieve Plan goals of increasing and diversifying supporters and partners.

Interviews conducted with JV staff revealed that, consistent with the findings of Soulliere et al. (2022), many JVs continue to question whether NAWMP objectives for people are truly equally as fundamental as those for waterfowl populations and habitat. This contrasts with a widespread view among JVs that people, either implicitly or explicitly, are critical to accomplishing waterfowl population and habitat objectives (*2024 Update Technical Report*). People fuel the economic and political engine that drives habitat conservation activities for waterfowl in North America. As such, people are the means by which waterfowl habitat goals are achieved. That said, reaffirming people as fundamental objectives seems to resonate with NAWMP partners and supporters. In fact, stakeholder input strongly suggests that people should be considered as both a fundamental and a means objective for the NAWMP (see Appendix C in NAWMP 2012).

Barb Campbell (Canadian Wildlife Service) conducting a breeding waterfowl pair survey in southeastern Ontario.
Shawn Meyer

The NAWMP partnership has invested significant resources over the past decade in learning about the key target audiences and how social sciences can support and advance wetland conservation. In 2022, the Unified Science Team and the NSST reported on the status of integrating human dimensions into JVs (Soulliere et al. 2022). The JVs acknowledged the importance of social sciences for achieving their goals and objectives, noting that social sciences can help them better understand the major social and environmental changes occurring across North America. As expected, there are different levels of social science engagement across JVs. There are several perceived barriers to social science engagement and integration, including JV staff capacity, traditions and culture, partnership composition, regional landscape characteristics and the stage of updating implementation/conservation plans (Soulliere et al. 2022).

More recently, the *2024 Update Technical Report* found the lack of a proactive NAWMP communication plan has limited the circulation of information about the outdoor recreation opportunities and societal benefits provided by the NAWMP. There is little evidence to illustrate how data from the 2021 hunter, birdwatcher and public surveys have been used to directly inform or influence people to support waterfowl conservation. The NAWMP Communications Committee undertook an inventory of marketing assets that indicated less than 10% of the identified marketing assets directly message about the NAWMP. Most assets identified in the study were informational, did not use persuasive language and were often limited to background information on the creation and adoption of the NAWMP.

If the NAWMP partnership is to achieve its fundamental goals for waterfowl populations, habitat and people, the partnership must reach a better understanding of the barriers and motivations that affect participation by people or communities in wetland conservation. The partnership must also understand what drives or blocks support for policies that conserve the multiple benefits provided by waterfowl habitats. Learning how to better use social sciences to inform conservation program delivery, and to promote positive conservation attitudes and behaviors, is critical if the NAWMP is to achieve conservation delivery and wetland policy objectives. Ultimately, the NAWMP must go beyond merely learning; it must invest in resources and governance processes to ensure that social sciences and community priorities are fully integrated into its conservation efforts. Collectively, the NAWMP partnership must develop, expand and perhaps reimagine conservation, communications, marketing and outreach initiatives and tools to successfully engage a more diverse group of participants and build relevance to a broader and more varied array of partners.

NAWMP Professional Development

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

Expanding the NAWMP Partnership

Consistent with its fundamental goal to grow and diversify its support base (NAWMP 2012), the NAWMP must seek to inspire and support the conservation community as it embraces the richness of diverse cultures, individuals, experiences and perspectives. The NAWMP encourages efforts at all levels to grow and engage a diverse suite of practitioners, partners and supporters that will increase the relevance of the NAWMP to the broader communities within which it works. Ultimately, the NAWMP should aspire to reflect the diversity of people in North America. This is another element of the strategy of expanding NAWMP supporters and partners by communicating the multiple benefits the NAWMP provides to the communities and landscapes within which it conserves waterfowl and their habitats.

There are opportunities to gain experience and diversify NAWMP practitioners, supporters and partners by engaging and collaborating with culturally diverse and community-based organizations in conservation planning and delivery. Community outreach can be expanded to groups that have been outside the historical conservation community. Ultimately, the success of the NAWMP in sustaining waterfowl populations depends on including and engaging all people who share landscapes with waterfowl. It is crucial to connect with those who value not only waterfowl but also the multiple benefits provided by waterfowl habitats. JVs and Flyways will play a critical role in this outreach because important audiences will vary geographically.

Indigenous-Led Conservation Areas in the Canadian Boreal Forest

Indigenous Protected and Conserved Areas (IPCAs) are places where Indigenous governments have the primary role in protecting and conserving lands and waters for future generations. Indigenous governments may work with national and territorial governments, non-governmental organizations, local stewards and interested parties to identify and secure important conservation areas, including those that contain waterfowl habitats. Ducks Unlimited Canada, through its National Boreal Program, currently is working with the Deninu Kųé First Nation and the Fort Resolution Métis Government in the Northwest Territories in their efforts to establish an IPCA in the Slave River Delta and Taltson watershed, a NAWMP priority area in the Prairie Habitat Joint Venture's Western Boreal Forest region. Once complete, this IPCA will span hundreds of thousands of acres and include breeding habitat for green-winged teal, mallard, scaup and other waterfowl, as well as many waterbirds, shorebirds and landbirds.

Boreal toad restoration site in Rio Grande National Forest, Colorado.
Dana Shellhorn, USFWS

Priority People Recommendations

1. The Plan Committee confirms that the engagement of people should be both a fundamental and a means objective, though the focus may differ by geography. The Plan Committee also will consider whether objectives articulated in the 2014 Addendum are sufficient or warrant revision. Finally, in consultation with the Human Dimensions and Public Engagement Team (HDPET), Joint Ventures should explicitly articulate objectives for people within JV implementation plans. These goals should be stated along with relevant assumptions that can be evaluated within an adaptive framework.

2. The Plan Committee will appoint the HDPET to develop a strategic plan to guide human dimensions efforts related to NAWMP work. This effort will better inform, guide and facilitate integration of human dimensions into population and habitat plan implementation among Joint Ventures and across the NAWMP enterprise. This could entail facilitated workshops, with some suggested important topics to include:

    a. Approaches for establishing specific metrics for people as both a fundamental and a means objective within JV implementation plans

    b. Evaluation and assessment of new and current people-related objectives and important metrics

    c. Recommendation for scheduled updates/reviews of goals and objectives for people (NAWMP 2012)

    d. Identification of information gaps

    e. Identification of barriers and solutions to integration of people objectives into NAWMP and Joint Venture population and habitat goals

    f. Identification of desired NAWMP-related societal benefits

    g. Development of strategies and resources for Joint Ventures to engage broader segments of society in the waterfowl enterprise

    h. Development of strategy to ensure the social license for waterfowl harvest remains strong

3. The Plan Committee will encourage and support strategic investments in regional-scale knowledge gathering that quantifies key ecosystem service benefits to people from actions targeted to improve conditions for waterfowl.

Northern lights over a waterfowl management sign in Minnesota.
Mike Budd, USFWS

4. The Plan Committee will continue to provide support and guidance for the NAWPEP Committee to implement its strategic plan.

5. The Plan Committee will encourage Joint Ventures and/or NAWMP partners engaged in program planning and implementation, especially at regional and local scales, to seek wider engagement of practitioners, supporters and partners in the NAWMP that better reflects the communities in which it operates.

Boreal forest wetland near Hornepayne, Ontario.
Shawn Meyer

Integration

The 2012 Revision of the NAWMP identified three co-equal fundamental goals, with specific objectives articulated in the 2014 Addendum. These objectives are anchored in the goals to (1) sustain waterfowl populations and population fluctuations at historic levels, (2) conserve habitats at levels sufficient to satisfy life cycle requirements of waterfowl and the desires of those who support waterfowl conservation, and (3) increase the number of supporters through a variety of activities. Additionally, the 2018 Update advocated for integrating across the three objectives. Specifically, practitioners were urged to "[*consider*] *the impact of specific management decisions on all objectives and* [*learn*] *about the effects of those actions on the attainment of multiple objectives through monitoring and evaluation*."

The 2018 Update also stated that most decisions relevant to NAWMP implementation occur at regional or local scales, and that integration would be most successful at regional (state, provincial, territorial or JV) scales. Toward that end, Krainyk et al. (2019) undertook an innovative research project to develop a decision support tool to spatially integrate the biological and social objectives of the NAWMP. The tool allows customization, so it can be used by national, regional and province/state-level wildlife professionals to aid their decisions in targeting waterfowl habitat conservation. Such tools hold great promise, and they support efforts by the NAWMP to advance integration. As part of the 2024 Update review process, a survey of JVs was completed. It revealed advancements in the use of social sciences to inform decision-making, but also showed that JVs are viewing human dimensions science primarily as a tool to help achieve biological objectives, rather than a means to support people objectives as an end result (*2024 Update Technical Report*). Examples of JV conservation approaches that explicitly seek benefits to both waterfowl and other ecosystem services were also reviewed. These approaches have paid dividends for JVs by engaging broader audiences and by demonstrating broader societal benefits from waterfowl habitat conservation (*2024 Update Technical Report*).

Interviews with individual JV staff revealed considerable progress on integrating waterfowl population and habitat objectives (Appendix H). Of the 23 JV staff interviewed, 15 indicated they had quantified habitat objectives integrated with NAWMP population objectives. On the other hand, only 2 of 23 indicated that they had incorporated priorities for people into their geographic priorities for waterfowl habitat, and none of them had quantified waterfowl population objectives integrated with NAWMP people objectives (Appendix H; *2024 Update Technical Report*).

Relatively slow progress on formal integration of people objectives with waterfowl population and habitat objectives should not be interpreted as a lack of interest in human dimensions by NAWMP partners. Rather, it illustrates uncertainties surrounding the process. This is not surprising given that this important aspect of the NAWMP began with the 2012 Revision. NAWMP practitioners had much to digest and learn during the intervening period. In fact, it is encouraging that many JVs indicated their partnerships have invested substantially in better understanding socio-economic factors influencing habitat conservation. These investments took many forms, including better quantification and communication of the range of benefits provided by the restoration and conservation of waterfowl habitat, design and development of programs that benefit waterfowl and agricultural producers simultaneously, efforts to provide actionable science to inform

policy debates, and extensive gathering of data on waterfowl hunter and other recreationist motivation, satisfaction and demographics (Patton 2018; Cole 2022).

If the desire is to retain and integrate three coequal fundamental goals, JVs may require additional support and guidance to help them focus conservation efforts more effectively. For example, if sustaining waterfowl populations is fundamental to supporting waterfowl hunters for the sake of waterfowl hunting itself, then JVs and/or Flyways may need additional guidance regarding integration of habitat and harvest management efforts, hunter R3 efforts and similar efforts that have not traditionally been JV foci. Quantitatively integrating across three coequal goals remains both conceptually and practically difficult. Nevertheless, since the 2012 Revision and the 2018 Update, we've seen real progress in breaking the problem into more formal pairwise integration of two goals at a time. The next four sections show examples of that progress.

Habitat and Waterfowl Populations

The science that relates waterfowl population growth to habitat conditions continues to strengthen. Population models that can quantify habitat's contribution to population growth at each life cycle stage have been completed for several species with diverging life-history strategies (Stearns 1992; Hoekman et al. 2002; Flint et al. 2006; Coluccy et al. 2008; Johnson 2009; Amundson et al. 2013; Wilson et al. 2012; Howerter et al. 2014; Koons et al. 2014; Arnold et al. 2017; Zhao et al. 2020). With additional investment in these models, the NAWMP partnership should be able to increase spatial targeting of resources to geographies that drive population growth rates. Also, with nearly four decades of experience delivering NAWMP habitat programs, practitioners have extensive knowledge of how relative habitat delivery costs vary by program and geography.

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

The Central Hardwoods Joint Venture (CHJV) stood out as an exciting and somewhat unexpected example of habitat and population integration. The CHJV was established primarily for its continental importance to landbirds, yet the JV embraced an elaborate population-based planning effort for migrating and wintering waterfowl (see Fleming et al. 2019) that steps down NAWMP continental waterfowl objectives to habitat objectives for their geography. The CHJV further used available land cover to assess the state of the landscape relative to desired conditions for waterfowl. This provides a useful model for other JVs that have not yet integrated waterfowl population and habitat objectives.

The cooperation of farmers and other private landowners is critical to the success of the Plan.
Tim Sopuck

Habitat and People

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

People and Waterfowl Populations

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

A group of black brant waterfowl hunters at Izembek National Wildlife Refuge in Alaska.
Ryan Hagerty, USFWS

Recently, social scientists have examined hypotheses about the relationship between participation in waterfowl hunting or viewing and conservation behaviors and advocacy for appropriate public policy. Hypotheses about effects of harvest regulations, a function of waterfowl populations, on hunting participation have been debated for decades. A United States–scale research effort is underway to develop a new model for integrating waterfowl hunting regulations and their effects on hunter participation and harvest into existing population and habitat models. The goals are to create a foundation for understanding hunter dynamics, integrating them into existing modeling frameworks and, ideally, reducing uncertainties in order to incorporate a social component into decision tools for setting regulations and managing harvest (Berl et al. 2023).

Habitat, People and Populations

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

Existing examples provide compelling opportunities for extension:

1. The quantification of multiple benefits conferred by waterfowl habitat resources continues. Further work to understand the spatial and temporal flow of these multiple benefits, and continuing to include these in planning tools, will enhance NAWMP partners' ability to engage broader segments of society in conserving the many values associated with waterfowl habitats.

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

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

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

Incorporating these components into new or existing planning tools will help engage new supporters while delivering more efficient conservation programs and avoiding substantial opportunity costs currently present in funding allocations. Further, strong international cooperation and coordination across Canada, the United States and Mexico are essential to ensure conservation resources are invested where they will be most effective in accomplishing NAWMP goals.

Recovery efforts for tidewater goby at a Ventura, California, wetland.
Ashley Spratt, USFWS

Priority Integration Recommendations

1. The Plan Committee will support and encourage the NSST, HDPET, Harvest Management Working Group (HMWG) and Joint Venture science and planning staff to build on existing tools (e.g., Krainyk et al. 2019) and apply them at local, regional and international scales to ensure biological and social integration and to allow examination of trade-offs of management alternatives associated with incorporation of different sets of fundamental objectives. Efforts should be made to extend these tools to incorporate landscape-specific risks to waterfowl productive capacities, contributions to waterfowl population growth, and relative costs of conservation delivery.

2. The Plan Committee will support, encourage and engage the NSST, HDPET, HMWG or other relevant advisory groups to explore approaches and develop planning tools that can be applied at local, regional/Joint Venture and international scales to incorporate a greater suite of benefits that include econometrics and support Joint Ventures in refining their conservation plans. In part, funding for such work may be available from entities (and prospective partners) who seek multiple benefits and outcomes and may be willing to collaborate to achieve desired tools and outcomes. These tools should be extended to map products, including as replacement for the current priority area map used to inform allocation decisions (Appendix I).

Flooded Ottawa River, Ontario, May 2023.
Marcel Gahbauer

Climate Change and Waterfowl

A growing body of evidence shows there are substantial, ongoing and increasing threats to waterfowl habitats from climate change (NAWMP 2012; Hagy et al. 2014; de Zwaan et al. 2024). A literature review included in the *2024 Update Technical Report* indicated most major waterfowl regions and populations in North America face existing or emerging detrimental impacts that can be linked to climate change, though there are a few species whose habitats and populations may benefit. For certain species groups (e.g., sea ducks), changing climate may pose the preeminent threat to sustaining populations. NAWMP accomplishments may mitigate climate change effects by preventing carbon release and/or increasing carbon sequestration, reducing the impacts of extreme weather such as flooding, and conserving water where supplies are at risk from warming, drying conditions. These consequences should be proactively communicated and promoted.

Climate change is a large-scale, complex, daunting challenge that will exacerbate existing, ongoing habitat conservation issues and may impact disease dynamics of waterfowl in unknown ways. The Plan Committee and partners will need to consider and address capacity issues to ensure that the NAWMP is responsive to emerging climate change information and is sufficiently nimble to adjust conservation planning strategies and program implementation at appropriate scales, both within and across JVs. Ultimately, the Plan Committee must ensure that climate change science is factored into waterfowl conservation planning to ensure effects on populations, habitat and supporters are understood, and that appropriate adaptation responses are developed to support waterfowl and NAWMP supporters.

Aerial footage of a flooded portion of San Bernard National Wildlife Refuge near the Texas coast.
USFWS

A glacial river branches out in a broad coastal delta and meets the north Pacific Ocean at Kodiak Island, Alaska.
Steve Hillebrand, USFWS

Priority Climate Change Recommendations

1. The Plan Committee will actively encourage and support Joint Venture and/or NSST efforts to review, synthesize and incorporate rapidly advancing climate science at appropriate scales; where changes are already apparent, adjusting implementation plans may be appropriate.
2. NAWMP partners will work to support, retain or achieve strong wetland policy to conserve wetlands and associated habitats for provision of multiple benefits that help waterfowl and people adapt to climate change effects.
3. NAWMP partners should continue to evaluate and integrate waterfowl habitat conservation with nature-based and agricultural-based climate adaptation strategies that benefit waterfowl populations, habitat and people.
4. NAWMP partners should assess and develop strategies to address potential decreased funding from license sales associated with waterfowl distributional changes related to climate and land-use change.

Frozen lakes of Yukon Flats, Alaska.
Lisa Hupp, USFWS

Trumpeter swans and mallards at National Elk Refuge, Wyoming, in winter.
Karl Cieszkiewicz, USFWS

Sunset from the duck blind on the Rideau River, near Kilmarnock, Ontario.
Shawn Meyer

Summary

The NAWMP remains strong because it is adaptive and has a diverse and growing number of partners who share a commitment and vision to sustain waterfowl habitats in North America. The Plan also has some of the most committed supporters for any wildlife conservation effort in the world: waterfowl hunters. Hunters have carried the burden of waterfowl and wetlands conservation for decades and continue to do so today. Unfortunately, daunting challenges continue to erode waterfowl habitat and threaten future sustainability of populations. Such large-scale challenges compel the conservation community to grow and diversify partners and supporters.

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

Waterfowl conservation, in addition to conserving habitat and sustaining populations of these magnificent birds, provides many important benefits to people. These include clean and abundant water, food, biodiversity, places to connect with nature and mitigation of climate change impacts.

The NAWMP can grow and diversify its supporters and partners by communicating the many values of its waterfowl habitat work through effective outreach and engagement. Done well, these efforts will ultimately lead to a broader, more diversified base of motivated stewards who value waterfowl habitat and the many benefits that improve quality of life in their communities. That is the opportunity. The NAWMP partnership should be proud of its successes, appropriately concerned about existing threats and excited about opportunities to adapt, grow and rise to the challenge to sustain North America's waterfowl and the attendant benefits that, collectively, are valued by people.

Buffleheads at Siletz Bay, Oregon.
Peter Pearsall, USFWS

King eider splashing across the surface of a tundra pond in Alaska.
Peter Pearsall, USFWS

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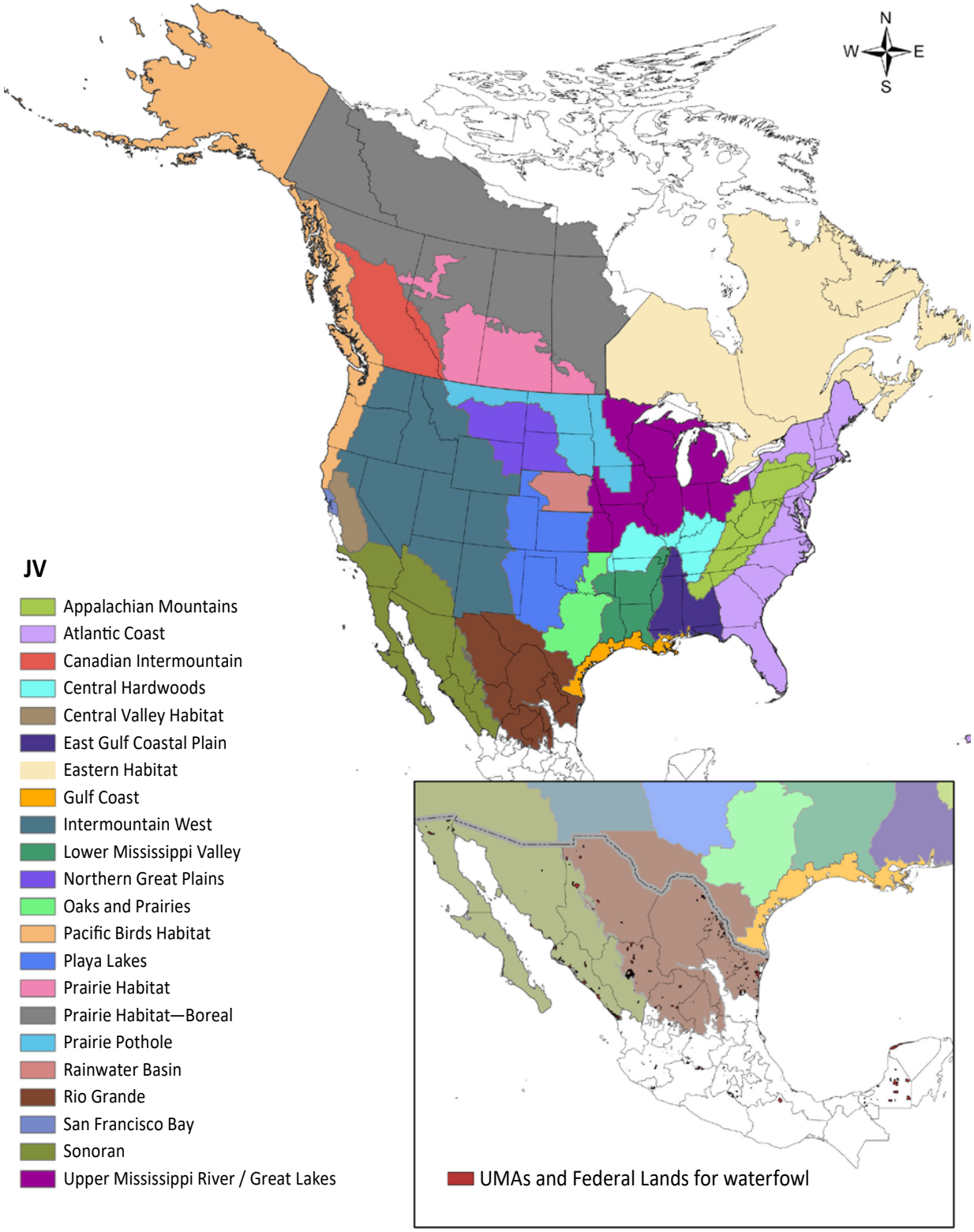
Red-throated loon on a still pond.
Peter Pearsall, USFWS

Appendix A. Map of existing NAWMP Joint Ventures (JVs) and Management Units for Wildlife Conservation (UMAs)



Long Description

A map of North America showing the 22 NAWMP Joint Venture (JV) regions, with an inset map of Mexico showing Management Units for Wildlife Conservation and Federal Lands for waterfowl.

The NAWMP JV regions are described in the table below.

Joint Venture	Region
Appalachian Mountains	The Appalachian Mountains JV includes southern New York, central Pennsylvania, northwestern New Jersey, southeastern Ohio, all of West Virginia, western Maryland, eastern Kentucky, western Virginia, eastern Tennessee, western North Carolina, northeastern Alabama and northern Georgia.
Atlantic Coast	The Atlantic Coast JV includes northern, western and eastern New York; all of Vermont, New Hampshire, Maine, Massachusetts, Connecticut and Rhode Island; the northwestern and southeastern corners of Pennsylvania; most of New Jersey; eastern Maryland; all of Delaware; eastern Virginia; eastern North Carolina; all of South Carolina; southern Georgia; and most of Florida.
Canadian Intermountain	The Canadian Intermountain JV includes central and southern British Columbia, from east of the west coast to the British Columbia–Alberta border, and the Rocky Mountains of western Alberta.
Central Hardwoods	The Central Hardwoods JV includes most of southern Missouri, parts of southern Illinois and Indiana, most of Kentucky, a small corner of northeast Oklahoma, part of northern Arkansas, central Tennessee and part of northwestern Alabama.
Central Valley Habitat	The Central Valley Habitat JV is concentrated in central California, including the Central Valley and part of the surrounding mountains.
East Gulf Coastal Plain	The East Gulf Coastal Plain JV includes the westernmost part of Kentucky, western Tennessee, eastern Mississippi, a small portion of west-central Louisiana, southern Alabama and part of the Florida panhandle.
Eastern Habitat	The Eastern Habitat JV includes all of Ontario, Quebec, Newfoundland and Labrador, New Brunswick, Prince Edward Island and Nova Scotia.
Gulf Coast	The Gulf Coast JV covers a narrow stretch on the coasts of Texas and Louisiana, with small areas in coastal Mississippi and Alabama.
Intermountain West	The Intermountain West JV includes eastern Washington and Oregon, all of Idaho, western Montana, west-central Wyoming, northeastern and east-central California, all of Nevada and Utah, western Colorado, northern Arizona and west-central New Mexico.
Lower Mississippi Valley	The Lower Mississippi Valley JV includes southeastern Oklahoma, southern and northeastern Arkansas, northeastern Texas, northern Louisiana, the southeast corner of Missouri, tiny slivers of western Kentucky and Tennessee, and the northwest corner of Mississippi.
Northern Great Plains	The Northern Great Plains JV includes southeastern Montana, southwestern North Dakota, northeastern Wyoming and western South Dakota.
Oaks and Prairies	The Oaks and Prairies JV includes central Oklahoma and eastern Texas.
Pacific Birds Habitat	The Pacific Birds Habitat JV includes all of Alaska; coastal British Columbia, Washington and Oregon; and the northwest coast of California.
Playa Lakes	The Playa Lakes JV includes western Nebraska, eastern Colorado, western Kansas, eastern New Mexico, western Oklahoma and north-central Texas.
Prairie Habitat	The Prairie Habitat JV includes a smaller area in northeastern British Columbia and northwestern Alberta and a larger area covering southeastern Alberta, southern Saskatchewan and southwestern Manitoba.

Joint Venture	Region
Prairie Habitat—Boreal	The Prairie Habitat—Boreal JV includes most of Yukon and the Northwest Territories; southern Nunavut; and northern British Columbia, Alberta, Saskatchewan and Manitoba.
Prairie Pothole	The Prairie Pothole JV includes northern Montana, northeastern North Dakota, eastern South Dakota, western Minnesota and north-central Iowa.
Rainwater Basin	The Rainwater Basin JV includes central Nebraska only.
Rio Grande	The Rio Grande JV includes southwestern Texas and parts of northeastern Mexico, including eastern Chihuahua, most of Coahuila, northern and southwestern Nuevo León, northern and southwestern Tamaulipas, eastern Durango, southeastern Zacatecas, and northwestern and central San Luis Potosí.
San Francisco Bay	The San Francisco Bay JV includes a small area of coastal California around San Francisco.
Sonoran	The Sonoran JV includes southern California; southern Arizona; and areas in northwestern Mexico, including Baja California, Baja California Sur, Sonora, Sinaloa, western Chihuahua and western Durango.
Upper Mississippi River / Great Lakes	The Upper Mississippi River / Great Lakes JV includes eastern Minnesota; all of Wisconsin and Michigan; eastern Nebraska and Kansas; western, southern and eastern Iowa; northern Missouri, Illinois and Indiana; and northwestern Ohio.

The inset map shows Management Units for Wildlife Conservation and Federal Lands for waterfowl in Mexico. These areas are scattered throughout much of Mexico, but denser concentrations occur in the following locations: northern Baja California and both sides of the Baja California–Sonora border; the southwest coast of Sonora and the west coast of Sinaloa; northwestern to southeastern Chihuahua, central Durango and northern Zacatecas; northeast Coahuila, northern Nuevo León and northern Tamaulipas; central Jalisco; eastern Colima; both sides of the Michoacán–Guanajuato border; southern Morelos; northern Oaxaca; throughout Campeche; and the northwest coast of Yucatán.

Appendix B. Working Groups involved in the 2024 Update

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Appendix C. Revised NAWMP population objectives (long-term average population size; in 1,000s) for select duck species

Objectives and 80th percentile values are sourced from the 2018 Update via "Revised Objectives: An Addendum to the 2012 North American Waterfowl Management Plan" (September 2014) and are based on long-term average population estimates (TSA: 1955–2014). Adjusted NAWMP population objectives reflect adjustments proposed in the 2024 Update, including (1) calculation of long-term average populations using survey data from 1974–2022; (2) inclusion of additional surveys to expand geography and include surveyed population in eastern North America.

2024 Update Traditional Survey Area (TSA)				2018 Update Traditional Survey Area (TSA)			
Species	**Long-term Average[a]**	**80th Percentile[a]**	**Population Size[b]**	**Species**	**Long-term Average**	**80th Percentile**	**Population Size**
Mallard	7,773	9,451	9,731	Mallard	7,726	9,297	9,965
Western mallards[c]			987				
Mid-continent mallards[c]			9,831				
Gadwall	2,434	3,258	3,386	Gadwall	1,921	2,977	3,449
American wigeon	2,523	2,888	2,678	American wigeon	2,596	3,048	2,660
Green-winged teal	2,401	3,019	3,272	Green-winged teal	2,059	2,631	3,473
Blue-winged teal	5,479	6,700	7,225	Blue-winged teal	4,949	6,329	7,794
Northern shoveler	2,994	4,095	4,149	Northern shoveler	2,515	3,592	4,434
Northern pintail	3,149	3,538	2,717	Northern pintail	4,003	5,722	3,235
Redhead	811	1,051	1,107	Redhead	701	918	1,187
Canvasback	605	712	699	Canvasback	581	691	689
Scaup	4,673	5,582	4,244	Scaup	5,026	5,984	4,425
TSA Total	**32,842**	**40,294**	**39,208**	**TSA Total**	**34,703**	**40,748**	**45,421**

[a] The population objectives (in thousands) 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 (Silverman et al. 2012, Appendix A).

[b] The population size (in thousands) was calculated as the average of the last 10 survey years, 2012–2023 (due to the COVID pandemic, the Waterfowl Breeding Population and Habitat Survey or WBPHS was not conducted in 2020–2021) in the TSA of the WBPHS, strata 1–18, 20–50, 75–77.

[c] 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 (USFWS 2023). Combined western and mid-continent stocks do not equal the TSA mallard estimate because it does not include state or provincial surveys.

2024 Update Eastern North America				2018 Update Eastern Survey Area (ESA)			
Species	**Long-term Average[a]**	**80th Percentile[a]**	**Population Size[b]**	**Species**	**Long-term Average**	**80th Percentile**	**Population Size**
Mallard[c]	1,449	1,556	1,358	Mallard	409	426	1,156
American black duck[c,d]	756	802	722	American black duck	628	648	701
Green-winged teal[e]	357	394	334	Green-winged teal	263	281	382
Ring-necked duck[e]	699	731	682	Ring-necked duck	515	529	682
Goldeneyes[e]	665	733	616	Goldeneyes	433	449	559
Mergansers[e]	778	832	807	Mergansers	436	462	594
ESA Total	**4,704**	**5,048**	**4,519**	**ESA Total**	**2,685**	**2,783**	**4,074**

[a] The population objectives for species in the ESA are based on the average of the period 1998–2023.

[b] The population size (in thousands) was calculated as the average of the last 10 survey years, 2012–2023 (due to the COVID pandemic, the Waterfowl Breeding Population and Habitat Survey or WBPHS was not conducted in 2020–2021) 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 ESA (U.S. Fish and Wildlife Service [USFWS] strata 51–53, 56, 62–72 and Canadian Wildlife Service [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 ESA (WBPHS strata 51–53, 56, 62–72 and CWS helicopter strata 71 and 72).

Appendix D. Objectives and estimates for North American duck populations other than those provided in Appendix C

Objectives and mean population size estimates are for total birds in spring or early summer unless otherwise noted.

2024 Update			2018 Update		
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	3,000[l]	6,100[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

2024 Update			2018 Update		
Species/Subspecies/ Subpopulation	**Objective**	**Population Size**	**Species/Subspecies/ Subpopulation**	**Objective**	**Population Size**
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
Common eider, American	105,000 breeding pairs	105,000 pairs[p]	Common eider, American	165,000 breeding pairs	250,000
Common eider, northern (CA winter)		260,000[q]	Common eider, northern	400,000	260,000
Common eider, northern (GL winter)		500,000[q]			
Common eider, Hudson Bay	275,000[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
Surf scoter, east		150,000[x]	Surf scoter		700,000
Surf scoter, west		[m]			
White-winged scoter, east		60,000[x]	White-winged scoter		400,000
White-winged scoter, west		[m]			
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

2024 Update			2018 Update		
Species/Subspecies/ Subpopulation	**Objective**	**Population Size**	**Species/Subspecies/ Subpopulation**	**Objective**	**Population Size**
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 (*fws.gov/library/collections/mottled-duck-population-status-reports*).

[d] Hawaiian duck population estimate from 2016 (*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 U.S. Fish and Wildlife Service (USFWS) revised recovery plan: recovery for downlisting to threatened, 2,300 birds; recovery for delisting, 3,000 birds (*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 global estimate (*pif.birdconservancy.org/avian-conservation-assessment-database*).

[h] Eastern wood duck population estimate is the 2014–2023 average from the Breeding Bird Survey/northeast U.S. plot survey composite model for the U.S. Atlantic Flyway (Zimmerman et al. 2015).

[i] Eastern and western population estimates of wood ducks (divided by 106° longitude) are the 2013–2022 average, from Lincoln estimates based on band recoveries and harvest data (R. Alisauskas, unpublished data).

[j] Continental estimates for ring-necked duck, common goldeneye, bufflehead and mergansers are the average of the sum of Traditional Survey Area (TSA) and Eastern Survey Area (ESA) estimates for the period 2012–2023.

[k] Population estimate for ruddy duck is the average from the TSA for the period 2012–2023.

[l] Updated Canadian winter population estimate for the eastern harlequin duck from Gutowsky et al. (2022) and recent surveys in Quebec and Saint-Pierre-et-Miquelon. U.S. winter population unknown; may be available in two years. Current expert opinion estimate is 2,000 (C. Lepage, CWS). Population objective from Environment Canada (2007).

[m] Insufficient information currently exists to calculate a reliable population estimate or objective.

[n] Population estimate for eastern king eider based on Greenland winter survey last conducted in 2017.

[o] Population estimate for western king eider based on index from Point Barrow migration survey (McGuire et al. 2019).

[p] Population estimate for American common eider is minimum modeled estimate based on the number of birds detected in Christmas Bird Counts in the USA and the winter eider surveys in Canada (Gutowsky et al. 2023); population objective estimated from Noel et al. (2021).

[q] Population estimate for wintering northern common eiders in Canada and Greenland (Merkel et al. 2002, 2019). Some of the Greenland birds may breed in North America (*natur.gl/arter/common-eider/?lang=en*). The SDJV recommends developing individual objectives for the CA and GL wintering populations in the next update.

[r] Estimate and objective for Hudson Bay common eider from winter survey conducted in 2006 (S. Gilliland, unpublished data).

[s] Estimate for Pacific common eider derived from a compilation of data from different regions (USFWS 2006).

[t] Population objective for Steller's eider from the recovery plan (USFWS 2019). Population estimate represents North American breeding population based on results of the Arctic Coastal Plain aerial survey, Barrow Triangle aerial survey, and the foot survey near Utqiagvik. Only a small number of Steller's eiders nest in North America, but a large portion of the Pacific Steller's eider population (~50,000) uses Alaska during molt, winter, and spring staging periods and may be a better management unit to highlight in the next NAWMP update.

[u] Population objective for spectacled eider from the recovery plan (USFWS 2021). Population estimate represents the Alaska breeding populations only, based on aerial surveys of the Arctic Coastal Plain and the Yukon-Kuskokwim Delta. The global population includes breeding populations in both Alaska and Russia that winter together in the Bering Sea. Results from an aerial survey of the global population conducted by USFWS in 2023 are not yet available.

[v] Winter population estimate for eastern black scoter from USFWS winter survey 2008–2011 (Silverman et al. 2012). NOTE: James Bay/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. SDJV 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 for Pacific black scoter from USFWS breeding survey (USFWS unpublished data).

[x] Population estimate for eastern populations of surf scoter and white-winged scoter 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 for bufflehead recommended by SDJV CTT is the long-term average of the TSA (1974–2023).

Appendix E. Objectives and estimates for North American goose populations

Objectives and mean population size estimates are for total birds in spring or early summer unless otherwise noted.

Species and Populations	Survey Description	Population Size		Population Objective	
		Most Recent 10-year Average	Last Year (or Years) Included in 10-year Average	Management Plan	Notes—Objective
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	2001–2005 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	

Species and Populations	Survey Description	Population Size		Population Objective	
		Most Recent 10-year Average	Last Year (or Years) Included in 10-year Average	Management Plan	Notes—Objective
Mid-continent	Adult Lincoln estimate	3,096,423	2019	1,000,000	
Taverner's	WBPHS + YKDCZS + ACP, 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	Midwinter survey, winter index	136,037	2023	150,000	
Pacific	Midwinter survey, winter index	147,199	2023	162,000	
Eastern High Arctic	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 through-out Hawaiian islands	3,862	2022 estimate (USFWS webpage)	Recovery from T&E status	Downlisted from endangered to threatened in 2019

Appendix F. Objectives and estimates 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	Pending Flyway review	27,055 adults and subadults*

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

Appendix G. North American Waterfowl Management Plan species priorities (from Roberts et al. 2023)

Duck prioritization

Duck Species	Listed species	Combined score for goal				
		Social	Habitat	Population	Total	Rank
Steller's eider	x	1	5	5	11	High
Spectacled eider	x	1	4.5	5	10.5	High
Hawaiian duck	x	1	4	5	10	High
Laysan duck	x	1	4	5	10	High
Northern pintail		2	3.5	5	10.5	High
Mottled duck		1	4	5	10	High
King eider		1	4	5	10	High
Cinnamon teal		2	3	4	9	High
American black duck		2	3	4	9	High
Lesser scaup		2	3	4	9	High
Long-tailed duck		1	3	5	9	High
Mallard		5	2	2	9	High
American wigeon		2.5	2.5	3	8	Medium
Black scoter		1	3	4	8	Medium
Eastern Barrow's goldeneye		1	4	3	8	Medium
Western Barrow's goldeneye		1	4	3	8	Medium
Common eider		1	3.5	3	7.5	Medium
Greater scaup		1	3	3	7	Medium
White-winged scoter		1	3.5	3	7.5	Medium
Gadwall		3	3	1	7	Medium
Masked duck		1	3	3	7	Medium

Duck Species	Listed species	Combined score for goal				
		Social	Habitat	Population	Total	Rank
Blue-winged teal		2.5	2.5	2	7	Medium
Green-winged teal		2.5	2.5	2	7	Medium
Surf scoter		1.5	3.5	2	7	Medium
Common merganser		1.5	2.5	3	7	Medium
Red-breasted merganser		1.5	2.5	3	7	Medium
Canvasback		1.5	3	2	6.5	Medium
Bufflehead		2.5	3	1	6.5	Medium
Common goldeneye		1.5	3	2	6.5	Medium
Eastern harlequin duck		1	3	2	6	Low
Western harlequin duck		1	3	2	6	Low
Redhead		2	3	1	6	Low
Fulvous whistling duck		1	3	2	6	Low
Mexican duck		1	3	2	6	Low
Wood duck		3	2	1	6	Low
Northern shoveler		2	2.5	1	5.5	Low
Ring-necked duck		2	2.5	1	5.5	Low
Black-bellied whistling duck		1.5	3	1	5.5	Low
Hooded merganser		1.5	2.5	1	5	Low
Ruddy duck		1.5	2.5	1	5	Low

Goose prioritization

Species/Population	Plan Objective	Population Trend/ Size	Threat Breeding	Threat 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	Medium
Pacific	3	1	2	2	6	Low
Rocky Mountain	3	1	2	2	6	Low
Atlantic Flyway resident	3	1	2	2	6	Low
Mississippi Flyway giant	1	1	2	2	4	Low
Western Prairie/Great Plains	3	3	2	2	8	Medium
Hi-Line	1	1	2	2	4	Low
Cackling Goose Populations						
Cackling	1	4	2	2	7	Medium
Aleutian cackling	3	2	2	2	7	Medium
Taverner's cackling	2	2	2	2	6	Low
Mid-continent cackling	3	3	2	2	8	Medium
Lesser Snow Goose Populations						
Wrangel Island	3	1	4	2	7	Medium
Mid-continent	3	3	4	2	9	High
Western Arctic	3	1	4	2	7	Medium
Greater snow goose	1	4	4	2	8	Medium
Ross's goose	3	3	4	2	9	High

Species/Population	Plan Objective	Population Trend/ Size	Threat Breeding	Threat Nonbreeding	Total	Rank
Greater White-fronted Goose						
Mid-continent	3	3	3	2	8.5	Medium
Pacific Flyway	3	4	3	2	9.5	High
Tule white-fronted goose	3	3	3	2	8.5	Medium
Brant Populations						
Pacific brant	1	2	4	3	6.5	Medium
Western High Arctic brant	1	2	4	3	6.5	Medium
Eastern High Arctic brant	2	4	4	3	9.5	High
Atlantic brant	1	2	4	3	6.5	Medium
Emperor goose	1	5	4	3	9.5	High
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	Medium
Trumpeter Swan Populations						
Rocky Mountain	1	4	4	3	8.5	Medium
Interior	3	4	4	3	10.5	High
Pacific Coast	3	4	4	3	10.5	High

Appendix H. Results of survey of Joint Ventures to assess species prioritization, objectives 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]
Appalachian Mountains	No	No	No	No	Not applicable	No	Not applicable	Not applicable
Atlantic Coast	Yes	No	Yes	Yes	2014–2018	No	Unknown	Unknown
Canadian Intermountain	Yes	No	Yes	No	Not applicable	No	Unknown[6]	Not applicable
Central Hardwoods	No	No	Yes	Yes	2014–2018	No	100%	100%
Central Valley Habitat	Yes	No	Yes	Yes	2014–2018	No	88%	Not applicable[6]
East Gulf Coastal Plain	No	No	No	No	Not applicable	No	Not applicable	Not applicable
Eastern Habitat	Yes	Yes	Yes	No	Not applicable	No	Unknown	Unknown
Gulf Coast	Yes	No	Yes	Yes	2014–2018	No	92%	93%
Intermountain West	Yes	No	Yes	Yes	2004–2012	No	100%[2]	100%[2]
Lower Mississippi Valley	Yes	No	Yes	Yes	2004–2012	No	76%[3]	76%[3]
Northern Great Plains	Yes	No	No	No	Not applicable	No	Not applicable	Not applicable
Oaks and Prairies	No	No	No	No	Not applicable	No	Not applicable	Not applicable
Pacific Birds Habitat	Yes	No	Yes[4]	No	Not applicable	No	Unknown[6]	Unknown
Playa Lakes	Yes	Yes[5]	Yes	Yes	2014–2018	No	79%[5]	79%[5]
Prairie Habitat	Yes	No	Yes	Yes	2014–2018	No	26%	97%
Prairie Habitat—Boreal	Yes	No	Yes	Yes	2014–2018	No	18%	~100%
Prairie Pothole	Yes	No	Yes	No	Not applicable	No	40%	Not applicable

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]
Rainwater Basin	Yes	No	Yes	Yes	2004–2012	No	59%	45%
Rio Grande	No	No	No	No	Not applicable	No	Not applicable	Not applicable
San Francisco Bay	Yes	No	Yes	No	Not applicable	No	Unknown	Unknown
Sonoran	Yes	Yes	No	No	Not applicable	No	Not applicable	Not applicable
Upper Mississippi / Great Lakes	Yes	Yes	Yes	Yes	2014–2018	No	Unknown	Unknown
Affirmative/Total	**17/22**	**4/22**	**16/22**	**11/22**	**Not applicable**	**0/22**	**Not applicable**	**8/22**

[1] Proportions capped at 100%.

[2] Data available only for SONEC (Southern Oregon-Northeastern California) portion of IWJV.

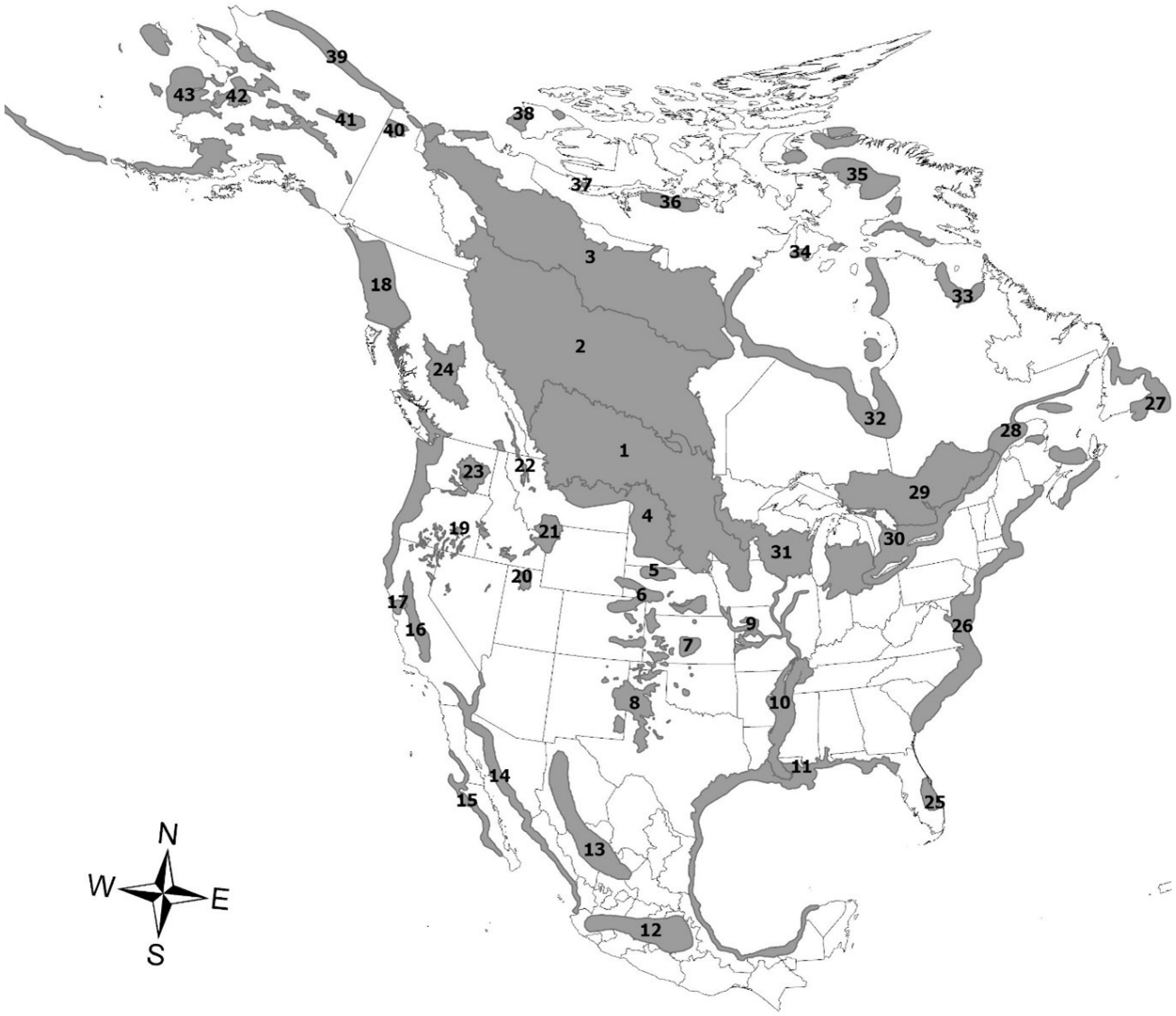
[3] Data available only for the MAV (Mississippi Alluvial Valley) portion of the LMVJV.

[4] Canadian portion only of the PBHJV.

[5] Goal is to meet as many waterfowl objective Duck Energy Days as possible on 200,245 acres of playas over the aquifer to meet integrated waterfowl and people-related aquifer recharge objectives.

[6] Data not readily available.

Appendix I. Map of existing Waterfowl Priority Areas[1]



1. Prairie Pothole Region
2. Boreal Plain and Shield
3. Taiga Plain and Shield
4. Northern Great Plains
5. Sandhills
6. Rainwater Basins / Central Platte River
7. Central Kansas Marshes
8. Playa Wetlands Region
9. Central Rivers
10. Mississippi Alluvial Valley
11. Gulf Coast Region
12. Lagos Y Lagunas Centro / Humedales Del Valle
13. Tierras Altas Norte
14. Costa Del Pacifico
15. Baja California
16. Central Valley
17. San Francisco Bay
18. Pacific Coast Region
19. Intermountain Region
20. Great Salt and Ruby Lakes
21. Yellowstone and Snake River Plain
22. Creston and Intermountain River Valleys
23. Columbia Basin
24. Central Plateau
25. Saint Johns River
26. Atlantic Coast
27. Coastal Newfoundland
28. Coastal Maritimes / St. Lawrence Gulf
29. Eastern Boreal Hardwood Transition
30. Lower Great Lakes and St. Lawrence River
31. Prairie Hardwood Transition
32. Hudson / James Bay
33. Ungava Peninsula and Killinek / Button Islands
34. East Bay / Harry Gibbons
35. Baffin Island Complex
36. Queen Maud Gulf
37. Lambert Channel Polynya
38. Banks Island
39. North Slope / Beaufort Sea
40. Old Crow Flats
41. Yukon Flats
42. Interior Alaska
43. Coastal Alaska and Bering Sea

[1] Originating in 2012, this map should be updated with current information.

Long Description

A map of North America showing the 43 Waterfowl Priority Areas. Their extents are outlined in the table below.

Waterfowl Priority Area	Region
1. Prairie Pothole Region	A large latitudinal area including southern Alberta, Saskatchewan and Manitoba; northeastern Montana; northern and northeastern North Dakota; eastern South Dakota; southwestern Minnesota; north-central Iowa; and a small area in the northeast corner of Nebraska.
2. Boreal Plain and Shield	A large latitudinal area including small areas in southeast Yukon and northeast British Columbia, the southern Northwest Territories, west-central and northern Alberta, northern Saskatchewan and northwestern Manitoba.
3. Taiga Plain and Shield	A large latitudinal area including a small portion of northeastern Yukon, most of the central Northwest Territories, southeast Nunavut, a small portion of northern Alberta and northern Saskatchewan, and northwestern Manitoba.
4. Northern Great Plains	A medium-sized area including east-central Montana and western North and South Dakota.
5. Sandhills	A small oval-shaped area in northwest Nebraska.
6. Rainwater Basins / Central Platte River	A small wishbone-shaped area extending from southeastern Wyoming to southwestern Nebraska and northeastern Colorado; a tiny area in central Nebraska; and a small oblong area in southeastern Nebraska.
7. Central Kansas Marshes	A small rounded area in central Kansas.
8. Playa Wetlands Region	A series of small areas in eastern Colorado, eastern New Mexico, south-central Nebraska, western Kansas, the Oklahoma panhandle and north-central Texas. The largest spans from east-central New Mexico to north-central Texas.
9. Central Rivers	A series of narrow interconnected areas in Missouri and Illinois that follow the Missouri, Mississippi and Illinois Rivers.
10. Mississippi Alluvial Valley	A broad longitudinal area following the Mississippi River through western Arkansas and Louisiana and eastern Tennessee and Mississippi.
11. Gulf Coast Region	A long, narrow coastal area including the Florida panhandle; the south coasts of Alabama, Mississippi and Louisiana; the southeast coast of Texas; and the east coast of Mexico, including Tamaulipas, Veracruz, Tabasco, Campeche and Yucatán.
12. Lagos Y Lagunas Centro / Humedales Del Valle	An oblong area in central Mexico, including central Jalisco; southern Guanajuato, Querétaro and Hidalgo; northern Michoacán and Mexico State; the northern tip of Guerrero; all of Morelos; and western Puebla.
13. Tierras Altas Norte	An oblong area in north-central Mexico, including central Chihuahua, Durango and Zacatecas, and a small area in western San Luis Potosí.
14. Costa Del Pacifico	A narrow area beginning at the Whitewater and Colorado Rivers in California and running down the northwest coast of Mexico, including Sonora, Sinaloa, Nayarit and Puerto Vallarta.
15. Baja California	A narrow area on Mexico's west coast, including the southwest coast of Baja California and the west coast of Baja California Sur.
16. Central Valley	An oblong area in north-central and central California.
17. San Francisco Bay	A small rounded coastal area surrounding San Francisco.
18. Pacific Coast Region	A long narrow area beginning at the Alaska panhandle, following the west coast of mainland British Columbia and the east coast of Vancouver Island, continuing down the coasts of Washington, Oregon and northern California.

Waterfowl Priority Area	Region
19. Intermountain Region	A series of small areas in south-central Oregon, northeastern California and northwestern Nevada.
20. Great Salt and Ruby Lakes	Two small areas concentrated around Great Salt Lake in northwestern Utah and Ruby Lake in northeastern Nevada.
21. Yellowstone and Snake River Plain	A series of small areas beginning in western Oregon, stretching across southern Idaho and into southwestern Montana and northwestern Wyoming. The primary area is at the border of Montana, Idaho and Wyoming, surrounding Yellowstone National Park. Three smaller areas extend along the Snake River, which flows west out of Yellowstone and across southern Idaho.
22. Creston and Intermountain River Valleys	A small area surrounding the town of Creston, British Columbia, west of the Columbia Valley, and a narrow longitudinal area extending from the southeastern Columbia Valley to northwestern Montana's Flathead River and Flathead Lake.
23. Columbia Basin	A small area mainly in southeastern Washington, with a tiny portion in Oregon along the Washington–Oregon border.
24. Central Plateau	A small to medium-sized area in central British Columbia.
25. Saint Johns River	A small area along Florida's east-central coast.
26. Atlantic Coast	A long narrow area beginning at the southern tip of New Brunswick and running along the east coast of the United States, including Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina and a small area of Georgia.
27. Coastal Newfoundland	A long narrow area along the north and east coasts of Labrador.
28. Coastal Maritimes / St. Lawrence Gulf	Five small areas in eastern Quebec and the Maritime provinces. The largest area includes a stretch of the east coast of mainland Quebec across from the Gaspé Peninsula, the southwestern Gaspé Peninsula, the St. Lawrence River between, and a narrow stretch of mainland Quebec following the east coast northward until almost Newfoundland. A second area is on Quebec's Anticosti Island, just north of the Gaspé Peninsula; a third is at Chaleur Bay, between the Gaspé Peninsula and northern New Brunswick; a fourth covers Prince Edward Island and touches on the northeast coast of New Brunswick and the northwest coast of Nova Scotia; and a fifth is along the east coast of southern Nova Scotia (excluding Cape Breton Island).
29. Eastern Boreal Hardwood Transition	A broad area including southeastern Ontario and southwestern Quebec, beginning at Lake Superior's eastern shore and ending at the Gaspé Peninsula.
30. Lower Great Lakes and St. Lawrence River	A narrow area beginning at the southernmost point of Ontario, running along the southeastern shore of Lake Huron, surrounding Lake Erie and Lake Ontario, and following the St. Lawrence River north to the Gaspé Peninsula.
31. Prairie Hardwood Transition	A medium-sized area covering central Minnesota, southern Wisconsin and Michigan, small parts of northeastern Iowa and northern Illinois, northeastern Indiana, and northwestern Ohio.
32. Hudson / James Bay	A long narrow area along the southwestern and southern shores of Hudson Bay and James Bay, with a secondary area on the Belcher Islands north of James Bay.
33. Ungava Peninsula and Killinek / Button Islands	Four small areas in north-central Quebec and southeastern Nunavut. The two larger areas are along the west and south coasts of the Ungava Peninsula in north-central Quebec. The two smaller areas include Killinek Island and the Button Islands in southeastern Nunavut, just north of the Quebec–Newfoundland border.

Waterfowl Priority Area	Region
34. East Bay / Harry Gibbons	Two small areas on the south and east coasts of Nunavut's Southampton Island.
35. Baffin Island Complex	Six coastal areas on Nunavut's Baffin and Bylot Islands. The largest is on Baffin Island's southeast coast; one is on Baffin Island's west coast; one is on Baffin Island's northwest coast; two are on Baffin Island's south coast; and one is on Bylot Island, just north of Baffin Island.
36. Queen Maud Gulf	A small oblong area along the north-central coast of mainland Nunavut.
37. Lambert Channel Polynya	A tiny area between the northwest coast of mainland Nunavut and Victoria Island.
38. Banks Island	Two small areas on the west and north-central coasts of the Northwest Territories' Banks Island.
39. North Slope / Beaufort Sea	A narrow area along the north coasts of Alaska, Yukon and the western Northwest Territories, bordering the Beaufort Sea.
40. Old Crow Flats	A small area in northwestern Yukon around the town of Old Crow.
41. Yukon Flats	A small area in east-central Alaska.
42. Interior Alaska	A series of small areas running through west-central and central Alaska.
43. Coastal Alaska and Bering Sea	A series of small areas concentrated on the west coast of Alaska, including St. Lawrence Island, Nunivak Island and the Alaska Peninsula.