North American Waterfowl Management Plan 2012:

People Conserving Waterfowl and Wetlands

North American Waterfowl Management Plan

Plan nord-américain de gestion de la sauvagine

Plan de Manejo de Aves Acuáticas Norteamérica

Cover photos:

Top: Green Winged Teal Pair – Ducks Unlimited Canada
Bottom: Big-Hay Bittern Landscape, Alberta – Ducks Unlimited Canada

Ministerial Signature Page

The 2012 *North American Waterfowl Management Plan – People Conserving Waterfowl and Wetlands* presents a bold renewed vision for the future, grounded in 25 years of implementation of the 1986 North American Waterfowl Management Plan. Since its creation, the Plan has achieved wetlands and waterfowl conservation successes by adopting a partner-based model that has been broadly acclaimed and widely emulated.

Building on a remarkable legacy of coordinated public-private strategies for managing waterfowl, our three countries have embarked on an ambitious journey to achieve a new conservation vision. Extensive public consultations have confirmed that we need to pursue abundant and resilient waterfowl populations and sustainable landscapes, through management decisions based on strong biological foundations. This Plan focuses more than ever on expanding an engaged community of users and supporters. This includes hunters and a non-hunting public, both committed to conservation and valuing waterfowl and their habitat as essential characteristics of the North American landscape. Citizens of our three countries ascribe increasing value to the broad suite of ecological values associated with wetlands and other important waterfowl habitats. They place their trust in science-based management that ensures sustainable populations of waterfowl. This Plan responds to the changing needs of our evolving societies while respecting and recommitting to the rich traditions that have been ours since before the founding of our nations.

North America has an astonishing diversity and abundance of waterfowl. This Plan is intended to secure that legacy for current and future generations. As stated in the Plan itself, we are proud to pursue together the simple but powerful vision of "People conserving waterfowl and wetlands."

Secretary of the Interior United States	Minister of the Environment Canada	Secretary of the Environment and Natural Resources Mexico

Background Image: Canvasback – Ducks Unlimited Canada

Le *Plan nord-américain de gestion de la sauvagine de 2012 – Protéger la sauvagine et les terres humides* – offre une vision renouvelée pour le futur, fondée sur l'application depuis 25 ans du Plan nord-américain de gestion de la sauvagine, lancé en 1986. Depuis sa création, le plan a permis la conservation de terres humides et de la sauvagine grâce à la mise en œuvre d'un modèle de partenariat largement reconnu et imité à grande échelle.

Forts de ce remarquable héritage de stratégies harmonisées entre les secteurs public et privé pour la gestion de la sauvagine, nos trois pays se lancent dans un programme de grande envergure, motivés par une vision renouvelée de la conservation. D'importantes consultations publiques ont confirmé que nous devrons maintenir des populations abondantes et résilientes de sauvagine au sein de paysages durables, grâce à des décisions de gestion qui reposent sur de solides fondements biologiques. Ce plan vise comme jamais auparavant à accroître la communauté d'utilisateurs et de sympathisants engagés. Cela comprend les chasseurs et le public non chasseur, engagés envers la conservation et qui reconnaissent dans la sauvagine et ses habitats des caractéristiques essentielles du paysage nord-américain. Les citoyens de nos trois pays accordent de plus en plus d'importance au grand nombre de valeurs écologiques associées aux terres humides et aux autres principaux habitats de la sauvagine. Ils ont confiance dans la gestion scientifique qui garantit des populations durables de sauvagine. Ce plan répond aux besoins évolutifs de nos sociétés, tout en respectant et en renouvelant son engagement envers les riches traditions sur lesquelles furent forgés nos pays.

L'Amérique du Nord possède des populations abondantes d'une grande diversité de sauvagine. Ce plan vise à préserver cet héritage pour les générations d'aujourd'hui et de demain. Nous sommes fiers de défendre ensemble cette vision simple, mais puissante, comme l'indique le titre du plan, pour « protéger la sauvagine et les terres humides ».

Secrétaire de l'intérieur États-Unis	Ministre de l'Environnement Canada	Secrétaire de l'Environnement et des Ressources naturelles Mexique

Background Image: Wetlands of the Clearwater Wetlands and Wildlife Corridor Project – Jason Hollinger, The Land Conservancy of B.C.

El documento *2012 North American Waterfowl Management Plan – People Conserving Waterfowl and Wetlands* (plan norteamericano de manejo de las aves acuáticas de 2012, conservación de las aves acuáticas y humedales) presenta una visión fuertemente renovada para el futuro, basada en los 25 años de aplicación del Plan de Manejo de Aves Acuáticas de Norteamérica publicado en 1986. Desde su creación, el Plan ha tenido un gran éxito en implementar la conservación de humedales y aves acuáticas (patos, gansos y cisnes) mediante la adopción de un modelo basado en alianzas que ha sido bien acogido en general y ampliamente emulado.

Nuestros tres países se han basado en una extraordinaria herencia de estrategias coordinadas entre el sector público y el privado para la gestión de las aves acuáticas y han emprendido un ambicioso periplo para lograr una nueva visión de la conservación. Las amplias consultas públicas han confirmado que debemos seguir luchando para obtenar poblaciones de aves acuáticas abundantes y resistentes y paisajes sostenibles mediante decisiones de manejo basadas en argumentos biológicos fuertes. El Plan se centra más que nunca en la ampliación de una comunidad comprometida de usuarios y seguidores. Ello incluye tanto a los cazadores como esos que no cazan comprometidos a la conservación y que valoran las aves acuáticas y sus hábitats como características esenciales del paisaje norteamericano. Los ciudadanos de los tres países atribuyen cada vez más importancia a la amplia serie de valores ecológicos asociados con los humedales y otros hábitats importantes de las aves acuáticas. También confían en una gestión científica que para hacer posible la existencia de poblaciones sostenibles de aves acuáticas. Este Plan responde a las necesidades cambiantes de nuestras sociedades que se encuentran en periodo de evolución siempre respetando y renovando el compromiso a las ricas tradiciones sobre las cuales fueron fundadas nuestras repúblicas.

América del Norte cuenta con una sorprendente variedad y abundancia de aves acuáticas. Este Plan está destinado a proteger este legado para la generación actual al mismo que las próximas generaciones. Como se indica en el mismo Plan, nos sentimos orgullosos de seguir luchando juntos por una visión sencilla pero poderosa para la conservación de las aves acuáticas y de los humedales.

Secretario de Interior Estados Unidos	Ministro de Medio Ambiente Canadá	Secretario de Medio Ambiente y Recursos Naturales México

Preface

Over its first 25 years, the North American Waterfowl Management Plan (NAWMP) has become a model for international wildlife conservation. In large measure, this is because it has evolved with engagement of the broad waterfowl conservation community. Previous Plan updates – in 1994 (when Mexico became a signatory), 1998 and 2004 – described abundant waterfowl populations as the Plan's ultimate goal, pursued through large-scale partnership-based habitat conservation.

This 2012 Plan renewal is termed a *revision* to differentiate it from the previous updates because for the first time since its inception, we fundamentally re-examined the NAWMP's goals. We developed renewed goals through extensive consultation with stakeholders, including Federal, Provincial/Territorial, State and non-government organization representatives from the continental waterfowl management community.

This revision was needed in light of a number of important changes that have occurred since the previous update in 2004.

First, in 2005, a Joint Task Group was appointed by the NAWMP Plan Committee and the International Association of Fish and Wildlife Agencies' Adaptive Harvest Management Task Force to explore options for reconciling the use of NAWMP population objectives for harvest and habitat management. This group concluded that the separate objectives for waterfowl populations and their habitats must be formally integrated to ensure that they support rather than act against each other. Second, from 2005 through 2007, a comprehensive assessment of the NAWMP highlighted the need to evaluate and learn from the outcomes of plan-directed conservation actions. Finally, the 2008 North American Waterfowl Policy Summit – a gathering of over 190 individuals representing the international waterfowl management community – recommended that the next update of the Plan be used to further the formal integration of harvest and habitat management, and continue seeking ways to also incorporate society's desires for users and supporters of waterfowl and wetlands habitat.

These policy advances – on top of the rising challenges presented by a changing climate, social changes, the effects on land use decisions of global economic pressures, and fiscal restraint faced by agencies – have aligned to set the new strategic directions for the 2012 NAWMP Revision. This revised Plan recognizes our successes, outlines the major current and future challenges facing waterfowl conservation, and presents new strategic directions for the immediate future. More detailed recommendations for actions are in the accompanying NAWMP Action Plan.

Background Image: Lesser Scaup – Ducks Unlimited Canada

This revision also pursues formal integration of objectives for waterfowl populations, habitat conservation, and societal needs and desires. The roadmap to achieve this renewed vision is not fully defined. The pathway will be better illuminated in the next phase with the Action Plan and, critically, by the efforts of the waterfowl conservation community to implement the general guidance offered here. Successful delivery will depend on the power of the NAWMP partnership's combined mandates. Opportunities abound for all new and existing partners to focus efforts where they have the greatest responsibility and the ability to affect the conservation outcomes envisioned in the Plan.

NAWMP Plan Committee Co-Chairs

Alberta Lakes, British Columbia – Ducks Unlimited Canada

Préface

Au cours de ses 25 premières années d'existence, le Plan nord-américain de gestion de la sauvagine (PNAGS) s'est imposé sur la scène internationale comme un modèle de conservation de la faune. Cela est dû en bonne partie à son évolution et à un engagement à grande échelle dans la conservation de la sauvagine. Les mises à jour antérieures du plan – celle de 1994 avec l'adhésion du Mexique, puis celles de 1998 et de 2004 – avaient comme principal objectif de décrire l'abondance des populations de sauvagine grâce à un programme de conservation à grande échelle conjoint de ses habitats.
Le renouvellement de 2012 du plan se veut une *révision* par rapport aux mises à jour précédentes, car pour la première fois de son histoire, on en révise les objectifs fondamentaux. Nous avons revu ses objectifs grâce à une consultation élargie des intervenants, notamment auprès des organismes fédéraux, provinciaux, territoriaux et non gouvernementaux et auprès des États membres de la communauté vouée à la gestion continentale de la sauvagine.

Buffalo Lake Landscape, Alberta

Cette révision s'imposait à la lumière du nombre de changements importants survenus depuis la dernière mise à jour, en 2004.

En premier lieu, en 2005, le Comité du PNAGS ainsi que le groupe de travail sur la gestion adaptative des prises de l'Association internationale des agences du poisson et de la faune sauvage ont mis sur pied un groupe de travail conjoint chargé d'évaluer les possibilités d'adapter les objectifs du PNAGS en matière de populations à la gestion des prises et des habitats. Le groupe a conclu que des objectifs distincts concernant les populations de sauvagine et leurs habitats doivent être officiellement intégrés afin qu'ils se complètent au lieu de se faire obstacle. En deuxième lieu, de 2005 à 2007, une évaluation exhaustive du PNAGS a mis en lumière la nécessité d'évaluer les mesures de conservation soutenues par le plan et de bénéficier de leurs résultats. En dernier lieu, le sommet nord-américain sur les politiques concernant la sauvagine, un rendez-vous regroupant plus de 190 représentants des communautés internationales vouées à la gestion de la sauvagine, a recommandé que la prochaine

mise à jour du plan soit utilisée pour faire avancer l'intégration formelle de la gestion des récoltes et des habitats, ainsi que pour l'intégration des désirs et des besoins de notre société en ce qui concerne les habitats humides, y compris ceux des chasseurs de sauvagine.

En plus des nouveaux défis que posent les changements climatiques et sociaux, des répercussions des décisions liées à l'utilisation des terres découlant des pressions de l'économie mondiale et des restrictions budgétaires auxquelles font face les organismes, les évolutions de cette politique ont donné naissance à de nouvelles orientations stratégiques sous-jacentes à la révision de 2012 du PNAGS. Le plan révisé prend en considération les réussites à ce jour, souligne les principaux défis actuels et à venir dans la conservation de la sauvagine, et présente de nouvelles orientations stratégiques pour l'avenir immédiat. Des directives plus détaillées figurent dans le plan d'action ci-joint du PNAGS.

Cette révision permet également d'intégrer en bonne et due forme les objectifs touchant les populations de sauvagine, la conservation de leur habitat ainsi que les aspirations et besoins sociétaux. La feuille de route de cette vision renouvelée n'est pas pleinement définie. Le plan d'action et, ce qui est essentiel, les efforts de la communauté vouée à la conservation de la sauvagine visant la mise en œuvre des recommandations contenues dans ce dernier permettront de mieux en éclairer le parcours. Sa réussite dépendra de l'efficacité des mandats combinés des partenariats créés en vertu du PNAGS. Les partenaires, nouveaux comme existants, auront maintes occasions de concentrer leurs efforts dans les créneaux où ils exercent la plus grande responsabilité et compétence susceptibles d'avoir une incidence sur les résultats de conservation envisagés dans le plan.

Co-présidents du Comité du PNAGS

Background Image: Summer on the Prairies – Ducks Unlimited Canada

Prólogo

Durante los primeros 25 años, el Plan Norteamericano de Manejo de las Aves Acuáticas se ha convertióo en un modelo para la conservación de la fauna al nivel internacional. Esto se debe en gran medida a que el Plan ha evolucionado con la participación de la amplia comunidad que se ocupa de la conservación de las aves acuáticas. En las versiones anteriores del Plan – 1994 (cuando México se convirtió en país signatorio), 1998 y 2004 – se describían las abundantes poblaciones de aves acuáticas como objetivo final que se intentaba lograr mediante la conservación de grandes hábitats basado en un sistema de alianzas.

El Plan de 2012 se califica como una *revisión* para diferenciarlo de las versiones anteriores porque, por primera vez desde su creación, hemos vuelto a examinar fundamentalmente, sus objetivos. Hemos elaborado nuevos objetivos mediante amplias consultas con las partes interesadas, tal como los representantes de gobiernos federales, provinciales, territoriales y estatales y organizaciones no gubernamentales de la comunidad encargadas del manejo de las aves acuáticas en el continente norteamericano.

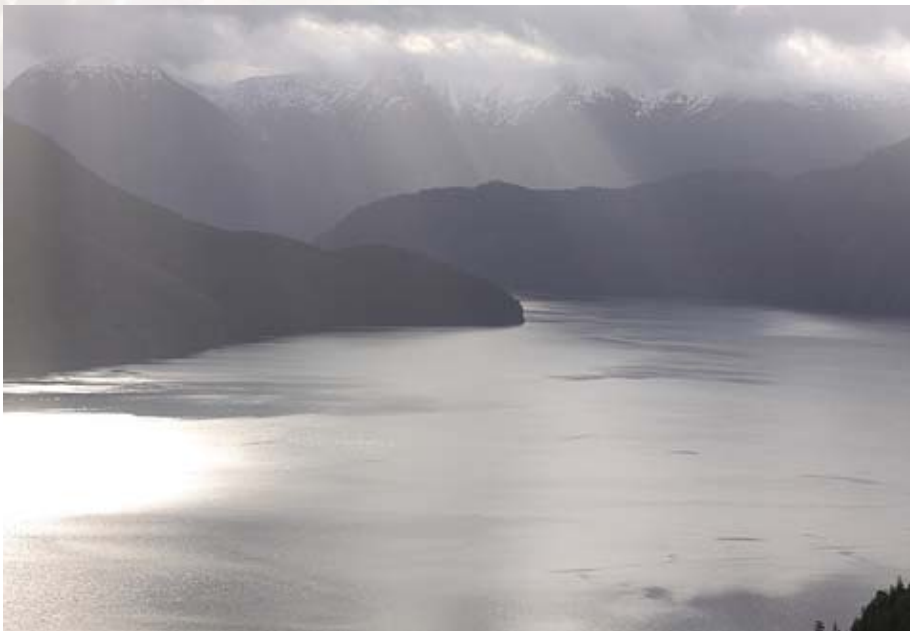
Esta revisión fué necesaria debido al gran número de cambios que se han producido desde la versión de 2004.

En primer lugar, en 2005, el Comité del Plan y el grupo de trabajo para la gestión adaptativa de las cosechas de la International Association of Fish and Wildlife Agencies nombraron un grupo de trabajo. Esto grupo fue apuntado para explorar las opciones que servirían para reconciliar el uso de los objetivos del Plan con para la gestión de las cosechas y los hábitats. Este grupo llegó a la conclusión de que los objetivos para las poblacionales para las aves acuáticas y sus hábitats deben integrarse oficialmente con el fin de apoyarse mutuamente en vez de entrar en conflicto. En segundo lugar, una evaluación exhaustiva del Plan tuvo lugar entre 2005 y 2007 y manifestó la necesidad de evaluar y aprender, basado en los resultados de las medidas de conservación específicas del Plan. Por último, la cumbre norteamericana de 2008 en materia de políticas sobre las aves acuáticas, en la que participaron más de 190 representantes de la comunidad internacional encargados de el manejo de aves acuáticas, aconsejó que la siguiente actualización del Plan se utilizara para fomentar la integración de la gestión de la caza y de los hábitats y de seguir buscando formas de incorporar las prioridades societales de los usuarios y defensores de las aves acuáticas y de los humedales.

Background Image: Arctic banding of White-fronted Geese – Kiel Drake

Estos avances en materia de políticas, además de los nuevos retos que plantean los cambios climáticos y sociales, los efectos de la presión económica mundial en las decisiones sobre el uso de recursos naturales y las restricciones presupuestarias que sufren los organismos, se han orientado para establecer la dirección estratégica para la revisión del Plan de 2012. Esta revisión reconoce nuestros éxitos, señala los principales retos actuales y futuros a los que se enfrenta la conservación de las aves acuáticas y presenta nuevas orientaciones estratégicas para el futuro inmediato. En el plan de acción que acompañaran el Plan se encontrarán recomendaciones más precisas.

En esta revisión también se trata de lograr una integración oficial de los objetivos poblacionales de aves acuáticas, la conservación de los hábitats y las necesidades y deseos societales. La ruta para lograr esta visión renovada aún no se ha definido totalmente. El camino a seguir irá apareciendo en la etapa que sigue, con la elaboración del plan de acción y, fundamentalmente, con los esfuerzos de la comunidad encargada de la conservación de las aves acuáticas para implementar las orientaciones generales que se presentan aquí.
El éxito dependerá de la fuerza que tengan los mandatos combinados de las alianzas que surjirán del Plan. Hay aplias oportunidades para que los socios nuevos y existentes enfoquen sus esfuerzos en los ámbitos donde tengan mayores responsabilidades y capacidad para influir los resultados de conservación previstos en el Plan.



Rain and clouds – Andre Breault, CWS Vancouver

Copresidentes del Comité del Plan Norteamericano de Manejo de las Aves Acuáticas

Executive Summary

Twenty-six years ago, the waterfowl management community began implementing a visionary initiative to conserve continental waterfowl populations and habitat – the North American Waterfowl Management Plan (NAWMP or Plan). This scientific approach to waterfowl habitat restoration and protection created a new, partnership-based model for conservation that has been broadly acclaimed and widely emulated. In the intervening years, NAWMP partners have conserved and restored 15.7 million acres (63,000 square kilometers) of wetlands, grasslands and other key habitats for ducks, geese and swans shared by Canada, the United States and Mexico. Many waterfowl populations are now substantially larger than they were 26 years ago.

But new threats to waterfowl and their habitats stand to undermine NAWMP successes. Unprecedented new challenges that create competition for land, water and funding must be addressed. Conservation programs must become more adaptable, efficient and relevant to a society that is increasingly disconnected from the natural world. In order to achieve the NAWMP vision in today's environment, this Plan sets forth three overarching goals for waterfowl conservation:

Goal 1: Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat.

Goal 2: Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels, while providing places to recreate and ecological services that benefit society.

Goal 3: Growing numbers of waterfowl hunters, other conservationists and citizens who enjoy and actively support waterfowl and wetlands conservation.

Two of these goals, dealing with populations and habitat, have always been foundational to the NAWMP. The third goal, focused on people, is new insofar as being an explicit part of this Plan. It underscores the importance of people to the success of waterfowl conservation, and is born out of concern for the ongoing loss of waterfowl hunters, the opportunity presented by growing numbers of people who pursue waterfowl with cameras and binoculars, and a recognition that the NAWMP can succeed only if waterfowl conservation is relevant to broader societal issues.

Background Image: Le Barachois of Hope Town in Chaleur Bay, Québec – Christine Lepage, CWS Quebec Region

Missouri Coteau Landscape, Saskatchewan

Securing the gains made over the past quarter century and going beyond to attain NAWMP objectives will be difficult given the profoundly changing economic, social and ecological circumstances of the day. Of paramount importance is the need for waterfowl conservation to gain greater standing with the general public. This Plan recommends strategic investments that provide people an opportunity to reconnect with nature through waterfowl. It also recommends dedicated efforts to quantify and communicate to the public the numerous environmental benefits associated with waterfowl habitat conservation. These include attenuation of floods, enhanced water quality, groundwater recharge, and numerous other ecological goods and services. To inform these strategies, NAWMP partners should rely on social and economic research to complement existing biological and ecological knowledge.

Progress toward achieving these NAWMP goals should start with an acknowledgement and embrace of change, and with the recognition that waterfowl management must become more adaptable. Not only should managers periodically question whether they are "doing things right" and "doing the right things", they should also re-examine existing institutions and the processes used to deliver conservation. Enhancing programmatic efficiency and effectiveness will be key. Currently, objectives for populations (including harvest management) and habitat conservation are independently derived and not coherent, and the goals for "people" are vague and poorly informed. Yet waterfowl management is a tightly linked enterprise: habitat programs sustain healthy waterfowl populations, which in turn provide hunting and other recreational opportunities; people who participate in those activities help fund conservation and encourage policies in support of habitat programs. North America needs an integrated system of waterfowl management that consists of common objectives that reflect the interrelated nature of the enterprise. This includes system models that link objectives and ensure coherence; monitoring programs that track progress towards objectives and enable learning; and institutional structures and processes that facilitate integration and adaptation.

In summary, waterfowl population management and waterfowl habitat conservation have evolved into distinct institutions that lack coherent, interrelated objectives. Neither institution has formulated explicit objectives for people, nor has either developed a level of adaptability that matches today's pace of environmental and social change. Given the decline in waterfowl hunters and their associated support, there is a desire to recruit new hunters, increase the efficiency of existing programs, and enhance public support for conservation. Accordingly, this Plan provides seven recommendations:

1. ***Develop, revise or reaffirm NAWMP objectives*** so that all facets of North American waterfowl management share a common benchmark;
2. ***Integrate waterfowl management*** to ensure programs are complementary, inform resource investments, and allow managers to understand and weigh tradeoffs among potential actions;
3. ***Increase adaptive capacity*** so structured learning expands as part of the culture of waterfowl management and program effectiveness increases;
4. ***Build support for waterfowl conservation*** by reconnecting people with nature through waterfowl, and by highlighting the environmental benefits associated with waterfowl habitat conservation;
5. ***Establish a Human Dimensions Working Group*** to support development of objectives for people and ensure those actions are informed by science;
6. ***Focus resources on important landscapes*** that have the greatest influence on waterfowl populations and those who hunt and view waterfowl;
7. ***Adapt harvest management strategies*** to support attainment of NAWMP objectives.

Work on these recommendations should begin immediately, because waterfowl populations and their habitats are facing threats that demand quick action and new approaches. The waterfowl management community has a long record of successes and a reputation for forging new frontiers in conservation. Many noteworthy accomplishments have been motivated by crisis and a call to action. This NAWMP represents a new call to action that, when carried out, will position waterfowl conservation for the challenging decades that lie ahead.

Waterfowl at Chincoteague National Wildlife Refuge in Virgina – U.S Fish & Wildlife Service

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Background Image: Mallard brood – Ducks Unlimited Canada

National Overviews

Canada

On a misty spring morning, surf scoters can be seen flying north in a small skein just a couple of meters above the cold ocean waters of the Bay of Fundy. In western Canada, thousands of kilometers away, a mallard sets down in a prairie slough after a long night of flying. For Canadians these images represent the return of spring, heralding a natural rebirth across the country as millions of ducks, geese, and swans make their way north and move over the vast expanses of our land to their summer homes.

These ducks live and raise their young in environments that have been modified and will continue to feel the impact of people as extensive agricultural areas continue to produce our food, and as Canada's boreal forest and northern regions produce more as yet undeveloped resources. Nevertheless, when managed with the principles of conservation, the land can provide economic benefits through forestry, mining, and agriculture while it continues to sustain waterfowl. Additionally, the wealth of a nation is directly connected to the quantity and quality of its environment and its inherent "natural capital." Natural capital and its derived ecological goods and services are important parts of Canadian thinking. This is the central thrust of Canadian environmental policy: sustaining natural values while achieving human well-being and economic progress.

For example, in 2010, during the International Year of Biodiversity, Canada celebrated the protection of more than 100 million hectares of land – nearly 10 percent of Canada's land mass – and 3 million hectares of ocean, through investments in the Natural Areas Conservation Program, the North American Waterfowl Management Plan, and other initiatives.

This Canadian commitment reflects a desire to protect present and future environments in a way that is integrated with sustainable economic activity and accommodates the yet-to-be known influences of a changing climate. This commitment will be particularly focused on Canada's vast boreal and arctic ecosystems. By concentrating on waterfowl and wetlands conservation in working landscapes, Canadian Joint Ventures advance bird conservation in partnership with landowners, municipalities, and the agriculture, forestry, and energy sectors. The habitat and international species Joint Ventures, established in Canada under the North American Waterfowl Management Plan, have become leaders in such approaches. In doing so, they support an environmental agenda that is well-connected with local and national economies, thus gaining allies for nature.

Background Image: Surf Scooters in flight – Tim Bowman, USFWS

Trumpeter Swans and other waterfowl at Marsh Lake, Yukon – Jim Hawkings, CWS Whitehorse

When the ducks are old enough to fly and hunting seasons begin along the migratory flyways, the take of birds is coordinated amongst our three great countries so that populations remain robust. Coordination implies a concept of co-management, which applies to habitat stewardship as well as harvest management and the consideration of societal desires. In Canada, waterfowl are an important food source for Aboriginal peoples, who play a growing role as managers and stewards of the environment. In some areas, mostly in northern regions, land claim governments and wildlife management boards have been established to co-manage wildlife and habitat management programs in their areas. Eider ducks and brant geese are typical harvested species in those parts of Canada where the northern wildlife management boards operate. Effective co-management of these species must necessarily include other nations such as Russia and Greenland — areas that are beyond the reach but within the spirit and intent of the North American Waterfowl Management Plan.

This North American Waterfowl Management Plan Revision calls for integrated management across our three countries in order to surmount the escalating challenges of the 21st century. It reaffirms our steadfast commitment to maintain healthy populations of wild birds and to sustain and even augment diverse and resilient habitats. Lastly, it places great importance on the incorporation of Canadians' desires for natural values while achieving human well-being and economic progress. Canada has already achieved much in this regard and is prepared and enthusiastic to support the goals of this Plan, which benefits not only waterfowl but a healthy Canadian society.

United States

The seasonal ebb and flow of waterfowl is one of the most complex and compelling dramas in the natural world. Driven by a genetic memory millions of years in the making, these birds embark twice each year on long-distance journeys between their breeding areas and wintering grounds. Their travels traverse mountains, deserts, prairies, forests and oceans throughout the northern hemisphere, linking the countries, peoples, and ecosystems they visit. The conservation and management of animals capable of such impressive mobility requires strong federal leadership to foster effective partnerships among the many nations, states, provinces, tribes, organizations and individuals that are woven together by the flight paths of these remarkable species.

The U.S. Fish and Wildlife Service (Service) is the principal agency charged with protecting and enhancing the populations and habitats of migratory birds that spend all or part of their lives in the United States. Accordingly, the North American Waterfowl Management Plan (Plan) will continue to be a major focus for Service efforts. Cooperation and coordination with partners and stakeholders is essential to successfully protect and conserve waterfowl and to ensure that hunters, birders, aboriginal groups and the public can continue to enjoy these winged marvels in the great outdoors. State wildlife agencies, tribal organizations and subsistence users play special roles by working with the Service to co-manage waterfowl harvest. These and other partners, including other government agencies, conservation organizations, private industry, landowners, and managers at every scale, must be included in Plan activities to achieve its goals.

For more than a century, conservationists have endeavored to sustain abundant waterfowl populations. These efforts have resulted, for example, in the creation of more than 590 national wildlife refuges and wetland management districts in the United States that have set aside more than 150 million acres as havens for waterfowl and other birds. Spurred by hunters, the U.S. Fish and Wildlife Service created the Federal Migratory Bird Hunting and Conservation Stamp ("Duck Stamp") in 1934 to provide a revenue stream to be used specifically to acquire and protect wetlands for waterfowl and other wetland-dependent wildlife. To date it has helped protect some 6 million acres. And beginning in 1955, Canadian and U.S. partners developed what is today the longest operating and most comprehensive survey of animal abundance in the world, the Waterfowl Breeding Population and Habitat Survey. These annual surveys determine the status of North America's waterfowl populations and to this day play a significant role in guiding the decisions of waterfowl managers throughout North America.

The North American Wetlands Conservation Act (NAWCA), now the premier partnership-based habitat conservation effort on the continent, was enacted to support goals of the 1986 Plan with strategic investments in North America's most vital wetland ecosystems. Grants made through NAWCA have helped thousands of public-private partnerships to protect and improve the health and integrity of wetlands, providing critical habitat for waterfowl and other wetland species in the United States, Canada, and Mexico. Through these accomplishments, the Service and its partners have established a legacy of conservation leadership that endures into the 21st century.

Despite these significant accomplishments, we confront a host of new challenges to the future of waterfowl. Our society faces a more complex set of environmental and management problems – occurring across the entire ranges of waterfowl – as a result of increasingly evident socioeconomic and ecological system changes. Future conservation success will only be possible if we acknowledge and embrace these changes, recognizing that waterfowl management must become more adaptable. Achieving an integrated approach to waterfowl management that fosters coherence among population, habitat, and human objectives is paramount. Ultimately, the future of waterfowl conservation will depend on public support for striking the right balance between conservation actions and socioeconomic priorities.

To surmount the escalating challenges of the 21st century and meet public expectations for waterfowl conservation and management, a clear and well-defined approach is needed to guide our collective actions. This Plan articulates a clear vision to move forward in a comprehensive, science-driven approach to waterfowl conservation that coordinates and integrates efforts across North America. We must continue to work with other countries, public and private organizations, and individuals to attain the Plan's vision and secure a bright future for waterfowl. The American people expect and deserve nothing less.

Mexico

The coastal and interior wetlands of Mexico provide important habitats during the winter for a significant portion of the migratory waterfowl population in North America, as well as numerous resident and endemic species of plants and animals. Mexico is committed to achieving long-term conservation of these important habitats.

Wetlands and waterfowl are resources of great ecological, cultural, and economic importance. Consequently, Mexico has signed several commitments and international cooperative agreements to improve and foster the conservation and management of waterfowl and their habitat. The North American Waterfowl Management Plan (NAWMP) is one of the most relevant and effective programs in Mexico. Based on these and other legal and political instruments, the Mexican Government has supported and implemented short, medium, and long-term programs and projects throughout the country.

Since the inception of the NAWMP in 1986, Mexico has been actively involved in its design and operation. Mexico was initially an "invitee", but since 1994 has been a full partner in NAWMP, playing a proactive role in the conservation of wintering areas for populations of waterfowl and resident species, identifying priority habitats and promoting the implementation of sustainable habitat and harvest management practices. However, the task is large and there remains much to be done.

In 2000, the Mexican Congress passed a law for the conservation and sustainable use of wildlife. This law and its associated policies promote both the habitat and species approach to conservation, paying particular attention to sustainable use, management of habitat and populations, and development of specific recovery programs for species or groups of priority species, including waterfowl. These approaches aim to maintain and promote the restoration of the diversity and integrity of the environment, as well as increase the well-being of the inhabitants of the country.

In recent years, the Dirección General de Vida Silvestre of SEMARNAT has established several forums, committees and advisory bodies to improve and promote communication and public participation in the development of specific programs for conservation, management, and recovery, and to provide technical advice for decision-making. Work to implement the North American Waterfowl Management Plan takes place primarily through Mexico's "Strategy for the Conservation, Management and Sustainable Use of Waterfowl and their habitats in Mexico," which serves as a national instrument of public policy guiding the conservation and management of waterfowl populations and their habitats as a joint undertaking by government and society. On-the-ground efforts are facilitated through the Units for Management and Conservation of Wildlife, which integrate conservation and socio-economic interests at the local level and focus on habitat conservation and education.

The wetlands on Marion Creek Benchlands, Columbia Valley – Nature Conservancy of Canada

Implementation is supported by the application of funds from the U.S.'s North American Wetlands Conservation Act, which has contributed about $2.5 million per year. During the period from 2003-2011, Mexico implemented 102 projects, distributed among 31 States, that help conserve priority wetlands.

Mexico's efforts tend toward holistic, ecosystem-focused conservation, with explicit recognition of, and objectives for, waterfowl and other waterbirds of regional importance. To further develop the national capacity for waterbird and wetland conservation, Mexico is an active participant in the conservation of the birds of North America through agreements such as the North American Bird Conservation Initiative, the Ramsar Convention on Wetlands, the Trilateral Committee (Canada/Mexico/United States) for the Conservation and Sustainable Use of Wildlife and Ecosystems, and the North American Commission for Environmental Cooperation Biodiversity Conservation Strategy.

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Background Image: Aerial view of Commune Baie-du-Febvre after restoration – Quebec Ministry of Natural Resources and Wildlife

The Future of Waterfowl

The annual migration of millions of waterfowl inspires us to reflect on the abundance of nature, the passage of time, and far away destinations. Using cues only partly understood by science, this feathered stream of life flows with the seasons over the same routes traversed by a thousand generations of their species. Were they a landscape instead of living organisms, waterfowl would surely be a national park, because the way they connect us with nature is just as powerful. Waterfowlers know this connection well. For most hunters, their time in the blind is as much about the sights and sounds of the marsh as it is about birds in the bag. Likewise, waterfowl at the city park offer a valuable interlude with nature that is increasingly important in a society distracted by too much multi-tasking and too little contact with the natural world.

Beyond connecting people with nature, waterfowl also gauge the well-being of the environment. As species that derive much of their food from wetlands, the presence and abundance of waterfowl are indicative of the health of those aquatic systems. But waterfowl use many terrestrial systems as well, nesting in grasslands, forests, tundra and rocky islets offshore. They graze on plants, glean waste grain, and feed on invertebrates and fish. Similarly, waterfowl depend upon a variety of essential migration and overwintering habitats – ranging from agricultural landscapes to flooded woodlands and coastal estuaries, from arctic to tropical climes. Loss or deterioration of these habitats affects waterfowl settling patterns, reproductive success, body condition and survival rates – warning signs that alert us to degradation of the land upon which all life depends. Fortunately, the opposite is also true: numerous ecological benefits are derived from conserving and restoring habitat for waterfowl. Sustained biodiversity, improved water quality, moderation of flooding events and carbon sequestration are just a few of the broad societal benefits derived from waterfowl habitat conservation.

Beyond connecting people with nature, waterfowl also gauge the well-being of the environment.

For nearly 80 years, hunters – who have an obvious and direct stake in ensuring healthy waterfowl populations – have helped fund conservation and voiced their concerns to policymakers. Elected representatives have likewise shown their support through progressive legislation like the U.S. North American Wetlands Conservation Act (NAWCA[1]). In 2000, Mexico adopted the revised General Law on Wildlife, which recognized the value of biological diversity and ensured that resource use was sustainable and beneficial to local people. Canada has achieved conservation of waterfowl habitat through the North American Wetlands Council of Canada, which seeks to influence policies,

1 A list of acronyms is provided in Appendix D.

Background Image: American Wigeon – Jared Hobbs

regulations, and legislation to conserve and restore Canada's wetlands and wetland fauna. In addition to the funding provided by the sale of hunting licenses and excise taxes on arms and ammunition, several U.S. states now dedicate a portion of general sales tax or lottery fund revenue to wildlife and wetlands conservation programs.

As waterfowl management enters a new era with potentially fewer hunters and increased fiscal restraint, how will it be possible to sustain the support necessary to secure the future of waterfowl? How can the waterfowl management enterprise adapt to societal and environmental changes that are occurring at an accelerating rate? In short, how can waterfowl conservation and management be adapted for success in the future?

Fortunately, waterfowl management is well-positioned to meet these challenges. The waterfowl conservation legacy is built upon a foundation of habitat restoration and protection on federal, provincial, state, and private landholdings and easements. Management actions and policy efforts are informed by the best available science, longstanding monitoring systems, and habitat programs delivered by experienced and dedicated people. Institutions – government wildlife agencies, Flyway Councils, Joint Ventures, universities and research centers – are established and effective.

However, to meet the challenges of the future, waterfowl management must become more adaptable, more efficient, and more relevant to the lives of the general populace, many of whom may be unaware of waterfowl conservation but are deeply concerned about clean water, flooding, and the health and quality of their environment.

In undertaking this renewal of the North American Waterfowl Management Plan (NAWMP or Plan), primary stakeholders were asked to consider and re-establish the fundamental goals of waterfowl management – something that has not been done in a quarter-century. To achieve broad consensus, the consultation process leading up to this Plan engaged a cross-section of the professional waterfowl management community, including a broad sampling of federal, state and provincial agencies, non-government organizations, and other partners. Fifteen consultation workshops in three countries, along with input received through other avenues, produced a rich source of ideas that form the foundation of this Plan.[2] From these consultations, strong consensus emerged on three fundamental goals for waterfowl management:

Goal 1: Abundant and resilient waterfowl populations to support hunting and other uses without imperiling habitat.

Goal 2: Wetlands and related habitats sufficient to sustain waterfowl populations at desired levels, while providing places to recreate and ecological services that benefit society.

Goal 3: Growing numbers of waterfowl hunters, other conservationists, and citizens who enjoy and actively support waterfowl and wetlands conservation.

Sustaining the continent's rich waterfowl fauna has been an enduring conservation mission for over a century and the focus of the NAWMP for the last 26 years. That mission continues, but now the NAWMP is being expanded to include three goals that span the entire management enterprise. Goal 1 recognizes that abundance is just one facet of population management. Waterfowl populations must

2 A detailed description of the NAWMP workshops in the United States and Canada can be found in the report "Stakeholder Consultation Process Results: North American Waterfowl Management Plan Revision", by D.J. Case and Associates, April 2011. http://www.nawmprevision.org/

also be resilient to environmental perturbation, yet not so abundant that they degrade their habitats and those of other species, or provoke public concerns. The goal for habitat management, though focused on resources needed by waterfowl, explicitly recognizes the societal values related to recreation and environmental benefits associated with waterfowl habitat. The newest goal of the Plan explicitly addresses the needs, desires and involvement of people.

But why have a goal for people in a waterfowl plan? If people – hunters, viewers, and the public at large – are critical to the future of waterfowl management, it is not enough to assume that successful habitat programs and healthy waterfowl populations are sufficient to satisfy human desires and elicit support for conservation. The needs and desires of people must be clearly understood and explicitly addressed. This important distinction – being a focus of management actions versus simply a recipient of management outcomes – is intended to motivate the waterfowl community to expand its understanding of waterfowl hunters, viewers, and the public through human dimensions research, and empower managers to establish and act on human objectives in concert with habitat and population programs.

Clearly, each of the three goals of this Plan has intrinsic value, but they are also strongly inter-related.[3] Healthy populations are a requisite for hunting seasons and other forms of waterfowl-related recreation. Without wetlands and other vital waterfowl habitats, healthy populations cannot exist. In the absence of funding and advocacy provided by conservation-minded people, habitat programs would be greatly diminished. Thus, actions undertaken on behalf of one goal will affect the attainment of other goals. In such a tightly linked system, it is essential to acknowledge people as an essential component of the triad. This inter-connectedness also requires that management programs be integrated in order to balance tradeoffs among goals and manage efficiently.

Wetland, Quebec – Christine Lepage, CWS Quebec Region

The interconnections between people, habitat and populations is perhaps no more apparent than with Aboriginal peoples. Plan partners should continue to seek ways to include Tribes, First Nations, Inuit and Métis in activities and decisions, and take advantage of the unique perspectives, values and contributions (like traditional ecological knowledge) that they can bring to waterfowl conservation. Designation of significant protected areas in the Western Boreal Forest is one recent example of the valuable role of First Nations' people.

3 See Appendix C, which describes the goal valuation exercise conducted during the NAWMP consultations and the linkages among the goals.

Mallard drake – Erwin and Peggy Bauer, U.S Fish & Wildlife Service

This Plan will consider three key, strategic issues related to "how" the waterfowl management community can achieve the three NAWMP goals. These issues — relevance, adaptability and efficiency — are considerations that will help shape and focus management actions. They should also prompt a re-evaluation of how resources are allocated and how existing institutions might be modified to position them for the future. A companion "NAWMP Action Plan" is being developed to provide additional guidance and offer more detailed, technical direction on elements needed to implement this Plan.

In summary, waterfowl management must continue to improve and evolve because today's economic, social and ecological changes create great challenges and uncertainty. Accordingly, this document is not so much a prescriptive "plan" as it is a vision for the future of waterfowl management. This Plan defines challenges and begins to identify actions that should be pursued over the next decade and beyond to meet those challenges. In the end, this revision of the Plan is truly that — an effort to "re-vision" the fundamental goals and objectives of waterfowl management, the programs and the linkages within management systems, and the institutional structures and support that will sustain waterfowl populations, hunting, viewing, wetlands and associated public values for decades to come.

Principles of the North American Waterfowl Management Plan

The following principles, several carried forward since the inception of the NAWMP in 1986, should guide all actions undertaken in support of the Plan:

1. Waterfowl are among North America's most observed and highly valued natural resources.[4]
2. Waterfowl management is a complex enterprise involving multiple governments, people, waterfowl populations, wetlands and other habitats. These elements are highly inter-dependent and should be managed in a coherent, integrated manner.[5]
3. Resident and endemic species also are important components of each nation's waterfowl resource and deserve conservation emphasis from within the jurisdictions where they occur.
4. Managed harvest of the waterfowl resource is desirable and consistent with its conservation.
5. Maintenance of abundant waterfowl populations is dependent on protection, restoration and management of habitat and the support of people who use and value these resources.[6]
6. Primary vehicles for accomplishing Plan objectives will include partnerships within and among three key waterfowl management arenas: habitat conservation, population management, and resource users.[7]
7. Long-term protection, restoration, and management of waterfowl habitats requires that Plan partners collaborate with conservation and community efforts in the development of conservation, economic, and social policies and programs that sustain the ecological health of landscapes.
8. Sound science and knowledge is the foundation for planning, implementing and evaluating the NAWMP programs.
9. Programs that manage waterfowl populations, habitats and recreational users should embrace and employ adaptive management. Making progress toward Plan goals requires an unwavering commitment to support essential monitoring and assessment activities.[8]
10. Waterfowl should be managed consistent with the North American Model of Wildlife Conservation.[9]

4 U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

5 New for 2012.

6 Newly expanded to include people.

7 Newly expanded to include more than Joint Ventures.

8 Newly expanded to include more than biology and conservation programs.

9 New for 2012. The elements of this Model are (1) wildlife is a public resource, (2) markets for game shall be eliminated, (3) allocation of wildlife by law, (4) wildlife shall be killed only for legitimate purposes, (5) wildlife are an international resource, (6) wildlife policy shall be science-based, and (7) hunting opportunity shall be afforded to all citizens.

Background Image: Buffalo Lake moraine, Alberta – Ducks Unlimited Canada

Building on the Conservation Legacy

Historically, the greatest successes in waterfowl management were motivated by crisis. Widespread drought and declining waterfowl populations during the 1930s led to the creation of the U.S. Migratory Bird Hunting and Conservation Stamp ("Duck Stamp") and related investments in habitat conservation. Important non-government waterfowl conservation organizations were founded during the same decade, and set to work on both domestic habitat programs and internationally funded habitat projects in Canada. The Canadian Wildlife Habitat Conservation Stamp was introduced in 1985. It is administered by the Canadian Wildlife Service with the funds transferred to Wildlife Habitat Canada.

In the 1980s, drought, poor nesting cover, and declining duck populations prompted a bold response from the waterfowl management community – the establishment of the NAWMP. International agreement over shared objectives and a vision for public-private partnerships evolved into Joint Ventures. This regional partnership-based approach to conservation has been widely emulated and universally acclaimed. The Joint Ventures in existence today encompass most of North America, and have expanded in geography and broadened their taxonomic focus to include all birds. Joint Ventures have developed decision-support tools that are now essential for biological planning and evaluation, and their habitat delivery programs are the backbone of the NAWMP. Plan partners have invested more than $4 billion (USD) in the protection and restoration of 15.7 million acres (63,000 square kilometers) of wetlands and associated habitats, have helped shape land-use, agricultural and other public policies critical to sustaining continental waterfowl populations, and have supported science critical for adapting actions along the way.

Similarly, waterfowl population management has a long history of success. Concern over dwindling bird populations during the first part of the 20th century prompted international attention, visionary international treaties and national legislation for the conservation of this shared resource. Migratory pathways that transcend national boundaries motivated the formation of the Flyway System. These efforts led to the development of an institutional framework for working together on management, scientific and public policy issues. In Canada, national harvest regulations have been in effect since 1917, and management mechanisms appropriate to Canada have developed, particularly in the later half of the 20th century. Despite differences in national governance systems, Canada and the United States have worked together within the Flyway System, particularly for gathering and sharing technical information. Mexico has joined Canada and the United States on tri-national committees and cross-border Joint Ventures, and manages domestically through geographically-based partnerships in Units for Management for the Conservation of Wildlife.

Background Image: A satellite transmitter attached to an American Black Duck – Jacob Bowman, University of Delaware

Decades of scientific and administrative efforts to ensure the sustainability of waterfowl harvest culminated in the mid-1990s with the implementation of Adaptive Harvest Management (AHM) in the United States, providing a more objective-driven, science-based, transparent process for population and harvest management. First focused on mid-continent mallards, this approach is being extended to other species, and the principles underlying AHM continue to shape advancements in both the science and institutional processes of harvest management.

Waterfowl hunters provide significant funding for habitat acquisition and management. In the United States, sales of Duck Stamps have generated more than $750 million, which has been used to help purchase or lease over 5.3 million acres of waterfowl habitat. Similarly, the Canadian Wildlife Habitat Conservation Stamp program has invested over $60 million in conservation programs and leveraged several times that amount from other sources. Revenue from state license sales and excise taxes on arms and ammunition raise millions more for conservation annually.

The broad economic benefits derived from waterfowl hunting are also significant. Trip and equipment-related hunting expenses generated over $2.3 billion in total economic output in 2006[10]. Waterfowl hunters have been strong advocates for conservation policies and general appropriations to fund conservation programs, and also manage considerable waterfowl habitat on private land. Without hunters, the fate of wildlife habitat would be in jeopardy.

Building on the NAWMP Foundations

Many of the issues and challenges presented in the 1986 NAWMP and subsequent updates are still relevant today, although the social backdrop has shifted and our knowledge of waterfowl biology and management has increased. This Plan will not reiterate the species accounts presented in the 1986 NAWMP and subsequent updates, but rather refers readers to those documents should they desire that information. Similarly, the important themes highlighted in the NAWMP updates – expanding the multi-national commitment to waterfowl conservation, conservation of whole landscapes, broader partnerships, and strengthening our biological foundation – are still relevant and, in fact, have become the accepted framework for our enterprise. This Plan builds on these important works by considering contemporary challenges, identifying high-level tactical solutions, and offering a vision for the future that addresses important strategic issues. More specific recommendations for implementation will be presented in a companion report, the NAWMP Action Plan.

Passage of the NAWCA by the U.S. Congress in 1989 created a vital funding source and a mechanism for leveraging public and private matching funds for wetland conservation in Canada, Mexico and the United States. In fact, the NAWCA was intended specifically as a funding mechanism for the NAWMP's wetland conservation programs. U.S. waterfowl hunters are the main participants in waterfowl/wetland conservation organizations that have provided 25 percent of the funding ($431 million) to support the NAWMP in Canada, and the political support necessary to sustain the U.S. federal contribution of an additional 24 percent ($422 million) over this same period. The most significant advances in habitat conservation under the NAWMP can be traced to the NAWCA and the financial support it provided and leveraged.

10 Carver, E. 2008. Economic Impact of Waterfowl Hunting in the United States. Addendum to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Fish and Wildlife Service Report 2006-2. 13pp.

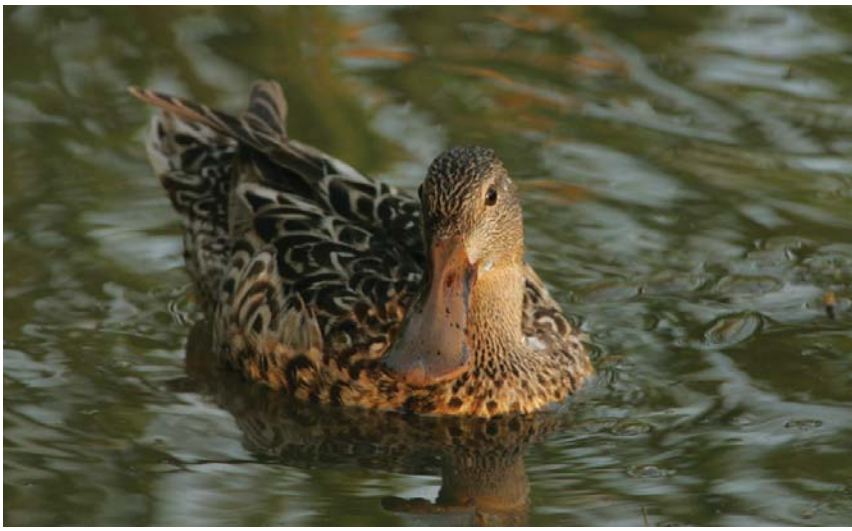
Other conservation achievements can be tied to policies and programs supported by the general public and not directly targeted to waterfowl. In the United States, the Clean Water Act has protected many wetlands through regulation. Another U.S. policy initiative, the Farm Bill, enacted programs such as the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP) that have restored large expanses of grasslands and wetlands, and contributed significantly toward reaching NAWMP goals. Similarly, the Agricultural Policy Framework in Canada enhanced awareness of environmental issues through the Environmental Farm Planning initiative, and created incentives for restoring wetlands and converting cultivated uplands to permanent cover through the National Farm Stewardship and Greencover Canada programs. Collectively, the Agricultural Policy Framework in Canada and the U.S. Farm Bill have funded and incentivized the conservation of millions of acres of waterfowl habitat.

Running through the history of waterfowl management has been a reliance on science-based management, backed by monitoring programs for both habitat and populations. An ever-increasing knowledge base extends from basic life histories of waterfowl to the influence of landscape features on population demography. Strategic habitat conservation has advanced through the application of systems and species models (specifically for priority species such as mallards, black ducks and northern pintails) that predict waterfowl population responses based on measures of landscape metrics. Spatial databases that are displayed and manipulated using geographic information systems (GIS) have dramatically improved the ability of managers to target programs for maximum effectiveness.

Canadian Coast Guard helicopter – Christine Lepage, CWS Quebec Region

Responding to the expressed or perceived desires of waterfowl hunters has always been an important consideration for harvest and population management programs. Many harvest management decisions intended to benefit hunters have been driven more by professional judgment than by objective assessments of hunter attitudes and desires. That model is changing with advances in structured social science ("human dimensions") research and implementation of hunter surveys at the state and national levels.

In contrast, comparatively few resources have been directed at understanding the needs and desires of those who engage waterfowl with cameras and binoculars. It has generally been assumed that the needs of this constituency would be met if managers provided habitat and populations in numbers needed to satisfy hunters. The number of people who make a dedicated effort to view waterfowl is now ten times the number of waterfowl hunters, and their numbers continue to grow. This phenomenon creates an opportunity to increase support for conservation as well as a responsibility to ensure the needs of this growing clientele are being addressed.



Northern Shoveler – Steve Hillebrand, U.S Fish & Wildlife Service

In the United States, waterfowl conservation has ridden, by and large, on the coattails of waterfowl hunters, who have been the strongest advocates for conservation policies and large financial contributors to waterfowl conservation. In Canada and Mexico, citizens interested in wetlands and their environmental benefits are also gradually becoming advocates for wetland conservation. It has generally been assumed that these hunter-citizen supporters, backed by the good work of NAWMP partners and the "obvious merits" of waterfowl and wetlands conservation, would continue to sustain the waterfowl management enterprise and carry the day with policymakers and appropriators. This Plan questions that assumption.

Given the legacy of waterfowl management accomplishments, why is it necessary to revise the NAWMP and reconsider the way business is done? First, in the wake of a global economic downturn there has been an erosion of conservation policy and program support that threatens the foundation of waterfowl conservation and management. Second, waterfowl populations and their habitats are facing unprecedented threats, and current levels of conservation are unsustainable without reversing trends of hunter decline and garnering more support from a broader constituency. Third, the magnitude and pace of ecological and social change requires more adaptive institutions, planning, and management. Finally, given the interconnected nature of the system itself and the threats posed to waterfowl, wetlands and waterfowling traditions, it is essential that a more integrated approach is taken to most efficiently and effectively accomplish Plan goals.

Confronting the Challenges

Adapting to Global Trends

The world is vastly different than it was 26 years ago, and large scale environmental, social, political, and economic changes are occurring at an accelerating rate. Since the original NAWMP, the world's population has increased 40 percent – from 5 billion to 7 billion people – and is expected to increase by a similar magnitude over the next decade. The internet and digital technology, which now form the backbone of communication and information flow, did not exist in 1986. Globalization was just beginning to be a topic of conversation, the Cold War shaped international affairs, and climate change had not yet captured public discourse. Even though waterfowl conservation has made significant advances during the past century, much of the waterfowl management enterprise is being pursued under more-or-less the same model that evolved with the advent of the NAWMP and the NAWCA more than a quarter-century ago. Since that time we have experienced:

- Global forces of supply and demand for food, fiber, and biofuels that affect the availability of land for conservation. As well, there is less local control over production systems, land use and the economy that affects both conservation programs and the economics and policies of land use.
- Ecological change, including the very large human impact on ecosystems that are vital to waterfowl throughout their annual cycle. For some species of concern like scaup, black ducks and northern pintails, there is evidence that habitat carrying capacity has been substantially reduced on a continental scale.
- Climate change, which is particularly troublesome because its effects are inherently long-term and large-scale, yet unpredictable. For ducks, hydrological changes in prairie wetlands may have profound implications, as might changes in prairie agriculture. In other regions, water-level changes in the Great Lakes, sea-level rise with increasing erosion of coastal marshes, and changes in the ecology of permafrost ponds in the North will impact waterfowl habitats.
- Social and demographic change, including the continuing urbanization of North America, which is creating generations of citizens who are increasingly disconnected from the outdoors and wildlife.

Background Image: Saskatchewan Environment Minister Dustin Duncan and several members of the Saskatchewan NAWMP Partnership celebrated the NAWMP 25th Anniversary project dedication of the Kehiew habitat conservation property in the Missouri Coteau – Ducks Unlimited Canada

- Increased energy consumption, which has led to new policies that drive increases in domestic production. Oil, gas and coal developments are disrupting boreal, arctic, coastal and even prairie ecosystems, and other landscape alterations are mounting as society seeks alternatives via wind energy developments, hydroelectric projects, and biofuel production.
- A succession of financial crises that have resulted in substantial cutbacks in government programs and reduced philanthropic donations to causes like waterfowl conservation. Investing is becoming more parochial, which makes it challenging to address the needs of a migratory resource where the most strategic investments may lie in sparsely populated regions of the continent.

Some of these changes induce "non-stationarity" – a situation wherein the environment is undergoing a directional change, as opposed to conditions varying around an average state. Few, if any, current management models account for non-stationarity. If past patterns (e.g., wet/dry cycles) are no longer useful for predicting future conditions, management decisions will be made with much greater uncertainty. Clearly, for waterfowl management to survive and thrive in the next decades, managers should be able to better understand the effects of these large-scale trends on the business of waterfowl management and conservation, and adapt accordingly.

Addressing Population and Habitat Threats

Although the NAWMP community can point to many outstanding successes, the future of ducks, geese and swans is not yet secure. Arctic-nesting waterfowl are encountering an ever-warmer environment in which coastlines are eroding, ponds are draining from melting permafrost, food availability may no longer coincide with peak periods of need, and there is an increasing amount of human activity in this formerly unaffected landscape. The effects of climate change, which are already affecting geese and ducks breeding at high latitudes and in some coastal areas, will soon affect waterfowl throughout their range. Farther south, the extraction of fossil fuels, minerals and timber has and will continue to transform the vast boreal forest from a largely intact ecosystem to a fragmented landscape. Working with industries and Aboriginal people of the North, progress has been made either restricting or improving the practices of extractive industry in some critical areas. Nonetheless, world demand for fossil fuels and minerals continues to increase, which will invariably put greater pressure on northern landscapes.

A recent succession of wet years throughout much of the Prairie Pothole Region has caused mid-continent duck populations to boom, boosting the populations of some species to record highs. Yet their breeding habitat is being irreversibly degraded by wetland drainage and conversion of grassland to cropland. This will inevitably lead to a population decline when drier conditions return. The depth of that decline, given substantial habitat loss, cannot be predicted. What is predictable is that an increasing demand for food and ethanol-based biofuel, along with advances in crop genetics, will continue to drive the conversion of critical wetland and grassland habitat. New farming technology will transform heretofore untillable prairie into cropland, and advancements in the use of inexpensive, plastic drainage tile will pose new threats to prairie wetland communities across the agricultural Midwest and southern Canada. Meanwhile, enrollment in U.S. Department of Agriculture-sponsored conservation initiatives like WRP and CRP is declining due to reduced funding for those programs, and because the compensation offered to landowners cannot compete with contemporary cropland rental rates.

Waterfowl migration and wintering habitats, many of which have already lost the vast majority of their wetlands, are being further threatened by invasive plant species, degraded water quality and diminished water supplies. The food and energy demands of non-breeding waterfowl are often met by the seasonal availability of agricultural foods – a resource with an uncertain future dependent on supply-and-demand, farming technology and irrigation water. Few areas have sufficient food and habitat secured in perpetuity. Waterfowl managers are justifiably concerned with achieving long-term securement of migration and wintering habitat, particularly given the extremely high costs of conservation in some areas. Sea-level rise, salt water intrusion, nutrient loading, coastal erosion, offshore and tidal energy developments and increased urbanization – acting alone or in combination – are rapidly degrading important coastal habitats.

In other regions of North America, and certainly for some species, it is clear that much work remains to be done. Among the species reported from the Western ("Traditional") Survey Area (see map, Appendix A), both scaup and northern pintail have been below their NAWMP population objectives for decades, and show no evidence of a substantial rebound even under favorable habitat conditions. Prairie and Parkland populations of American wigeon have not responded as well as other dabbling ducks to improved habitat conditions. Populations of eiders, scoters and other sea ducks in all survey areas are also of significant concern. These species are difficult to survey, little is known about their demography, and available indices suggest they are in general decline. The opposite is true for some goose species, notably snow geese. Despite a deep understanding of their biology and aggressive actions to reduce their populations, snow goose numbers continue to grow. The damage they inflict on the arctic coastal plain – and other species who share this ecosystem – increases in geographic extent every year. Canada geese, as well, are nearing or have exceeded socially acceptable population sizes in some areas.

Many issues affecting waterfowl populations and their habitats are unprecedented, and can be addressed only through additional research and novel conservation programs. However, of equal or even greater significance are social and ecological changes that affect the ability of managers to conserve the waterfowl resource, cope with global trends, and ensure that approaches to management are effective and efficient.

Sustaining Waterfowl Conservation

A landscape approach to conservation is at the very foundation of the NAWMP. Embodied in this approach is the recognition that conservation goals can only be achieved with broad public support and by influencing land use decisions over extensive areas of the continent. Most of these areas are "working lands" owned by individuals, families and corporations. While some conservation outcomes are achieved through regulations and policies, others result from collaborations that lead to voluntary actions. Support from the public and participation by landowners hinges on striking the right balance between conservation outcomes and the socioeconomic drivers that influence land use decisions. That balance is always shifting, depending on the relative value placed on conservation versus other drivers.

Ultimately, the balance point depends heavily on peoples' connection to waterfowl and the natural world – a connection that is rapidly eroding. This "disconnect" from the outdoors has been cited as the greatest challenge facing the conservation community. It undermines the motivation to preserve wildlife and wild places, and causes the public to undervalue the goods and services provided by a

healthy environment. This has implications for policy decisions, financial support, and the willingness of landowners to participate in conservation programs.

> "The biggest single threat to conservation in America is the growing disconnect of our people with the outdoors."
>
> Ken Salazar, U.S. Secretary of the Interior

Segments of society differ in their connection to the outdoors and wildlife. Hunters tend to have a close emotional connection and have played an integral part of waterfowl and wetland conservation for nearly a century. The 1986 NAWMP was intended to provide waterfowl populations to meet the recreational demand of 2.2 million hunters, along with millions of viewers. At the time, waterfowl and hunter numbers were both plummeting, and it was generally assumed that the loss of habitat was largely responsible for the decline in waterfowl populations, and that associated conservative hunting regulations and reduced bird abundance triggered a loss of waterfowl hunters (Fig. 1). Accordingly, many believed that restoring habitat would reverse the trends in both waterfowl and hunter numbers. However, when populations of waterfowl increased in the 1990s and harvest regulations were liberalized, unexpectedly, the number of hunters did not rebound (Fig. 1).

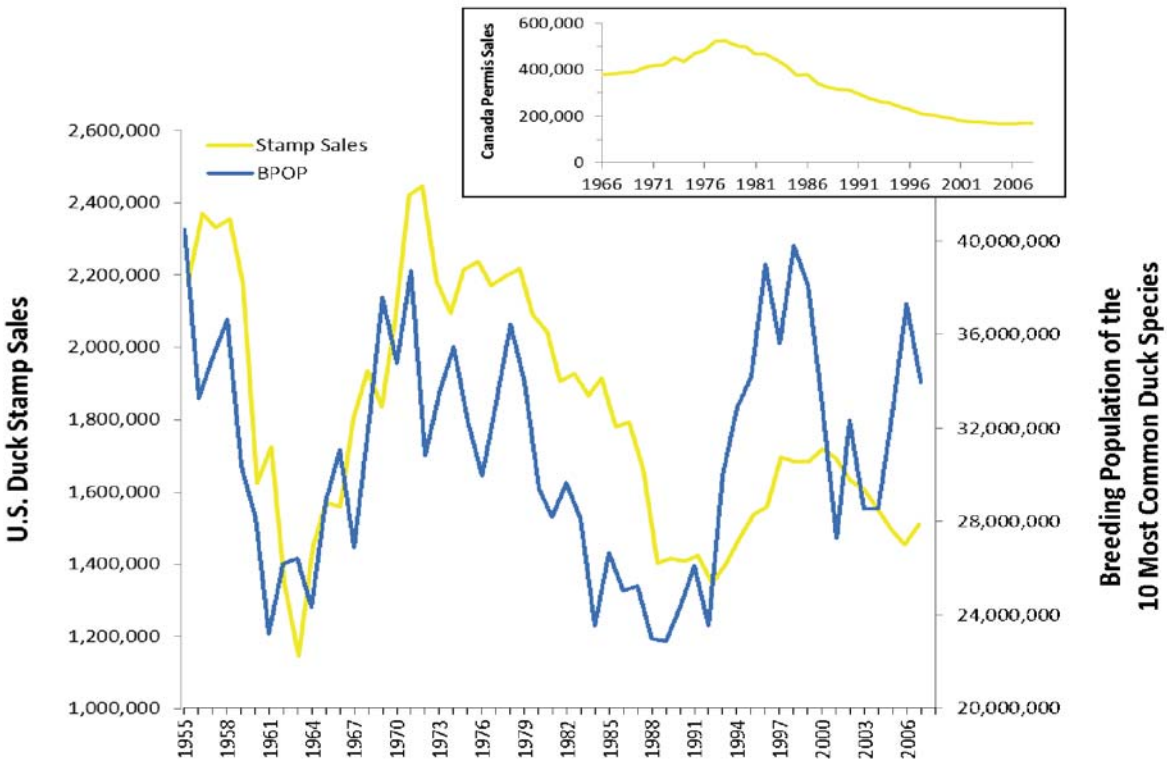


Figure 1. U.S. Duck Stamp sales and breeding population size of the 10 principal duck species from 1955-2008. Inset reflects Canada Migratory Game Bird Hunting Permit sales from 1966-2008. Stamp sales (an index of duck hunter numbers) were closely correlated with duck population size until the mid-1990s, after which stamp sales did not rebound commensurate with populations. The loss of Canadian waterfowl hunters is even greater than in the United States, with permit sales declining from over 500,000 in 1979 to fewer than 180,000 in 2008. Sources: U.S. Fish and Wildlife Service and Canadian Wildlife Service.

It is now apparent that the old paradigm – abundant waterfowl and liberal regulations will result in more hunters – no longer applies. Habitat management and harvest regulations have been ineffective at reversing the general decline of this important stakeholder group. The decline in hunter numbers continues despite abundant waterfowl populations and over a decade of unprecedented hunting opportunity. U.S. waterfowl hunters have decreased 27 percent since the 1970s, and continue to decline. Canadian waterfowl hunter numbers decreased 55 percent during the same period, though their numbers appear to have stabilized. Many managers question how the current model of waterfowl conservation can be sustained if waterfowl hunter numbers continue to decline.

In contrast to the declining trend in hunter numbers, interest in viewing waterfowl is popular and increasing. In 2006, 15 million people in the United States traveled a mile or more from home to view waterfowl. Seventy-seven percent of those people reported observing waterfowl, making them the most watched group of birds.[11] Some of these individuals purchase federal duck stamps to benefit conservation or have an entrance pass for national wildlife refuges, and also belong to one or more non-profit organizations that help fund conservation programs. Greater snow geese (and Canada geese) staging in Québec provide some $27 million in economic benefits derived from hunting, bird-watching and ecotourism activities.[12] The challenge is to direct more of the funds generated from waterfowl-related recreation towards conservation programs. Given their growing numbers, many believe this group of outdoor enthusiasts has the potential to be another cornerstone of waterfowl conservation.

Ultimately, the future of waterfowl and their habitats will be determined by the priorities established by society. Competing demands for resources and policies that reflect societal values will determine funding for conservation, regulatory frameworks, and the fate of wetlands and other habitats critical to waterfowl. For waterfowl conservation to rank as a priority, there must either be an emotional attachment to the birds and associated recreation pursuits, or pragmatic reasons to retain waterfowl habitat because of the multiple benefits provided to society. While hunters and viewers carry the emotional attachment, pragmatic justifications may gain greater favor with the general public. These include benefits such as reduction in flooding, groundwater recharge and improvement in water quality. Until recently, little effort was made to connect waterfowl conservation to other environmental issues of broader public concern. Public policies have been enacted to help secure environmental and other societal benefits, but these were set in place largely independent of waterfowl objectives, and some have been weakened in recent decades.

Ultimately, the future of waterfowl and their habitats will be determined by the priorities established by society.

11 Carver, E. 2009. Birding in the United States: A demographic and economic analysis. U.S. Fish and Wildlife Service Report 2006-4.

12 Groupe Conseil Génivar Inc. 2005. Etude des impacts socio-économiques : La sauvagine en migration dans le Québec méridional, particulièrement la Grande Oie des neiges et la bernache du Canada. Environment Canada, 63pp.

For instance, so-called "geographically isolated wetlands" – among the most valuable habitats for waterfowl – have recently lost protection under the U.S. Clean Water Act, and provincial laws regulating wetland drainage in Canada have been progressing very slowly. The Swampbuster provision of the U.S. Farm Bill still offers meaningful protection for wetlands, but the motivation for compliance will be reduced if USDA commodity programs are scaled back. Appropriations for some foundational programs – most notably NAWCA – are also in jeopardy. In Canada, the deficit reduction exercises occurring in the federal, provincial and territorial governments will affect future investments in the NAWMP. The ramifications for waterfowl conservation will be significant.

Northern Pintail Pair

These and other challenges make it clear that continuing with the status quo – focusing solely on waterfowl habitat conservation and population management – will not be enough to achieve the NAWMP goals and sustain habitat gains for the long term. New approaches and a new vision will be needed to address the changing social landscape and its influence on participation in hunting, viewing, and conservation. Such an expansion of vision is not without precedent. Previous generations expanded the focus of waterfowl management from regulating harvest and ending market hunting to providing refuges and protecting other habitats. Similarly, the original NAWMP expanded the focus from protecting fragmented habitats on public lands to restoring system processes at the landscape scale through broad partnerships. Through each expansion of waterfowl management, the community has engaged a broader constituency, incorporated information from more diverse scientific disciplines, and developed novel and successful approaches to conservation.

A New Vision of Waterfowl Management

Relevancy: Strengthening the Emotional and Pragmatic Ties to Waterfowl and Wetlands

To achieve increased public support, conservation of waterfowl and their habitats must compete successfully against other pressing societal issues. Creating a greater emotional attachment to waterfowl and appealing to people's pragmatic sense are complementary objectives that should increase the public stature of waterfowl conservation. Several strategies to achieve these objectives, described in greater detail below, are fundamental to the future of the NAWMP and are reflected in a vision of the future that includes:

- People connected to the outdoors and committed to conserving natural areas and abundant waterfowl populations;
- Sufficient waterfowl numbers and habitat to sustain populations and support waterfowl-related recreation;
- Healthy wetland ecosystems that sustain natural functions (e.g., water quality, flood control, carbon storage) that benefit people and wildlife;
- Continued financial support from public and private sources for conserving waterfowl and their habitats;
- Political support for effective and complementary conservation policies; and
- A thriving tradition and culture of waterfowl hunting that is supported by North American society.

In brief, the vision of the NAWMP is: ***"People Conserving Waterfowl and Wetlands."***

A Growing and Supportive Core of Waterfowl Hunters

The vision of the NAWMP is: *"People Conserving Waterfowl and Wetlands"*

The continuing loss of waterfowl hunters is an emotional and practical concern for waterfowl managers. Many in the waterfowl community consider waterfowling to be a treasured legacy that connects people with the outdoors in a most intimate way, and believe that the loss of the waterfowling tradition would extinguish an important cultural link with nature. From this perspective, the waterfowling tradition and conservation represent two dimensions of a singular experience – one that begins with the interactions with waterfowl and others out in the marsh, and

Background Image: Looking across McPhee Meadows to the Puntledge River – Rupert Wong, Nature Conservancy of Canada

ends with efforts to pass on the legacy of waterfowling through dedicated efforts to conserve wetlands, waterfowl, and the tradition of waterfowl hunting. New hunters must be recruited to the sport, and a higher percentage of existing hunters retained, or the tradition of waterfowling is in jeopardy. This will require an enhanced understanding of the factors that bear on hunter recruitment and retention. Fortunately, human dimensions research can help shed light on these issues.

The NAWMP's vision of the future includes a growing and engaged community of waterfowlers committed to conservation and perpetuating hunting traditions. It includes waterfowl managers making informed decisions that help recruit and retain hunters while minimizing impediments to participation, enhancing satisfaction, and safeguarding the waterfowl resource. It also includes the non-hunting public, which accepts waterfowl hunting as part of the North American culture, recognizes the environmental benefits derived from habitat conservation, and places trust in the science-based management that ensures sustainable populations of waterfowl.

An Engaged Conservation Community Inspired by Waterfowl and Wetlands

The millions of people in Canada, Mexico and the United States who pursue waterfowl with camera and binoculars are an important segment of the conservation community. Some have advocated for progressive policies, created wildlife sanctuaries and contributed to conservation organizations. Others have been less engaged, and increasing their support for waterfowl conservation will be vital to the future. Education will be important because some are simply unaware of the threat that habitat loss – often at distant locations – poses to the quality of their recreational experience. Communicating that linkage and appealing for support will be important to the future of waterfowl conservation because the number of waterfowl "users" is growing in number and influence.

Another challenge is the geographic disconnect between people and waterfowl. Over 82 percent of U.S. citizens live in cities and suburbs, just slightly more than the percentage of urban dwellers in Canada (80 percent) and Mexico (77 percent).[13] Traditionally, the NAWMP has focused on directing resources to habitats most important in the annual life cycle events of waterfowl. That focus should remain but consideration should also be given to initiatives that allow those removed from connections with abundant wetlands and waterfowl – especially youth – to experience waterfowl in natural settings.

While initially counterintuitive to population and habitat managers, modest, strategic investments in metropolitan waterfowl habitat might pay large dividends when difficult policy and funding decisions are put to a vote. As most biologists know, many waterfowl species adapt to urban/suburban environments, sometimes losing their wild characteristics. These birds are often demeaned as "park ducks" or "city geese", and some managers have spent considerable time dealing with nuisance waterfowl complaints. But how many managers appreciate that waterfowl in a metropolitan environment, a situation that can cause challenges, is also an experience that enriches the lives of average citizens – those who do not complain about fouled fairways and overgrazed greens? As part of the vision of the NAWMP, consideration should also be given to investments that allow an increasingly metropolitan populace to personally experience the beauty of waterfowl. Like all management actions under the NAWMP, these programs too should be subject to testing and adaptive modification over time.

13 Source: CIA World Factbook.

A Supportive Public

Publicly-funded programs and progressive public policies have always been profoundly important to waterfowl conservation. In this era of increasing fiscal restraint, it is imperative that the waterfowl management community work to encourage conservation as a priority with the general public. At a time when people are increasingly disconnected from nature, support for funding and policies will not be won based solely on the beauty of the birds or the joys of waterfowl recreation, but on the relevance of conservation to the quality of life of everyone. Strategic investments in science, education, and communications and marketing will be critical.

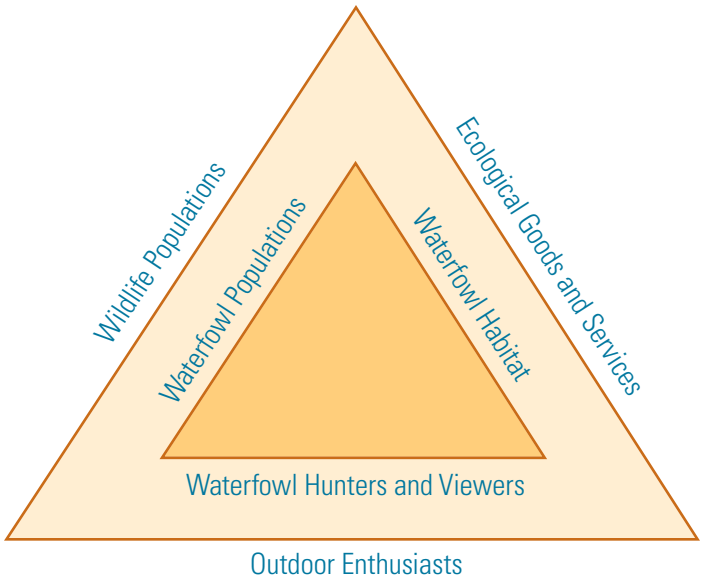


Figure 2. Conceptual diagram of the relationship between the NAWMP values and other societal benefits. The NAWMP is focused on values depicted on the axes of the inner triangle, but there is growing awareness of – and obvious connectivity to – the broader values and outcomes depicted in the outer triangle.

Conceptually, the three goals for waterfowl management are subsets of larger, associated benefits to society (Fig. 2). For example, enhancing waterfowl populations also benefits a broad suite of other wildlife species. Retaining, restoring and managing waterfowl habitat provides other ecological goods and services. Finally, the habitat provided for waterfowl also offers "habitat" and recreational areas for outdoor enthusiasts. Economists term these benefits "natural capital," defined as the stock of natural resources, environmental and ecosystem resources, and land.[14] Many – if not most – habitat projects conducted in the name of waterfowl conservation enhance natural capital (Table 1).

One "service" provided by the conservation of waterfowl habitat, not appreciated until recently, is associated with public health – particularly the well-being of children. A phenomenon termed "nature deficit disorder"[15] has commanded the attention of conservationists throughout North America. Initiatives to promote hunting and fishing and to "get people outdoors," have been initiated by several organizations and agencies. Waterfowl can play an important role in these efforts. Creating and managing waterfowl habitat for public health purposes, while not the paradigm for contemporary waterfowl management, is another subtle way for waterfowl conservation to become more relevant to the public.

14 Olewiler, N. 2004. The Value of Natural Capital in Settled Areas of Canada. Published by Ducks Unlimited Canada and the Nature Conservancy of Canada. 36 pp.

15 Louv, R. 2005. Last child in the woods: saving our children from nature-deficit disorder. Workman Publishing, New York, NY.

As new information on the environmental benefits of waterfowl conservation becomes available, it will be imperative to communicate the findings in a way that educates and motivates the public. The waterfowl community has not been particularly effective at such messaging, and this is yet another example of where human dimension and marketing research can be applied within waterfowl management. What environmental issues are most important to the public? How does waterfowl conservation affect those issues? What messages resonate, and how can those messages be delivered effectively in a way that is easily understood? What media should convey these messages? These key questions are relevant to waterfowl management in the new millennia.

Strengthening the connection between waterfowl management and ecological benefits should not change the waterfowl focus of management programs and priorities. Consistent with the new goals, management still should be aimed at maintaining healthy populations, conserving habitat, and addressing the needs and desires of those who make greatest use of the waterfowl resource (inner triangle, Fig. 2).

Table 1. Examples of ecosystem services and functions provided by wetlands and other waterfowl habitat (from Olewiler, N. 2004. The Value of Natural Capital in Settled Areas of Canada. Published by Ducks Unlimited Canada and the Nature Conservancy of Canada. 36 pp.)

Ecosystem Service	Ecosystem Function	Examples of Services
Water supply	Storage and retention of water	Water storage by wetlands, watersheds and aquifers
Water stabilization	Stabilization of hydrological flows	Moderation of flood events; supply water for agriculture and industry
Nutrient cycling	Storage, internal cycling and processing of nutrients	Nitrogen fixation, nutrient absorption and cycling
Habitat	Habitat for resident and migratory species	Nurseries, migratory bird habitat, regional habitat for locally harvested species
Genetic resources	Sources for unique biological materials and products	Medicine, products for materials, genes for plant resistance, ornamental species
Recreation	Provides opportunities for recreation	Ecotourism, hunting, fishing, boating
Cultural	Opportunities for non-commercial uses	Aesthetic, artistic, education, spiritual, scientific
Waste treatment	Recovery of mobile nutrients and removal of excess nutrients and compounds	Waste treatment, pollution control, detoxification
Climate stabilization	Regulation of global temperature, precipitation and other climate processes	Greenhouse gas sequestration, cloud formation
Erosion and sediment control	Retention of soil	Prevent soil loss by runoff, wind and other processes

Productive Collaborations

Fostered in part by the success of the NAWMP Joint Ventures, numerous new initiatives now exist to facilitate conservation delivery for birds and other wildlife. Equivalent national plans for conservation of landbirds, shorebirds, waterbirds and seabirds have been established, and guide geographically-based management plans and actions in every U.S. state (State Wildlife Action Plans), Canadian Bird Conservation Regions, and Mexican UMA-based Management Plans. Many of these initiatives have priorities and programs that overlap considerably with the mission of the NAWMP. Joint Ventures continue to explore opportunities afforded by partnering with these initiatives, as evidenced by their expansion from a waterfowl to an "all bird" focus.

In addition to conservation partnerships, opportunities to collaborate on landscape-scale research initiatives now present themselves. The U.S. Department of the Interior established Landscape Conservation Cooperatives (LCCs) that include priority landscapes for the NAWMP Joint Ventures. Initially focused on understanding the effects of climate change on ecosystems, LCCs have expanded their mandate to consider other large-scale, environmental stressors, and should provide scientific results broadly applicable to regional conservation decisions. LCCs represent a significant opportunity for collaboration on topics of mutual interest to the NAWMP and the broader conservation community.

Adaptation: Responding to a Rapidly Changing Ecological and Social Landscape

A hallmark of North American waterfowl management has been the continual improvement of management programs. An ongoing quest for a better way of doing business has motivated the management community to invest in original research, or synthesize existing data, to inform waterfowl management. For example, the NAWMP Assessment[16] (Assessment) reviewed Joint Venture conservation programs and offered numerous, specific recommendations for improving the effectiveness and efficiency of Plan activities. The Joint Ventures rose to this challenge and in many respects adjusted their programs as recommended. The advent of formal decision-support models and related monitoring programs has greatly enhanced the ways in which management decisions are made. In harvest management, the U.S. Supplemental Environmental Impact Statement on hunting of waterfowl – under review at the time of this writing – is undertaking a thorough re-examination of harvest management.

At the same time, the Canadian Wildlife Service is evaluating redundancies and gaps in its population monitoring program as well as the process for establishing hunting regulations. The U.S. National Duck Hunter Survey, conducted in late 2005, was the first to ask hunters in every state their perceptions and preferences on duck hunting and waterfowl management. Some Canadian provincial governments have asked hunters those questions as well. The results of these efforts shed light on the question of whether managers are "doing things right" insofar as program delivery.

16 Paulin, D. et al. 2007. North American Waterfowl Management Plan continental progress assessment. Final Report. Unpublished report. 98pp http://nawmprevision.org/sites/default/files/2007ContinentalAssessment.pdf

Long-billed Curlew – Jared Hobbs

In addition to considering the effectiveness of existing conservation work, managers frequently re-assess their programmatic investments by asking "are we doing the right things and in the right places?" Such re-assessment may be catalyzed by significant new information, the invention of new planning tools, or external forces that place new pressures on populations or habitats. For example, when new research revealed low duck nest survival in fragmented prairie landscapes with little upland cover, managers shifted resources to securing larger tracts of grasslands through conservation easements. Coincidental with this biological finding was the advent of GIS software that greatly enhances spatial targeting of conservation programs, leading to expanded work in some geographic areas and reduced emphasis in others. Finally, policy changes for the better (e.g., advent of the U.S. Conservation Reserve Program) or for the worse (e.g., loss of protection for isolated wetlands under the U.S. Clean Water Act) have prompted administrators to re-align staffing and financial resources to capitalize on opportunities or respond to new threats.

There have been periods in the history of waterfowl management when the community enacted significant changes by adopting new value systems, embracing new paradigms, and realigning the governance and institutions that guide waterfowl management. The very beginnings of waterfowl conservation in North America witnessed a fundamental transformation – from regarding waterfowl as a market-based commodity to a public trust. Subsequently, landscape-scale conservation in the United States was transformed by the creation of the National Wildlife Refuge System. Collaborative harvest management was transformed through the Flyway System. Non-government conservation organizations like Ducks Unlimited were founded, bringing with them new expertise and private funding for conservation. The NAWMP and formation of the Joint Ventures encouraged and transformed partnership-based, landscape-level conservation. More than anything else, the willingness of the waterfowl management community to consider and implement these fundamental changes is what sets it apart from many other endeavors in wildlife management.

The waterfowl community once again finds itself at this most significant stage in the learning cycle, asking "do we have the governance right?" To adapt and move forward, it will be necessary to reconsider management frameworks and institutional structures, particularly as the elements of waterfowl management become integrated and human objectives are explicitly incorporated into decision-making processes.

Adaptive Management: "Learning While Doing"

Traditionally, waterfowl researchers have attempted to resolve key uncertainties using a hypothesis-testing framework. Results of such research have led to a deeper understanding of waterfowl ecology and have led managers to improve management techniques and more effectively target conservation efforts. However, given the myriad and rapid changes described above, managers are increasingly forced to make decisions in the face of considerable uncertainty. In such a situation, an "adaptive management" framework – a structured, iterative process of planning, implementation and evaluation – is a preferred approach as advocated in the 2004 NAWMP Update.

> To adapt and move forward, it will be necessary to reconsider management frameworks and institutional structures, particularly as the elements of waterfowl management become integrated and human objectives are explicitly incorporated into decision-making processes.

To manage adaptively and make effective conservation decisions, waterfowl managers and stakeholders should be able to articulate clear goals and quantifiable objectives; predict the biological outcomes of management actions; design and implement monitoring procedures to measure those outcomes; and compare outcomes with the original predictions and objectives. Knowledge gained during one cycle is then used to adjust future planning and implementation in the next cycle.

Despite the obvious applicability of the adaptive management approach, there are only a few examples of it being employed in waterfowl management. This may be due, in part, to a longstanding tradition of avoiding risk, even when taking some risk is the only way to learn and reduce uncertainty.

Given that waterfowl management has been slow to embrace adaptive management, what could be done to encourage more widespread use of this approach? Six points are crucial:[17]

1. *Learning should be a performance element for both managers and decision makers.* Systematically reducing uncertainty should become a priority of waterfowl managers.
2. *Encourage controlled risk-taking in the face of uncertainty.* The focus on risk-aversion should shift to openness to experimentation and systematic learning.
3. *Treat adaptive management rigorously and formally.* Adaptive approaches involve more than simply muddling through. They establish a deliberative and purposeful process through which questions are framed, alternative hypotheses are proposed and implementation is designed to enhance learning opportunities. Results then are critically evaluated, and, if appropriate, subsequent actions and policies are revised and applied, again in such a manner as to enhance the continuing process of learning.
4. *Leadership and clarity of vision is essential.* The ability to excite, motivate, and sustain organizational commitment to adaptive management requires people who lead, not just manage.

17 Cited/adapted from: Stankey, G. H. 2002. Adaptive management at regional scales: Breakthrough innovation or mission impossible? A report on an American experience. Agriculture for the Australian Environment. 159-177.

5. *Monitoring and assessment programs are critical.* Without such programs, adaptive management cannot succeed.

6. *Organizations should be integrated, not compartmentalized.* An adaptive approach for all components of the waterfowl management enterprise should permeate organizational thinking and behavior.

A waterfowl management community that embraces and practices adaptive management is a visionary element of the NAWMP. This was articulated in the 1998 Update and elaborated in the 2004 Update and the 2006 Assessment, but has yet to be fully realized.

Efficiency and Effectiveness: An Integrated System of Waterfowl Management

North American waterfowl management is an inter-related enterprise involving people who advocate for beneficial public policies and help fund conservation programs. These policies and programs protect and restore habitat, resulting in waterfowl populations that can sustain an annual harvest while providing other societal benefits. Yet North American waterfowl management does not explicitly integrate population, habitat, and human objectives. For example, it is unclear whether, or to what extent, harvest should be regulated to help achieve NAWMP waterfowl population objectives. Conversely, the models used in Adaptive Harvest Management do not directly incorporate the habitat accomplishments of the NAWMP partners, in particular the habitat conditions in the United States. Finally, hunting regulations are not set with regard to any explicit objectives for participation in hunting and viewing. Lacking clear objectives for hunting, viewing and other waterfowl-related recreation, habitat managers have no objective or systematic way to balance their programs in consideration of multiple, competing desires of people and the resource needs of the birds.

Given how the different institutions of waterfowl management have evolved, it is understandable that these and other coordination issues have emerged. Coherent, interrelated objectives would enhance efficiency and the ability to adapt programs in response to changes in ecological systems and society. Shared objectives are a necessary first step in ensuring that management programs are aligned and work in a complementary fashion.

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A vision for integrated waterfowl management has begun to emerge. The Joint Task Group[18] (JTG) recommended a technical framework for specifying and evaluating the implications of common objectives for harvest and habitat management. Concurrently, the first comprehensive assessment of the NAWMP[16] offered parallel recommendations. One major obstacle, identified at the Future of Waterfowl Management Workshop,[19] is that no institution exists to oversee integrated decision-making. This barrier still needs to be addressed.

18 Anderson, M.G. et al. 2007. Report from the Joint Task Group for clarifying North American Waterfowl Management Plan population objectives and their use in harvest management. Unpublished report. 57pp. http://nawmprevision.org/sites/default/files/jtg_final_report.pdf

19 Case, D., and S. Sanders. 2008. The future of waterfowl management workshop: Framing future decisions for linking harvest, habitat and human dimensions. Summary report 10-9-08. 64pp. http://www.nawmprevision.org/sites/default/files/future_of_waterfowl_mgt_workshop_final_report.pdf

An important task for the waterfowl community is to develop a more fully integrated system to guide management programs and achieve the objectives under each of the NAWMP's three goals. Focused on social as well as ecological matters, a coherent management system would feature the familiar elements of an informed decision process – explicit objectives, coherent system models, targeted and focused monitoring programs, and institutional processes to adapt to new information. Such a system will require:

- *Quantifiable objectives.* The three new goals of the NAWMP provide the context for developing explicit objectives that are measurable and provide unambiguous guidance to decision makers. It will be essential to explicitly acknowledge potential trade-offs among these objectives. Managers should develop a feasible suite of actions, carefully considering and subsequently evaluating how those actions affect the attainment of each of the objectives adopted by the management community.
- *System models that link objectives and ensure coherence across scales.* An integrated management framework will require thoughtful development of models that predict outcomes of management actions. Some underlying models will be well-informed with empirical data, while others may have to be more conceptual. An enterprise as vast as the conservation and management of North America's landscapes, waterfowl populations, and user/supporter groups involves numerous decision problems at multiple temporal, geographic, and jurisdictional scales. Decisions cannot be guided by one overarching model; rather, an inter-related set of decision-support models will be needed to enable managers to allocate resources efficiently to achieve their objectives.
- *Targeted monitoring programs that track progress toward objectives and facilitate learning and adaptation.* Monitoring efforts should focus on the key parameters most useful for resolving decision problems, and on metrics that are most useful for detecting changes in ecological systems and societal trends that bear on waterfowl management. Effective monitoring will be vital to enable comparison of the model predictions with observed outcomes. This will enable learning and adaptation, and tracking of progress towards objectives at various scales. Some monitoring efforts may inform multiple decisions and, thus, won't necessarily result in greater management costs.
- *Institutional processes and structures that facilitate integration and adaptation.* Ultimately, the development of a more fully-integrated management system will depend on institutional processes and structures that facilitate integration across management streams and objectives. This will require an organizational culture and processes that support creativity, flexibility, justified risk-taking, and a focus on learning. In general, the form of institutions and coordinating processes should evolve to allow the functions of the developing system to work smoothly and efficiently. Sometimes, however, it may be necessary for institutional change to precede development of a new framework, in order to create the necessary environment for change.

A coherent framework should help guide the allocation of human and financial resources in waterfowl management. Such decisions typically are made at multiple scales – local, regional, state and provincial, national and international – and this Plan aims to develop the means to inform those decisions at all levels. Developing this framework will position waterfowl management for the future and ensure that the goals of the NAWMP are realized.

Objectives for Populations, Habitat and People

Estuary – Andre Breault, CWS Vancouver

An integrated system for waterfowl management should help ensure that individual objectives are not developed in isolation from each other, but are set in the context of helping to achieve all objectives. Nonetheless, unique attributes with respect to individual population, habitat, and people objectives should also be considered. These are offered here as a complement to the vision for integrated waterfowl management.

Many waterfowl species undergo substantial annual fluctuations in population size consistent with their life history strategies and reflective of natural variability in habitat conditions. For example, over the 56 years that mid-continent, breeding waterfowl surveys have been conducted, the aggregate index for the ten most common species surveyed has experienced four major "spikes" and three notable "troughs" in abundance (Fig. 1). The difference between the spikes and troughs in the aggregate index approaches 75 percent. This pattern of population size variation was less obvious when the 1986 NAWMP was developed, but it bears consideration now as new population objectives are formulated.

Given the natural variation in waterfowl populations, numeric population objectives might be better framed as a range within which a species' population is considered "at objective level". NAWMP objectives could seek to maintain waterfowl populations within this range. Management actions would be triggered when a population trend approaches the boundaries or exceeds an objective range.

Habitat conditions are, in many cases, more dynamic than waterfowl populations. Even the substantial work of NAWMP partners can be overwhelmed by the variation inherent in many natural systems. Moreover, degradation of important habitats can occur at a rate faster than habitat is being restored and secured by the NAWMP partners. These conditions require reliable tracking systems that capture habitat accomplishments and complementary monitoring systems that gauge the net change in important landscape features. Such tracking and monitoring systems are essential to understanding the status and trends in waterfowl carrying capacity and in assessing progress toward NAWMP goals. Developing sample-based systems to track such changes was a strong recommendation from the 2007 NAWMP Assessment, and is one that should be addressed by the management community.

Planting tree cuttings in the Central Valley JV – U.S Fish & Wildlife Service

Given the global trends that will influence future land use, waterfowl habitat objectives should be developed with careful consideration for the cost of maintaining habitat features and the long-term security of the habitat. Habitat objectives that emphasize permanent protection of naturally-functioning systems will likely be more sustainable than objectives achieved through intensive use of human and natural resources. Objectives should be less reliant on habitat that may be lost when economic drivers change (e.g., agricultural land use) and more dependent on natural habitat secured through cost-effective means like conservation easements or public policy.

Human objectives will span a range from a relatively narrow segment of society (e.g., waterfowl hunters) to the public at large. Within the populace are individuals with multiple motivations for their behavior. These motivations will not all be complementary, and difficult trade-offs will be necessary. Satisfying one user group might occasionally disadvantage another. Moreover, human objectives are not all about "users;" they should also encompass a broader population of "supporters" of both favorable environmental policies and funding.

Recommendations

These recommendations include both tactical and strategic approaches that should be the focus of the first phase of NAWMP implementation from 2012-2016. They are derived from several sources already referenced, including the NAWMP consultation workshops, comments received on earlier drafts of this Plan, the NAWMP Assessment, the Joint Task Group Report, and the Future of Waterfowl Management Workshop. The 2012 NAWMP Action Plan (in preparation) provides more specific direction and identifies important steps under each of the headings that follow.

Develop, Revise or Reaffirm NAWMP Objectives

Objectives for Waterfowl Populations

For the last 26 years, the NAWMP population objectives have not only inspired action but also played a vital role in conservation planning. As an important early step in the development of an integrated management system, new NAWMP population objectives should be developed in a manner reflecting the natural variation in populations and habitat features (especially wetlands). These should also be coherent with objectives for people. For example, waterfowl population objectives could be established as a range within which populations are deemed to be at objective levels. Criteria could be established to evaluate population trends on a periodic basis, and management actions in response to significant population increases or decreases could be devised and agreed upon as part of the planning process, well ahead of when management actions may be warranted.

While new population objectives are being formulated, the management community has expressed a strong desire to retain the current objectives. Those objectives have been reproduced in Appendix A. A few of those objectives have been changed as a result of new knowledge gained since the 2004 NAWMP Update. For example, work supported by the Species Joint Ventures and flyways led to new objectives for black ducks, some species of sea ducks, and populations of Canada geese. Updated population status information is also presented.

Objectives for Habitat

Prior to establishing new (or re-affirming existing) habitat objectives, the waterfowl habitat management community – in particular the Joint Ventures – should inventory their habitat base and assess the degree to which critical resources may be at risk from future socioeconomic drivers. This includes dependence on agriculture for providing food and habitat, requirements for water that may be subject to change under unsustainable allocation systems, and issues of directional change in

Background Image: Snow Geese – Molly Giles, Pennsylvania Game Commission

ecological systems (e.g., sea level rise, a warming climate) that could threaten critical habitats. Planning should be undertaken to mitigate potential future losses and help design habitat programs that ensure perpetual security of habitat values.

As has been normal practice, population and associated habitat objectives for Joint Ventures should be stepped down from continental objectives in recognition of how each Joint Venture contributes to the overall goal. Joint Ventures should ensure reliable tracking systems exist to document habitat accomplishments, and devise monitoring systems that track net change in critical landscape features. Metrics of net change should be collected at intervals within which significant change is anticipated to occur.

The global trends impacting society and the NAWMP often manifest themselves in the form of large-scale habitat (landscape) stressors. Examples include land-use changes resulting from agricultural practices, energy extraction, and climate change. As noted earlier, some of these stressors induce directional change in ecosystems that may confound or even invalidate the models used to manage waterfowl populations and harvest. Understanding these stressors and associated non-stationarity in the system is critical to making informed management decisions.

Insofar as LCCs are concerned with understanding these same stressors and system dynamics, the waterfowl management community should continue to collaborate with LCCs on research topics of mutual interest. Such collaboration carries mutual benefits: the scientific expertise and resources within LCCs are value-added to Joint Ventures, and the management and technical experience within the waterfowl management community can aid LCCs in understanding how stressors will impact waterfowl species and conservation investments.

Steep mountains – Andre Breault, CWS Vancouver

Objectives for People

The importance of stakeholder values and support to waterfowl management and conservation has long been recognized and was directly acknowledged in the original NAWMP. The 1986 Plan assumed that waterfowl population size was a major factor driving hunter participation and viewing and, furthermore, that hunter numbers would rebound with abundant waterfowl. Today, we recognize that a focus only on waterfowl populations will not be sufficient to sustain hunting, and that the relationship between waterfowl populations and viewer participation is uncertain. Plan partners will need to translate the third NAWMP goal pertaining to public use into measurable objectives, not only for sustaining waterfowl hunting traditions but for building broader public support for waterfowl conservation efforts across the continent.

Integrate Waterfowl Management

The waterfowl management community should proceed with the development of an integrated system of waterfowl management. This will be a challenging task from both a technical and process perspective. Two process challenges, both central to the quest for integration, must be overcome.

First, assuming that a technical decision framework can be developed that informs trade-offs among multiple objectives, it needs to be determined how multiple objectives for waterfowl management will be established (i.e., by what ***social process*** should this be accomplished). Here, the term "social process" is used to broaden the discussion beyond purely technical matters. One option is to rely on existing institutions and processes to achieve coherent adaptive actions. An alternative is to establish an entity with a new, overarching facilitation or coordination function.

Second, when a set of coherent objectives is established, again from a ***process*** point of view, a procedure needs to be established to monitor progress toward achieving the expanded NAWMP objectives and adapt actions in light of those results. It should be determined who will "oversee" the expanded set of objectives. If it is multiple institutions, they should develop the means to coordinate actions in pursuit of those objectives and monitor performance metrics.

One significant challenge is that no existing entity possesses clear responsibility for the interrelated decision problems that should be defined and addressed in an integrated system. There is no single institution to determine who will participate in the development of objectives, what stakeholders will be consulted, what technical resources will be committed to the task, and – ultimately – who will make the relevant decisions, monitor progress, and adapt the system in the future as required. The waterfowl management community should resolve these issues with due respect for the long-standing institutions and processes already in existence.

One significant challenge is that no existing entity possesses clear responsibility for the interrelated decision problems that should be defined and addressed in an integrated system.

As an initial step to maintain momentum for achieving greater coherence and integration of waterfowl management, the NAWMP Plan Committee (PC) should assume an interim facilitation role. The PC's federal Co-Chairs will appoint an Interim Integration Committee (IIC) to promote the coherent management of North American waterfowl populations and harvest, habitat conservation, and the growth of associated users and conservation supporters. The IIC will report to the Plan Committee and focus on technical assessments and solutions; process and institutional matters; and leadership and marketing related to integration. Technical work will be pursued jointly with established harvest, habitat and human-dimension working groups. Terms of reference for the IIC will be included in the NAWMP 2012 Action Plan.

The management community should create a more permanent focal point for reaching consensus around integrated objectives, and provide a forum for review of monitoring and assessment data informing progress toward the Plan's multiple goals and objectives. Warranted changes in program direction, emphasis, or monitoring/assessment should be identified as they emerge, and appropriate agencies urged to act in a unified manner.

When explicit objectives have been set and a linked decision framework and monitoring systems developed, the three federal governments that have over-arching management authority for migratory birds and treaty responsibilities should consider comprehensive, long-term changes in processes and/or institutions to ensure future success of integrated waterfowl management. This should include a review of progress in understanding functional linkages and the dynamics of the interacting human, avian and habitat systems that are being managed, and the waterfowl management community's effectiveness, efficiency and responsiveness to change. Further ideas on this process will be offered in the companion Action Plan (in preparation).

Increase Adaptive Capacity

The waterfowl management community should embrace adaptive management as the standard approach for making management decisions in the face of uncertainty, while continuing to improve management performance. Consistent with the "vision for adaptive management" presented earlier in this Plan, incentives to encourage adaptive management should be implemented and impediments removed. This reiterates earlier recommendations from NAWMP updates in 1998, 2004 and the 2007 NAWMP Assessment. Advice from recent reviews of adaptive management performance is offered elsewhere in this Plan. Additionally, the waterfowl management community must invest resources in adaptive management monitoring and assessment as integral elements of management programs.

As part of implementing adaptive management, there also should be an established process for institutional review and change. Ideally, institutions evolve to enable management systems to function more efficiently and lead the way toward a better approach to doing business. This Plan is intended to prompt the management community to actively consider appropriate institutional changes that would facilitate adaptive management, and to enable the development of an integrated system of management and increase relevancy. In particular, waterfowl management structures should match the breadth of decision problems that will arise under integrated management, and bureaucracies should have the capacity to coordinate the integration of elements of all three goals into their management actions.

Build Support for Waterfowl Conservation

Waterfowl are large, colorful species that can be observed in rural, suburban, and even urban environments. This is undoubtedly why they are among the most commonly viewed groups of birds. Their attractiveness and widespread distribution provide an opportunity to re-connect people with nature, and the waterfowl conservation community should consider opportunities and venues for facilitating this interaction. This could take the form of modest wetland developments in strategic locations, interpretive trails within existing wetland complexes, promotion of existing and future urban national wildlife refuges, or organized waterfowl birding trips. The objective of these investments would be to build a general appreciation for waterfowl and educate the public on waterfowl conservation issues and habitat .

In a parallel effort, the science community should begin to compile a comprehensive review of the environmental and societal benefits of protecting, managing, and restoring waterfowl habitat. These benefits may be specific to Joint Venture areas or more universally relevant at a continental scale. Where critical information is lacking, strategic investments in research and monitoring should be made. Joint Ventures should assume the lead in communicating the regional benefits of waterfowl conservation to the general public and to policymakers, whereas the NAWMP Plan Committee should play a role in disseminating information through updates of the recent "NAWMP value proposition" document and other avenues. These communication and marketing efforts should be purposeful, sustained and institutionalized within the waterfowl management community. Further, just as the environmental and societal benefits are informed by science, so too should human dimensions research inform communication and marketing strategies.

Ruddy Duck Pair

Establish a Human Dimensions Working Group

The HDWG should be supported by and report to an established institution, in anticipation of it becoming part of the foundation of contemporary waterfowl management. The charge of the HDWG should be clear and unambiguous. This group should assume the lead in establishing objectives for people, strategies for recruiting and retaining waterfowl hunters, engaging conservationists and concerned citizens, and developing an understanding of how waterfowl conservation intersects with issues of concern to the general populace.

Participants for the HDWG should include technical experts from academia or other institutions, as well as public agencies. In addition, marketing expertise from the private sector should be engaged, as appropriate, to advise on how to best communicate messages to selected audiences. It is imperative that conservation and public marketing actions be monitored and evaluated so management programs directed at people can be refined and adapted. Draft Terms of Reference for an HDWG exist, currently under the umbrella of the National Flyway Council, and focused largely on hunter recruitment and retention issues. This nascent group should embrace a broader mandate and develop an initial multi-year work plan in light of this NAWMP revision and in communication with the Plan Committee.

Focus Resources on Important Landscapes

The 1986 NAWMP and subsequent updates emphasized the need to focus conservation resources in areas most important to waterfowl demography. Certain regions of North America have always stood out as being critical. For instance, the grasslands and wetlands of the Prairie Pothole Region are clearly a top priority. The NAWMP Assessment and other plans call for more resources to be directed to this region of the continent. The Northern Boreal Forest is another key breeding area where NAWMP partners may be able to influence land use decisions over a vast landscape. Work has already started in the western portion of the boreal forest. The heavily used habitats of the Gulf Coast, the Mississippi Alluvial Valley, and the Central Valley of California are migration and wintering areas that deserve continuing attention if NAWMP goals are to be met.

Other important areas have lower waterfowl densities but nonetheless deserve management attention. These represent important regions for several NAWMP priority species, some of which are never found in high densities. The core breeding range for black ducks in Canada's eastern boreal forest is one significant example. Moreover, for many sea ducks – in particular scoters, long-tailed ducks and king eiders – the core breeding range is found in the vast reaches of taiga and tundra where birds nest at very low densities.

An updated map depicting areas of greatest continental importance to North American Waterfowl (Appendix B) is provided as further guidance to the management community. The NAWMP Science Support Team (NSST), who coordinated map development, cautions Plan partners regarding use of this image in ranking the relative importance of conservation projects. However, the NSST has also committed to develop map tools suitable to guide conservation delivery. Using the experience gained in the current mapping exercise, this work should identify significant areas at multiple spatial scales, based on several criteria. Although estimates of regional population abundance would be one key measure, consideration may also be given to the distribution and abundance of waterfowl hunters, wildlife viewers, and other potential outdoor recreationists; relative abundance of public lands; distribution of waterfowl species of greatest concern; and relative risk of habitat loss or conversion. Ultimately, a more sophisticated mapping approach is needed to inform conservation priorities for achieving the three fundamental goals of this Plan.

Wetland, Quebec – Christine Lepage, CWS Quebec Region

Adapt Harvest Management Strategies

The 1986 NAWMP advocated for stable harvest regulations with minimum annual adjustments, asserting that such a system would sufficiently safeguard waterfowl populations, offer adequate recreational opportunities, and allow more time to "be directed toward such important waterfowl activities as habitat protection, management, and improvement." This recommendation largely characterizes the approach to harvest management in Canada, where hunter numbers and harvest rates are relatively low. In the United States, greater hunter numbers, greater concern over potential effects of harvest on waterfowl populations, and dissatisfaction with a contentious regulatory process led to the development of a regulatory system known as Adaptive Harvest Management (AHM).

By all measures AHM – which was first implemented in 1995 – has been a tremendous success. Based on the principles of adaptive resource management, AHM has provided insights into duck population dynamics and management controllability. It has also reduced the contentiousness in the regulations process, safeguarded duck populations and offered substantial hunting opportunity. Indeed, the success of the AHM approach has led to an ongoing proliferation of model-based harvest strategies for other species of ducks and, in some cases, stocks of ducks of the same species.

Unfortunately, the development of each new harvest strategy requires a substantial investment of time and technical expertise, as well as added monitoring and assessment capacity. During the consultation phase of this NAWMP revision, many in the waterfowl management community questioned whether the incremental gain in hunting opportunity resulting from new harvest strategies was worth the investment of time and resources. There was further concern that the associated regulatory complexity may actually discourage hunter recruitment and retention. Hence, there is renewed interest in the waterfowl management community in considering regulations that are "simpler" in the same sense, and for the same reasons, as articulated in the 1986 NAWMP. In advocating for a thoughtful re-examination of U.S. harvest strategies, the management community has also re-affirmed a strong commitment to retaining the many desirable attributes of AHM: an objective-driven, informed and adaptive decision process that safeguards waterfowl populations and minimizes contentiousness in the regulations setting process.

The development of an integrated system of waterfowl management will necessitate a reconsideration of harvest management strategies in the context of achieving the three NAWMP goals. As waterfowl population, habitat, and user objectives are clarified, revised or developed, harvest strategies may also need to change in order to pursue multiple explicit objectives. One critical need, described under recommendation one, is to revise and/or clarify the interpretation of waterfowl population objectives as well as the role of harvest management in attaining population objectives. Substantial effort will also be required to develop objectives for users (i.e., hunters and non-consumptive), which is largely a value-based exercise.

Decisions about modifications of the regulatory process or packages should, in the long term, negotiate tradeoffs among complexity, harvest opportunity, hunter satisfaction, and management risk. Management risk has traditionally focused on the implications of regulatory change to waterfowl populations. More recently, managers have become concerned that new regulations (or continuation of the status quo) may increase the risk of further declines in hunter numbers. However, limited data exist to evaluate hypotheses regarding effects of regulations on user satisfaction or participation. Research is needed to assess risk and more explicitly quantify these and other tradeoffs.

Moving Forward

Partners in the North American Waterfowl Management Plan have achieved much in the quarter-century since 1986. The Joint Ventures have made great strides in identifying the habitat needs of the continent's waterfowl populations and securing a significant portion of that capacity for the future. The NSST is active in supporting the Plan and is making important contributions to the biological foundations of the NAWMP. This is a proven path for conservation success. Conservation at landscape scales that is supported by broad partnerships and guided by sound science has achieved more than the Plan's founders could have imagined. The Flyways and Harvest Management Working Group have made great strides to better understand the role harvest plays in waterfowl population dynamics and initiating dialogue to more explicitly consider the relationship between harvest management and participation in hunting.

There is much to celebrate about these accomplishments, yet many challenges remain. Today's world is fundamentally different than when the Plan was conceived in the early 1980s. Some of the historic problems have been addressed, but numerous new ecological, social, and economic trends and challenges have emerged. The waterfowl management community has also concluded that it is time to manage populations, habitats, users and supporters in a more holistic and integrated fashion. This raises important new considerations for how decisions are made and institutions function. Hence, this revision of the Plan marks a more fundamental change in direction than any of the previous three NAWMP Updates.

With this NAWMP, the Plan community reiterates its commitment to waterfowl conservation in all its dimensions and sets a course to meet future challenges by becoming more adaptable, more efficient, and more relevant. The adaptive processes advocated here offer a path to success, even in the face of complex ecological and social uncertainties. The NAWMP recognizes the central role of science, in many dimensions, in guiding Plan actions. The community has embraced a set of interdependent goals for populations, habitat and people that describes the universe of waterfowl management. Working together, Plan partners focused on habitat, population, and people will have the opportunity to identify address multiple objectives in the most efficient and effective manner possible. It is now time to expand the focus of waterfowl management to address the needs of hunters and viewers, while demonstrating the values of waterfowl and waterfowl habitat to society. The years ahead will be filled with challenges, opportunities and difficult decisions. Nevertheless, the work of thousands of waterfowl conservationists over the last century has positioned the waterfowl community to evolve and succeed yet again.

North America was endowed with the greatest diversity and abundance of waterfowl on earth. The NAWMP is intended to steward and secure that legacy for current and future generations. ***"People conserving waterfowl and wetlands"*** is a powerful but simple vision in a complex world. The connections are undeniable; the importance of success, essential. It is up to the waterfowl management community to make it happen.

Background Image: Homathko East Central Coast – Andre Breault, CWS Vancouver

Appendix A

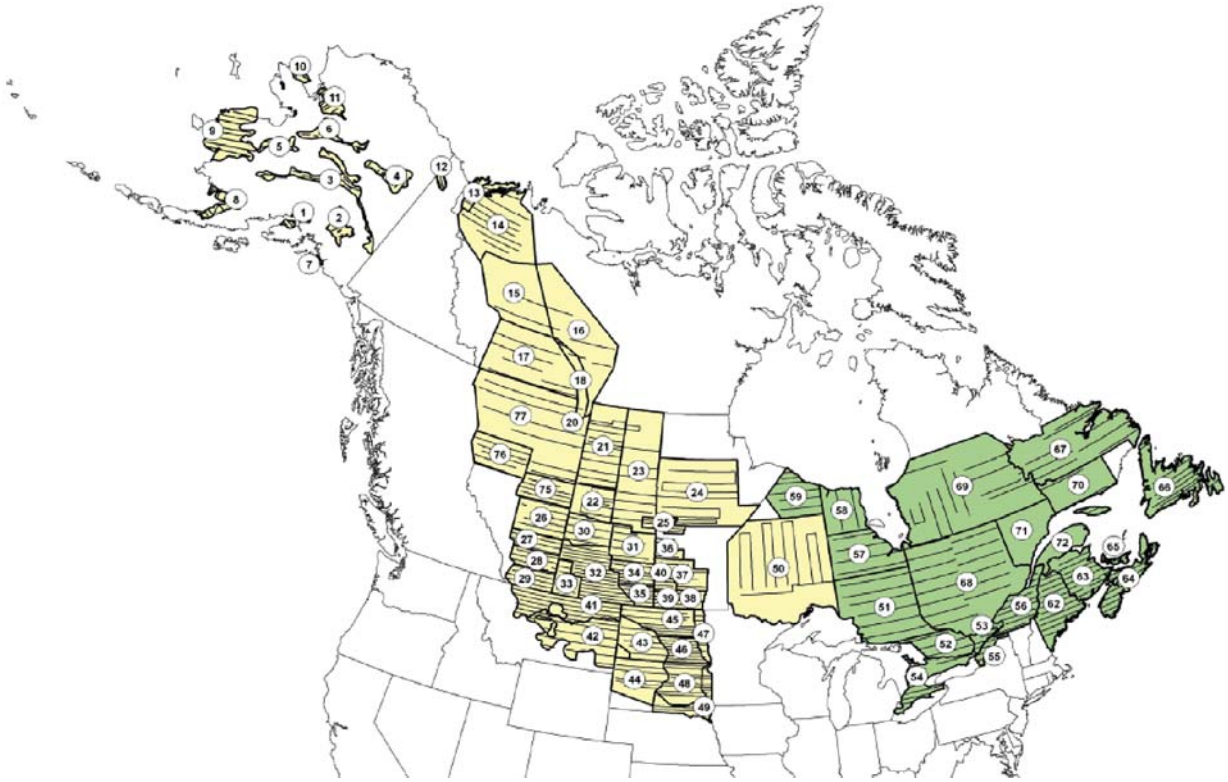
North American Waterfowl Population Status and Interim Abundance Objectives

NAWMP population objectives have been a foundational component of this continental conservation plan and a focus to help guide the activities of Plan partners, particularly within the Joint Ventures. Developing a more integrated waterfowl management system will require future population objectives to be framed with the perspective of achieving multiple goals. For example, the waterfowl management community should consider population sizes necessary to achieve desired levels of recreation but within the context of the habitat needed and potentially available to sustain the birds. Informing new population objectives in this way will be a necessary, early step in the development of an integrated management system. However, until such analyses occur, the population objectives established in the original 1986 NAWMP and subsequent updates should continue to guide waterfowl management. Those interim objectives are provided here, along with current population estimates.

Population objectives serve three primary purposes in conservation planning: 1) they provide a biological target and plan foundation, 2) they function as a performance measure for assessing conservation accomplishments, and 3) they operate as a communication and marketing tool to demonstrate the need for conservation. The currency of population objectives has typically been abundance, but abundance can be coupled with other demographic parameters such as density or a vital rate. In the past, limited biological information restricted expression of the NAWMP objectives to population size. Ongoing and future work by the waterfowl conservation community may result in different expressions of waterfowl population objectives, particularly as waterfowl scientists move toward use of annual cycle models in objective setting.

Population abundance objectives for 10 common duck species breeding in the Western ("Traditional") Survey Area (TSA; Appendix A, Figure 1) were included in the 1986 NAWMP. These objectives are based on 1970s abundances, and the objective of a "traditional" distribution of waterfowl during various life-cycle periods. The Eastern Survey Area (ESA; Figure 1) provides primary breeding habitat to several sea duck species, plus it encompasses the breeding range of American black ducks and a number of goose populations. This area and other annually monitored smaller regions represent the "Other Surveyed Areas" in Table 1. Population objectives for some additional duck species occurring outside the TSA were included in this category. Estimates of population abundance within the TSA, Other Surveyed Areas, and some unsurveyed regions were pooled to generate continental population estimates for all duck species (Table 1).

Population status for North American geese (Table 2) and swans (Table 3) are also provided. Abundance objectives are based largely on species-specific Flyway population plans. Most population objectives have not changed from the 2004 Plan, but they too will be assessed as multiple NAWMP goals are integrated.



Appendix A, Figure 1. Strata and transects of the Waterfowl Breeding Population and Habitat Survey. Yellow shading depicts the Western ("Traditional") Survey Area; green shading denotes the Eastern Survey Area. Surveys conducted by Canadian federal, provincial, and territorial governments are not shown.

Table 1. Breeding duck population estimates (2002-2011 mean) and objectives for North America (1,000s of ducks).

Species/Subspecies/Subpopulation[b]	Population size[a] (objectives where established)		
	Continental	Traditional Survey Area[c,d]	Other Survey Areas
Mallard	11,900	7,910 (8,200)	2,350
Mexican duck[e]	56	Not Applicable	Not Applicable
Northern pintail	3,780	2,960 (5,600)	220
American black duck	1,200	36	884 (830[f])
Mottled duck	260	Not Applicable	230
Florida subspecies[e]	60	Not Applicable	59 (42)
Western Gulf Coast subspecies	200	Not Applicable	172 (106[g])
Gadwall	3,650	2,770 (1,500)	220
American wigeon	2,780	2,350 (3,000)	67
Green-winged teal	4,380	2,790 (1,900)	550
Blue-winged and cinnamon teal	7,690	6,030 (4,700)	320
Blue-winged teal	7,390	Not Differentiated	230
Cinnamon teal	300	Not Differentiated	90
Northern shoveler	4,260	3,720 (2,000)	74
Hawaiian duck[e,h]	2.5	Not Applicable	2.5 (5)
Laysan duck[e,h]	0.5	Not Applicable	0.5 (10.5)
White-cheeked pintail[e]	1.4	Not Applicable	1.4
Wood duck	4,600	Not Applicable	670
Eastern population	4,400	Not Applicable	660
Western population	200	Not Applicable	7
Muscovy duck[e]	30	Not Applicable	Not Applicable
Whistling ducks	220	Not Applicable	Not Applicable
Fulvous whistling duck	Unknown	Not Applicable	Not Applicable
Black-bellied whistling duck	Unknown	Not Applicable	Not Applicable
West Indian whistling duck[e]	0.1	Not Applicable	0.1
Redhead	1,310	880 (640)	25
Canvasback	690	620 (540)	6
Scaup	4,900	3,760 (6,300)	330
Lesser scaup	4,100	3,160[i]	13
Greater scaup	800	610[i]	62
Ring-necked duck	2,060	1,130	720
Ruddy duck	1,242	630	33
West Indian subspecies[e]	1.5	Not Applicable	1.5
Continental subspecies	1,240	630	33
Masked duck[e]	6	Not Applicable	Not Applicable
Harlequin duck	254	Not Applicable	25
Eastern population	4	Not Applicable	2 (3[j])
Western population	250	Not Applicable	25
Long-tailed duck	1,000	170	100
Eiders	1,700	18	160
King eider	600	Not Differentiated	150
Eastern population	200	Not Differentiated	Not Applicable
Western population	400	Not Differentiated	150

Species/Subspecies/Subpopulation[b]	Population size[a] (objectives where established)		
	Continental	Traditional Survey Area[c,d]	Other Survey Areas
Common eider	1,100	Not Differentiated	9
American subspecies	300	Not Differentiated	100 (165[k])
Northern subspecies[e]	550	Not Differentiated	180 (400[j])
Hudson Bay subspecies[e]	260	Not Differentiated	260 (275[j])
Pacific subspecies	150	Not Differentiated	9
Steller's eider[e]	1	Not Differentiated	1
Spectacled eider[e]	17	Not Differentiated	6
Scoters	1,600	1,060	140
Black scoter	500	Not Differentiated	11
Pacific population	200	Not Differentiated	160 (160)
Atlantic population	300	Not Differentiated	110[l]
Surf scoter	700	Not Differentiated	120
White-winged scoter	400	Not Differentiated	13
Goldeneyes	1,480	710	740
Common goldeneye	1,200	Not Differentiated	290
Barrow's goldeneye	260	Not Differentiated	32
Eastern population	7.5	Not Differentiated	7.4 (7.5[j])
Western population	250	Not Differentiated	25
Bufflehead	1,670	1,140	120
Mergansers	2,700	790	730
Hooded merganser	1,100	Not Differentiated	220
Red-breasted merganser	400	Not Differentiated	19
Common merganser	1,200	Not Differentiated	280

a Traditional Survey Area estimates were derived from the Waterfowl Breeding Population and Habitat Survey (WBPHS), strata 1-18, 20-50, 75-77. Other Survey Areas estimates were derived from some combination of WBPHS strata (51-57, 62-69), the Breeding Waterfowl Plot Survey also conducted in eastern Canada, and concurrent state, provincial, or regional breeding waterfowl surveys in British Columbia, California, Connecticut, Delaware, Florida, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Utah, Vermont, Virginia, Washington, and Wisconsin. In cases where a survey was not completed every year, or when data were unavailable, mean estimates were computed using available estimates for that time period. Continental estimates include the surveyed area estimates as well as rough estimates of populations outside of surveyed areas based on harvest derivation studies, expert opinion, winter survey data, or special purpose research surveys. Continental estimates for species such as the muscovy duck, whistling ducks, masked duck, and many sea ducks are based on few data and are particularly speculative.

b Sub-populations are identified distinctly when there is significant evidence for allopatry. Races are also distinguished according to current taxonomic classification and refer to genetically distinct sub-species. The taxonomic delineation presented in this table is intended to aid in development of regional habitat conservation strategies and is not intended to supersede other international agreements regarding the appropriate organizational level for species management.

c Duck objectives in the Traditional Survey Area are based on the WBPHS strata 1-18, 20-50, 75-77 and represent average population estimates from 1970-1979.

d "Not differentiated" indicates the survey protocol does not enable discrimination to a particular taxonomic level. "Not applicable" indicates the species, race, or sub-population is not recorded in the WBPHS Traditional Survey Area or in surveys represented by the Other Survey Areas category.

e Not shared among two or more signatory nations. Management is the responsibility of that nation whose boundary coincides with the range of the species, sub-population, or race.

f The American black duck population objective was developed from predictions of a model relating Mid-winter Waterfowl Survey counts to population estimates derived from the WBPHS Eastern Survey Area (USFWS strata 51, 52, 63, 64, 66, 67, 68, 70-72). Note: Objective is not directly comparable to the black duck population estimate for Other Survey Areas since the Other Survey Areas estimate encompasses a wider region with survey strata not included in the black duck objective.

g Objective currently based on the mid-winter index for Texas, Louisiana, Mississippi, and Alabama, with an index of at least 70,000 in LA and 35,000 in TX. This index is not directly comparable with the Other Survey Areas estimate presented which is based on a range-wide breeding population survey.

h Hawaiian and Laysan ducks are monitored by the Annual Hawaiian Waterbird Survey.

i Estimate of lesser scaup in the Traditional Survey Area was computed from nontundra WBPHS strata 1-7, 12, 14-18, 20-50, 75-77. Estimate of greater scaup in the Traditional Survey Area was computed from tundra strata 8-11 and 13. These should be considered only crude estimates since some mixing of lesser and greater scaup occurs in tundra and northern boreal strata.

j Population objective based on winter index. Note: Objective for the northern subspecies of common eider is 400,000 (Canada only, where survey established) and for the Hudson Bay subspecies of common eider is 275,000-300,000.

k Population objective is breeding pairs.

l Population estimate based on molting male index.

Table 2. Objectives and estimates for North American goose populations.

Species and populations	Objective[a]	Mean population size[b] (2002-2011)
Canada and cackling goose		
Atlantic	250,000[c]	171,000
Atlantic Flyway resident	700,000	1,070,100
North Atlantic	Not yet established	56,000
Southern James Bay	50,000[d]	78,100
Mississippi Valley	255,000[d]	320,900
Mississippi Flyway giant	1,182,000[d]	1,481,200
Eastern Prairie	75,000[d]	150,600
Western Prairie and Great Plains	285,000[e]	545,800
Tall Grass Prairie	250,000[e]	471,300
Short Grass Prairie	150,000[e]	215,700
Hi-Line	80,000[e]	266,600
Rocky Mountain	117,100	154,900
Pacific	Not yet established	No estimate
Lesser	Not yet established	No estimate
Dusky	Avoid ESA[f] listing	10,900
Cackling	250,000[g]	224,800
Aleutian	40,000[e]	102,500
Vancouver	Not yet established	No estimate
Taverner's	Not yet established	No estimate
Snow goose[h]		
Greater	500,000	923,800
Mid-continent lesser	1,500,000[e]	2,628,400
Western Central Flyway lesser	110,000[e]	170,300
Wrangel Island lesser	120,000	140,000[i]
Western Arctic lesser	200,000	608,000
Ross's goose	100,000	>1,000,000[i]
White-fronted goose		
Mid-continent	600,000[g]	660,500
Tule	10,000[e]	7,500
Pacific	300,000[g]	513,200
Brant		
Atlantic	150,000[e]	149,800
Pacific	150,000[e]	127,700
Western High Arctic	12,000[e]	8,700
Eastern High Arctic[j]	Not yet established	29,000[i]
Emperor goose[j]	150,000	69,100
Hawaiian goose[j]	2,800	1,900

a Population objective is total spring population unless otherwise indicated.

b Incomplete survey years were excluded from the computation of population mean. Where no estimates are available for 2002-2011, the most recent estimate is presented.

c Objective is breeding pair index, partitioned to 225,000 pairs in the Ungava Region and 25,000 pairs in boreal Québec.

d Population objective is total winter population. Note: Objective for Mid-continent lesser snow goose is a range from 1,000,000 - 1,500,000.

e Endangered Species Act (ESA) (United States).

f Population objective is total autumn population.

g Lesser snow goose population estimates include some Ross' geese

h Population estimate provided by the Arctic Goose Joint Venture

i Not shared among two or more signatory nations. Management is the responsibility of the nation which encompasses the range of the population, sub-population, or race.

Table 3. Objectives and estimates for North American swan populations.

Species and populations	Objective	Mean population size (2002-2011)
Tundra swan[a]		
Eastern population	80,000	99,680
Western population	60,000	87,370
Trumpeter swan[b]		
Pacific Coast population	25,000	26,790
Rocky Mountain population[c]	None	9,626
Interior population	2,000	9,809

a Objective is total winter population. Mean population size is based on annual winter surveys.

b Objective is total autumn population. Population census and surveys conducted spring through fall across species range, at 5-year intervals. Mean population size is based on 2010 census and survey results.

c U.S. portion of breeding population was 676; objective for U.S. segment is 718. There is no population objective established for Canadian portion of breeding population.

Appendix B

Areas of Greatest Continental Significance to North American Ducks, Geese, and Swans for the 2012 NAWMP Revision

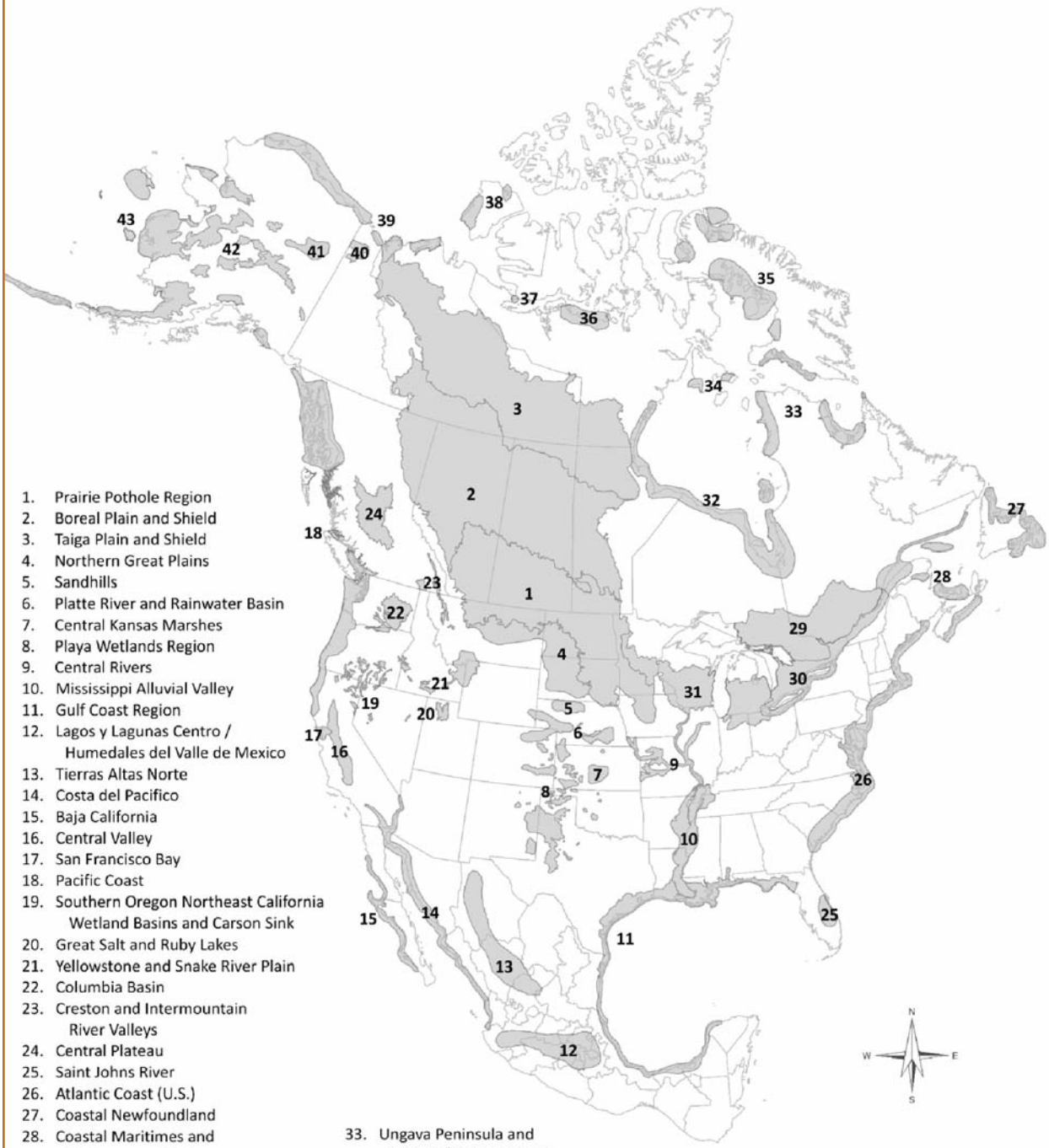
This revised map of areas most significant to North American waterfowl is a refinement of the image depicted in the 2004 NAWMP Update. It was prepared by the NAWMP Science Support Team (NSST) based on information provided by Joint Venture Coordinators, Joint Venture Science Coordinators, and NSST members. Entities proposing new areas or boundary adjustments were asked to provide rationale for why an area should be deemed continentally significant. Such information included the period(s) of the annual cycle during which an area was of particular importance, the percentage of a species' population supported by a given area during that annual cycle period, and/or the percentage of total North American waterfowl occurring in a given area during some period of the annual cycle.

Objective decision criteria for assessing "significance" to continental waterfowl populations were difficult to establish. For example, comparing the relative importance of smaller areas with high waterfowl densities to larger areas with abundant waterfowl at low densities was problematic. These comparisons became increasingly difficult when made among different periods of the annual cycle. Moreover, the quantity and reliability of population survey data varied among regions and proposals. In addition, some areas were identified as critical to a single species of high concern whereas others were deemed important because they were used by numerous species. Certain arid locations provide high value to waterfowl, but those values are inconsistent among years because of a highly variable environment (e.g., playa wetlands). Finally, the NSST recognized that additional areas of North America attract large numbers of waterfowl or species of concern but were not currently considered of great significance at the continental scale. In the future, some of these areas may be included (and others removed) as new information is used for map development.

In total, 40 adjustments were made to the 2004 map. Many were relatively minor boundary adjustments, but some changes were more substantial and included the following:

- Expansion of areas on Baffin Island, Newfoundland and coastal Quebec (key nesting, molting, and wintering areas for sea ducks)
- Removal of sites along coastal Labrador and the Canadian Pacific Coast (new evidence suggests other sites are more important for molting and wintering sea ducks)
- Addition of the "Central Rivers" and "Platte River" regions in the central United States (key migration areas for ducks and geese using the Mississippi and Central flyways)
- Addition of the "Prairie Hardwood Transition" (significant breeding, migration, and increasing wintering importance for ducks and Canada geese)
- Addition of Taiga Plain and Shield and expansion of Boreal Plain and Shield in north-central Canada (important breeding areas for several duck species, including sea ducks)
- Addition of high-density duck, goose and swan breeding areas in interior Alaska.
- Reconfiguration of the "Playa Wetlands Region" to reflect areas of highest wetland density and importance to non-breeding ducks and geese

Appendix B, Figure 1. Areas of greatest continental significance to North American ducks, geese, and swans



Appendix C

The 2010-2011 NAWMP Consultation Process: The "Valuing Objectives" Exercise

The consultation process included two rounds of stakeholder workshops in the United States and Canada and a related single event in Mexico. Participants included waterfowl managers, biologists, and administrators charged with waterfowl population management and habitat conservation. Consultations with federal, state, provincial and non-government organizations were held in late 2010 through February 2011[2].

During the first round of workshops, participants were asked to identify the goals (termed "fundamental objectives" in the workshops) of waterfowl management, and to develop hierarchies that identified step-down objectives necessary to achieve the goals. In most cases, the resulting diagrams depicted an interconnected system wherein goals were identified for both their intrinsic value and their utility for achieving another goal. In discussions, many participants asserted that the goals of waterfowl management are inextricably linked and cannot be pursued in isolation.

To help quantify the intrinsic value of each goal and the extent and nature of the linkages, an exercise was conducted in Round 2 workshops asking participants (N=91) first to allocate 100 points of "value" among four goals:

1. Perpetuate waterfowl hunting.
2. Sustain opportunities for the public to view and enjoy waterfowl and waterfowl landscapes.
3. Maintain healthy waterfowl populations in North America at levels sufficient to fulfill human desires and in harmony with the ecosystems on which waterfowl depend.
4. Conserve landscapes capable of sustaining waterfowl populations at levels sufficient to satisfy human desires in perpetuity.

Having done so, participants were then asked to allocate some portion of each goal's value to pre-designated linkages among goals (keeping the sum constant at 100 points). In effect, stakeholders were asked to specify the extent to which they valued each goal in its own right (intrinsic value), plus the goal's value relative to the degree it helped accomplish another goal (utility value). The results of this exercise are diagrammed below.

The figure depicts a linked system reflecting hierarchy diagrams and concepts gleaned from the consultation workshops; two initial goals, waterfowl hunting and waterfowl viewing/enjoyment, were subsequently combined into a single human use goal (#3 above) after this exercise, and the values for each of these and their linkages have therefore been summed in the figure here. Points in boxes represent the average values assigned to each goal and linkage by workshop participants. Sums of value points for each goal, both fundamental and those allocated to the utility flowing from one to another, are depicted in the summary box (e.g. Conserve Landscapes = 13 + 15 (A) + 11 (C) = 39).

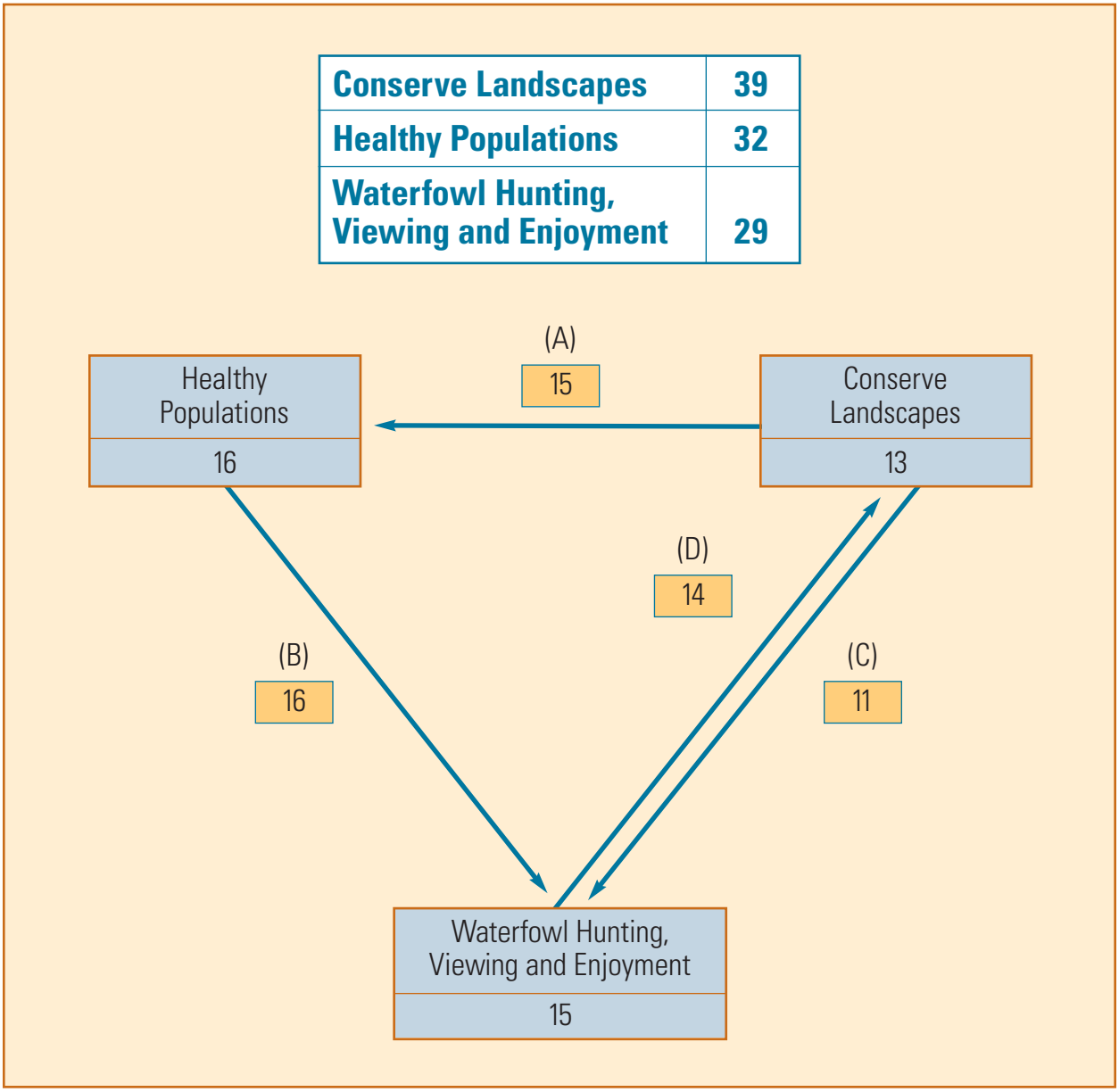
The utilities, reflected by arrows, convey the following relationships:

"A" represents the value that landscape conservation makes to healthy populations.

"B" reflects the value that healthy populations play in perpetuating waterfowl hunting, viewing and enjoyment.

"C" represents the value of conserving landscapes in helping to perpetuate waterfowl hunting, viewing and enjoyment.

"D" represents the role that waterfowl hunting, viewing and enjoyment play in helping conserve landscapes.



The results of this analysis were informative on several levels. Clearly, for many stakeholders, goals were not truly "fundamental" as characterized by independence of one another. Indeed, individual goals and the linkages between goals were weighted similarly when participant values were pooled. Similar intrinsic value was associated with "healthy populations" of waterfowl, with only slightly less value associated with "landscape conservation" and "waterfowl hunting and viewing." Yet the values associated with the linkages among goals were often almost as large as those associated with the fundamental goals themselves. Moreover, there is a marked directionality in these linkages.

For many stakeholders, conserving landscapes not only serves to provide places for people to hunt and enjoy the outdoors, but also is essential to sustain waterfowl populations at desired levels. Similarly, stakeholders view abundant and resilient waterfowl populations as a worthy fundamental goal, but also as a means to allow and sustain human use of the waterfowl resource. Closing the loop, waterfowl hunting and enjoyment is viewed as a desirable fundamental goal, but stakeholders equally recognize that this goal plays a key role in generating support and funding to conserve landscapes. While some stakeholders initially questioned the need for a more integrated framework for North American waterfowl management, this analysis was surprising for many participants in revealing their own beliefs about the strong linkages within the waterfowl management enterprise.

With nearly equal intrinsic values, it is important that the waterfowl management community devote adequate resources to addressing each goal and their sub-components. Moreover, the clear implication of strong linkages ***among*** goals is that the waterfowl management enterprise is absolutely dependent on achieving all three goals. Put another way, a failure to achieve any goal will have serious ramifications for success of the entire waterfowl management enterprise.

Appendix D

Acronyms Used in this Plan

AHM	Adaptive Harvest Management
AP	NAWMP Revision Action Plan
CRP	Conservation Reserve Program
CWS	Canadian Wildlife Service
EC	Environment Canada
ESA	Eastern Survey Area
GIS	Geographic Information Systems
HD	Human Dimensions
HDWG	Human Dimensions Working Group
HMWG	Harvest Management Working Group (formerly AHMWG – Adaptive Harvest Management Working Group)
ISC	Integration Steering Committee
ITT	Integration Technical Team
JTG	Joint Task Group
LCC	Landscape Conservation Cooperative
NAWCA	North American Wetlands Conservation Act
NAWCC	North American Wetlands Conservation Council
NAWMP	North American Waterfowl Management Plan
NGO	Non-government Organization
NSST	NAWMP Science Support Team
PC	NAWMP Plan Committee
RSC	Revision Steering Committee
SEMARNAT	Secretaria de Medio Ambiente Y Recursos Naturales, Mexico

TSA	Traditional Survey Area
USDA	U.S. Department of Agriculture
U.S. SEIS	U.S. Supplemental Environmental Impact Statement
USFWS	United States Fish and Wildlife Service
WMI	Wildlife Management Institute
WRP	Wetlands Reserve Program