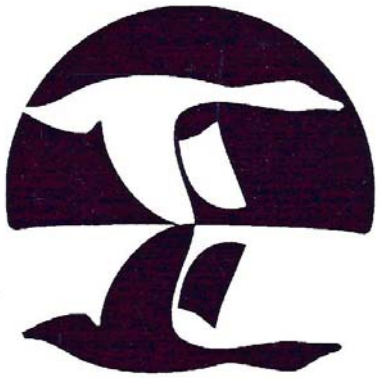
NAWMP Science Support Team – 2006



North American Waterfowl Management Plan

Plan nord-américain de gestion de la sauvagine

Plan de Manejo de Aves Acuáticas de Norteamérica

Setting the Technical Agenda … Strengthening the Biological Foundation

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Setting the Technical Agenda … Strengthening the Biological Foundation

Abstract:

We present the mission, objectives and roles of the NSST, chart a course for developing a NSST vision, goals and objectives based on a comprehensive analysis of the NSST Charter (mission and objectives) and NSST Roles (task assignments and charges) identified in historical documents. We elucidate the primary impending challenges ahead for the NSST. Among the most pressing issues discussed are: 1.) Addressing the coherence of harvest and habitat management under the realization that harvest and habitat management are inextricably linked, and the objectives of both harvest management and the NAWMP should explicitly reflect that linkage; 2.) Coalescing regional habitat objectives and linking them to continental population objectives so that they "add up", while being partitioned amongst the Joint Ventures (JV), to a cogent continental assessment to assess NAWMP progress while accounting for uncontrolled environmental variation; and 3.) Developing creative, efficient approaches to waterfowl and habitat conservation, given limited resources and globalization of stewardship initiatives, that reaffirm our commitment to those resources in the context of "All Bird" management.

Introduction:

Since 1986, the first two elements of the NAWMP vision statement "*To sustain abundant waterfowl populations by conserving landscapes, through partnerships, guided by sound science*" have successfully evolved (i.e., 1. conserve landscapes to sustain abundant waterfowl populations and 2. broaden partnerships). In the document *2004 NAWMP – Strengthening the Biological Foundation* the next 15-year cycle was set in motion to place more emphasis on strengthening the third element - the NAWMP's biological foundation for waterfowl conservation. The Plan Committee delegated leadership for both setting the technical agenda and overseeing its implementation to the NAWMP Science Support Team (NSST).

Mission and Objectives of the NSST:

The overarching purpose of the NSST is to provide support for the Plan Committee. In the document *2004 NAWMP – Strengthening the Biological Foundation* the next 15-year cycle was set in motion to place more emphasis on strengthening the NAWMP biological foundation. According to the NSST Charter, the NSST Mission is to "*To help strengthen the biological foundations of the North American Waterfowl Management Plan and facilitate continuous improvement of Plan conservation programs.*"

The NSST, created in 2000, consists of three national representatives appointed by the Plan Committee Co-Chairs and one technical representative from each of the joint ventures and flyway councils. Ad-hoc members may also be appointed by the Co-Chairs of the Plan Committee.

Specific Objectives outlined in the NSST Charter include**:**

1. **To foster continuous improvement in the effectiveness of NAWMP actions through the establishment of iterative cycles of planning, implementing and evaluating conservation programs at both the continental and JV levels.**

   The key conceptual shift is to view planning, implementation and evaluation as integral components of management. Accomplishing this objective will require the adoption of adaptive management at both the joint venture and continental levels. The NSST will strive to institutionalize such continuous improvement in management performance. At the JV level, this will result in the establishment of management cycles that assess the costs and benefits of various conservation techniques, test key planning assumptions, and monitor progress toward attainment of JV goals and objectives. Necessarily, JV technical teams will lead these efforts supported by advice and coordination from the NSST. Strong, effective JV technical teams and management boards will be essential for success. Establishing a body like the NSST at the JV level is one option for the JVs to consider.

2. **To conduct large-scale studies of landscape variation and waterfowl demography.**

   Relatively little assessment has been accomplished by the NAWMP partners at scales larger than individual Joint Ventures. Redressing this shortcoming will be an important step in strengthening the biological foundations of NAWMP, and this will become a high priority for the NSST. Coordination of JV monitoring and assessment activities, both within and among countries, will be necessary to ensure a coherent, consistent approach to biological planning and evaluation, and essential for analysis of waterfowl/habitat relationships at large spatial scales (e.g., the prairie pothole region, or the mid-continent wintering grounds). Such coordination will have the added benefit of facilitating sharing of ideas, experience, and perhaps resources among the involved JVs.

3. **To report annually to the Plan Committee and the Plan partners generally on the status of the biological foundations of the Plan, evaluation results and implications for future conservation activities.**

   An important annual task of the NSST will be to report to the Plan Committee and other Plan partners on the biological effectiveness of Plan activities. These reports will draw on both reports of progress by the JVs and original and commissioned research by the NSST. Other special analyses may be undertaken from time to time on behalf of the Plan Committee. Conversely, the NSST will serve to elaborate and reinforce any biological guidance from the Plan Committee to the JVs.

Roles of the NSST:

Six specific roles were assigned to the NSST as follows:

1) **Provide technical input and recommendations to the Plan Committee on NAWMP implementation.**

   (i) Summarize NAWMP accomplishments and assess achievements in relation to NAWMP objectives and periodically report to the Plan Committee.
   (ii) Assist in periodic review of NAWMP population objectives considering the habitat implications of waterfowl sub-population management.
   (iii) Advise on NAWMP species and geographic priorities.
   (iv) Provide input on NAWMP updates and technical companion documents.
   (v) Provide technical assistance in developing broad-scale implementation strategies for NAWMP.
   (vi) Help interpret long-term implications of climate, agroeconomic, and other global changes for the future of waterfowl conservation.

2) **Facilitate the identification of methods for biological planning and for evaluating Plan performance at continental and regional scales.**

   (i) Assess the function and appropriate form of continental and regional population objectives.
   (ii) Assist in developing a better understanding of the effects of habitat variation on population demography in order to link regional habitat objectives to continental population objectives, and assess NAWMP progress while accounting for uncontrolled environmental variation.
   (iii) Help identify metrics and standard methodologies for evaluating NAWMP performance.
   (iv) Identify common currencies and definitions for inter-JV planning.
   (v) Seek standardization and integration in survey and data management protocols for habitat and population monitoring and provide input on priority data holdings of the emerging Migratory Bird Population and Habitat Data Center.

3) **Act as a forum for discussions and integration of biological planning and evaluation at multiple scales.**

   (i) Improve the coordination of national/continental and regional assessments.
   (ii) Improve the coordination of biological planning, monitoring, and assessment efforts among the JVs.
   (iii) Identify broad-scale information gaps and technical issues beyond the scope of individual JVs.
   (iv) Promote the conceptual framework of ARM as an effective decision-making tool.

4) **Facilitate technical information exchange and reporting among JVs and the Plan Committee.**

   (i) Improve technical information exchange among JVs.
   (ii) Improve technical information and report exchange among the Plan Committee, the North American Wetlands Conservation Council, and the JVs.
   (iii) Provide effective lines of communication among JVs and the Plan Committee.
   (iv) Improve coordination among JVs and the Adaptive Management and Assessment Team.
   (v) Provide a vehicle for synthesis and dissemination of information.

5) **Help identify and communicate data, monitoring, assessment, and research needs to USGS-BRD, academia, FWS, and other Plan partners.**

   (i) Develop a biological framework to prioritize research, assessment, and monitoring needs that enables objective comparison of evaluation investment decision options.

6) **Facilitate technical integration with the Flyway system and other bird initiatives on issues of common interest.**

   (i) Provide a point of contact to the Flyway System to improve coordination on issues of common concern (e.g., population objectives, monitoring).
   (ii) Provide a point of contact to national technical groups of other bird conservation initiatives.
   (iii) Provide for technical exchange with the states through the International Association of Fish and Wildlife Agencies.
   (iv) Communicate habitat monitoring needs to other conservation initiatives.

Addressing the Roles - Vision, Goals, Objectives and Strategies:

As the principal technical advisory body to the Plan Committee and the primary vehicle for cross-JV collaboration, it is incumbent on the NSST to propose a coordinated multi-scale monitoring strategy that (a) includes a monitoring protocol for each species that provides reliable estimates of absolute abundance during some portion of the annual cycle, (b) identifies a cohesive set of regional population and habitat monitoring programs to better understand regional factors affecting continental waterfowl populations and to promote ongoing refinement of habitat conservation objectives and strategies, and (c) identifies opportunities for collaboration in population and/or habitat monitoring with other bird conservation initiatives.

The issue of improving NSST operations in terms of a fruitful and functional relationship with the Plan Committee would benefit from a structured procedure to convey ideas and recommendations. Development of NSST operating guidelines may provide the vehicle needed to ensure follow-up and connectivity with the Plan Committee. Communications beyond annual reports are paramount to nurture a functional relationship and a structural framework for communication would enhance the integrity of that communication processes.

As a precursor to setting the technical agenda, the NSST would benefit from a shared vision statement that frames the destiny of the body and its stakeholders. A vision statement should focus on what will be different in the future because of our efforts, capture the essence of what we are trying to do, and why. It should be future-oriented, concise, clear, compelling, and give a sense of purpose to our efforts. Below, I present an interim vision statement for the NSST to consider in crafting such a shared vision that exemplifies the NSST's destiny.

NSST VISION STATEMENT

The North American Waterfowl Management Plan's Science Support Team serves as the principal technical advisory body to the Plan Committee and has a prominent role in the achievement of the Plan's vision and goals. This body provides the leadership, direction and capabilities to set and pursue the technical agendas that address priority actions to conserve North American waterfowl. As such this body serves as the primary vehicle for communication and collaboration beyond individual Joint Ventures, among Joint Ventures, and between The Plan Committee and Joint Ventures to include collaboration with all other migratory bird conservation initiatives. The NSST facilitates continuous improvement of Plan conservation programs and ultimately the biological foundations of waterfowl conservation. In pursuit of these goals, we strive to develop creative, efficient approaches to waterfowl and habitat conservation in the context of "All Bird" management, recognizing the importance of creative, efficient approaches given limited resources, and globalization of stewardship initiatives. In light of this, we reaffirm our commitment to the science and conservation of waterfowl and their habitats.

At a minimum, the NSST should develop goals for migratory birds or focal species and their habitats. A shared vision statement and goals will reflect planning purposes and help fulfill the mission of the NSST. Subsequently, we may develop objectives for achieving planning goals. Objectives contain SMART criteria: Specific (who, what, where, when, and why); Measurable; Achievable; Results-oriented; and Time-fixed as recommended in "*Writing Refuge Management Goals and Objectives: A Handbook*" (http://www.fws.gov/refuges/pdfs/WritingRefugeGoals_022504.pdf)

When appropriate, we may use models in objective development. A model may be simple or complex, but generally contains explicit descriptions of the relationship among the activity and the issue. Models provide a clear and explicit expression of the logic and assumptions used to guide strategies, allowing improved communication and the formulation of testable strategies for an adaptive process.

The future will bring difficult choices to the waterfowl management community and many have espoused their warning that it will be challenge enough to merely "hold the line" in terms of providing the habitat base to support NAWMP population goals, let alone management to enhance *K*, or restrictions in harvest to respond to habitat loss.

The NSST must evolve as it addresses task assignments and charges in the following sequence: Develop a shared vision among multiple stakeholders; Foster full participation and engagement of all stakeholders; Refine the Vision; Develop cogent goals via brainstorming; Develop objectives with SMART criteria; Formulate strategy via brainstorming; conduct prioritized implementation; conduct adaptive management (plan, implement and evaluate).

The NSST will always be encumbered by the fact that NSST members have other full-time duties. The ability to meet only irregularly, complicated by the difficulty of scheduling for the large number of representatives on the NSST, further confounds the capacity of the NSST to fulfill the role requested by the JVs. The Plan Committee must consider establishing several fully supported positions and operational funding to enable the NSST to be effective.

When the Plan Committee created the NSST in late 1999, the proposal included a prospectus for dedicated staff and funding to enable meetings, support short-term analytical work that the NSST might commission, and the appointment of national coordinators to ensure momentum and continuity of efforts between meetings of the full NSST. Clearly such resources are needed for the NSST to fulfill its mandate.

While broad support exists for the NSST across the Plan Community, there is disappointment about its track record of accomplishments since completion of the 2004 Update. The NSST must become more active, with greater engagement of its JV and Flyway partners. In particular, there are issues to grapple with including integration of habitat management with harvest management (currently being elucidated by the JTG) that will require additional work (e.g., new approaches for translating continental population objectives to JV habitat goals); there are issues regarding population objectives and the next Plan Update about which the Plan Committee requires technical advice; and there many technical matters common to multiple JVs (e.g., performance metrics for non-breeding JVs, inter-JV research coordination) for which the NSST should serve as the key focal point for developing solutions.

The NSST ought to serve as a conduit between the JVs and the Plan Committee for reports on biological accomplishments, and serve as a source of technical advice for both the Plan Committee and the JVs. The NSST should be engaged in regular future assessments of NAWMP biological progress.

The Coherence of Habitat Management and Harvest Management:

"Coherence" became an issue at the signing of the 1986 NAWMP when habitat and harvest management communities attempted to predicate actions and measure success in terms of population responses. The 1986 NAWMP articulated the importance of integrating habitat and harvest management to maintain "*adequate abundance and diversity of waterfowl populations for all users*". However, in subsequent NAWMP updates, these linkages were relegated to Flyway Councils while Plan partners and JVs focused on habitat programs. Increasingly elaborate programs and methods have been developed to manage harvest, map habitat and model populations. Yet today, these components operate largely in isolation and with little forethought to their impacts on one another.

Cohesion between waterfowl harvest management objectives and habitat conservation objectives would enhance the biological foundation required to effectively meet and gauge waterfowl population objectives. We are embarking on a journey to explore useful ways in which to interpret NAWMP goals for both habitat and harvest management. The initial visions were first put forth by members of the Joint Task Group in a draft manuscript entitled ***Reuniting Waterfowl Management***, and have been subsequently discussed by both the AHM Task Force and Plan Committee.

Harvest and habitat management are inextricably linked, and the objectives of both harvest management and the NAWMP should explicitly reflect that linkage. Population goals of the NAWMP cannot be clearly interpreted without the context provided by a specified harvest policy and the environmental conditions under which they are to be achieved. The two programs are working toward common ends, however, without clarification and linkage. There is a missed opportunity for coherence between them. They need to incorporate an understanding of how harvest and habitat concomitantly affect waterfowl populations. This needs to be reflected in the articulation of objectives. Population objectives must be reviewed under a joint AHM-NAWMP effort to clarify whether Plan population objectives represent optimal level for maximizing harvest yield, a habitat *K*, or something else.

The future will bring difficult choices to the waterfowl management community regarding desired harvest levels versus habitat realities, and whether future actions take the form of management to enhance *K*, or restrictions in harvest to respond to habitat loss. It is imperative that these two waterfowl management programs work to harmonize their objectives, at a minimum for those species of ducks important in harvest management.

It has been suggested that the conceptual framework of ARM and AHM could be similarly applied to the management of waterfowl habitats. In applying an ARM framework, formal linkages would be developed among Plan implementation, evaluation and assessment. While the concept is logical and intriguing, many formidable technical, logistical and institutional challenges exist which will be difficult to overcome in practice. These difficulties are exacerbated by the time scale required to implement and learn. The tremendous expenditures to date under the NAWMP and the threats to future fiscal partnerships add urgency to the development of effective evaluation mechanisms at both the JV and continental scale which provide feedback for any changes in NAWMP priorities or implementation strategies.

Several challenging technical and institutional obstacles exist which would appear to thwart a swift application of the ARM framework to waterfowl habitat management. The major technical obstacles relate to the differences in large-scale population response to habitat versus harvest management and a lack of habitat monitoring programs to provide timely feedback on habitat status for assessment. The impact of a particular set of annual harvest regulations on waterfowl populations is relatively rapid and is confined to the subsequent hunting season. Monitoring programs in place can provide timely data to assist in discriminating the impact of the harvest management action on the population. Also, in harvest management, a central controlling authority exists. In contrast, conservation actions for waterfowl habitat management are often protracted, population response to actions may not be immediately detectable at any scale, and monitoring programs do not exist to track changes in overall landscape conditions with respect to NAWMP conservation activities. In addition to these formidable technical issues, the decentralized decision-making process and the extant management authority autonomy characteristic of NAWMP delivery programs constrains management "control" and coordination.

Waterfowl harvest and habitat management have converged on identical goals which place explicit value on both the maintenance of populations and the maximization of harvest opportunity. The AHM Working Group continues to emphasize the need for improvement of the AHM model suite by better describing the effects of habitat on population dynamics. The same fundamental questions regarding the nature of habitat-population relationships plague the NAWMP habitat management community as they attempt to evaluate progress and provide guidance on implementation priorities. These factors have suggested an opportunity to link the efforts of the AHM Working Group and the NSST in order to address these fundamental questions by augmenting the existing model suite used in AHM with alternative hypotheses about the dynamic effects of habitat on waterfowl populations.

Integration of AHM and NAWMP programs presents a formidable challenge but that destiny seems clearly inevitable given the institutional shift from insular to more systems approaches to resource management.

In AHM, NAWMP population goals have either been ignored or used in a manner which places much of the burden of responsibility to attain the goals on harvest managers. This has occurred irrespective of the productive capacity of the habitats. A common modeling framework could aid in addressing coherent objectives to foster the linkages and inform the design of resource monitoring and research initiatives. Coherent objectives should foster AHM-NAWMP cooperation in terms of modeling and monitoring, synergy and cost-effectiveness in shared planning and assessment, recognition of how each program responds to the other, and an increased ability to communicate the goals, methods and successes. Simulating studies of alternative increases or decrease in K concomitant with setting different BPOP and harvest yield objectives for populations should contribute to technical integration, and hence cohesion, of harvest and habitat management.

A common monitoring framework could foster the synergy to integrate harvest and habitat decision making. Combining coherent program objectives that account for management costs and benefits in this framework could provide a vehicle for evaluation of expected performance of concurrent harvest and habitat management decisions. Application of the concepts and tools associated with AHM to habitat conservation also may provide a means to account for various sources of uncertainty concerning the impacts of habitat change on waterfowl abundance and harvest potential. ARM provides an explicit framework that ensures that monitoring data are relevant and useful in making immediate management decisions. This framework provides a means to improve future decision-making through an iterative cycle of biological prediction and testing. Both institutional and technical challenges have limited practical ARM implementation. Adaptive management of the recreational harvest of North American waterfowl, however, stands as a good example of this process, where the role and use of monitoring data is clearly defined prior to a decision-making cycle

The information needs for effective assessment of the impact of harvest regulation and NAWMP-associated habitat conservation have converged. To address these needs, the NSST and the AHM Working Group should combine efforts to study methods to incorporate appropriate habitat parameters and critical hypotheses about the effect of habitats on waterfowl population processes into population models. If appropriate estimates or correlates of habitat can be developed and key hypotheses regarding the effect of habitat on population processes can be codified into quantitative models, the models competing in AHM could be augmented with these relationships. By adding

these factors to the competing models, "learning" rates for harvest management could be improved while addressing several critical needs of the continental assessment of the NAWMP.

Practices that increase habitat quality and quantity that effectively increase *K* should be used in linking AHM and NAWMP objectives through monitoring and measuring the increase of survival rates of young and adult waterfowl. If projections that habitat loss will continue lead to a reduction in *K*, we must consider the implications of a cohesive AHM-NAWMP strategy that beckons the waterfowl management community to not only sustain but to increase *K*.

What are the methods we would use to define and measure *K* to assess or predict the effects on N_{eq} of human (or climate change) induced changes to *K*? For harvest management purposes, the waterfowl community will want to concentrate initially on MCM and breeding ground aspects of this issue. The NAWMP community must also commence thinking about vital rates and *K* for other parts of the annual cycle and for other species.

Finally, coherence between habitat and harvest management objectives will remain incomplete without consideration of hunter satisfaction and other socio-economic considerations such as non-consumptive uses of waterfowl, crop depredation and waterfowl overabundance issues. A framework for unifying waterfowl management at the continental scale must ultimately incorporate all three elements: habitat, harvest, and socio-economic considerations (i.e., costs and benefits associated with specific population targets).

Linking Regional Habitat Objectives to Continental Population Objectives:

Continental population objectives are expressed as abundances. However, to achieve desired population objectives, Plan activities ultimately must influence key vital rates. While most JVs recognize the value of linking Plan achievements to measures of population response, there is considerable uncertainty and lack of confidence as to how, or even if, this can be accomplished. Questions are raised about which vital rates (e.g., recruitment, survival) should be used for planning purposes and how targets for these vital rates should be established. Such an approach may be most tenable for breeding area JVs, given the potential to evaluate the influence of habitat programs on vital rates (e.g., nest success, survival). Questions remain whether habitat programs on winter or migration areas influence survival or body condition and in turn, continental waterfowl populations. Beyond the prairies, JVs appear to have little understanding of how Plan conservation investments influence waterfowl vital rates. Clarification is needed from the NSST and the Plan Committee on how JVs should move forward to directly link habitat efforts to vital rates and population responses. If we cannot identify critical limiting factors in a given geographic region, guidance will be needed so that JVs can direct their conservation efforts in an accepted, defensible manner.

All JVs should implement an explicit, biologically-based planning model(s) allowing predictions of how habitat programs affect vital rates or population responses. These efforts would oblige JVs to articulate key assumptions or uncertainties and work towards refining planning models. There is a need to develop a centralized capacity to provide modeling expertise.

Presently, waterfowl managers have only a rudimentary understanding of the *K* of individual habitat blocks. They know even less about how habitat *K*, waterfowl abundance, and climatic forces interact

to influence vital rates at regional and population-wide scales. This lack of information obviously compromises the manager's ability to provide an adequate area and distribution of habitats to minimize density dependent effects.

The NSST's predecessor was the Continental Evaluation Team (CET). The CET studied how the elements of the ARM framework might assist in addressing fundamental gaps in our understanding of survival-recruitment-habitat functional relationships. Clarifying these relationships was considered one of the objectives of the Continental Assessment since they are foundational to the objectives and strategies of the Plan. It was unclear whether it was feasible to expect that these procedures could assist in an evaluation of the "effect" of NAWMP implementation on continental waterfowl populations. However, the CET expected to at least be able to infer the relative magnitude of Plan impact given the habitat-population relationships which can be identified over time, tracking information on Plan accomplishments and properly structured habitat monitoring efforts which provide information on cumulative landscape change in key habitat areas.

Two fundamental questions present particularly troublesome problems for managers in allocating resources among NAWMP priorities and in evaluating the impacts of NAWMP actions:

1. What is the role of wintering and migrational habitat in population survival and recruitment (potential cross-seasonal effects) processes and how does this vary in response to population size and environmental conditions in various wintering and migrational areas (potential interspatial effects)?

2. What is the relationship between upland conditions on the breeding grounds and duck recruitment, hen survival, and subsequent population size and how does this relationship vary in response to spatial clines in water conditions throughout major breeding areas?

An important role of the Continental Assessment is to address these fundamental gaps in scientific understanding that confound attempts to place the activities and priorities of the NAWMP in perspective with a constantly changing continental landscape and the highly dynamic waterfowl populations it supports.

Joint ventures need to develop a better understanding of how specific management actions and habitat changes affect waterfowl recruitment and survival. Similarly, Plan partners need coordinated strategies to gain insights about the effects of large-scale spatial and temporal variation in habitat conditions on waterfowl vital rates. Migration areas pose special challenges for biological assessment because of the mobility of migrating birds.

Regardless of whether a JV is focused on breeding, migration, or wintering habitat, the common challenge will be to weigh empirical evidence for population limitation and consider the alternative actions to effect a measurable positive change in K (i.e., via vital rates) in each region. Developing explicit postulates regarding limiting factors and predicted effects of conservation measures on K might provide an improved framework for future JV planning and assessment.

In terms of cross-seasonal effects, serious questions arise about the influence of individual JVs on populations and how limited resources for habitat restoration are expended. JV habitat objectives are based on Plan population objectives and assumptions about how habitat quantity and quality, and distribution affect continental waterfowl populations. There is little quantitative data

concerning residence times and turnover rates for birds using habitat in specific JVs and how these vary with resource availability and depletion or the effect on vital rates. Quantifying biological resource dynamics and impacts on vital rates often has not been fiscally feasible at some temporal (seasonal) and spatial scales. Maintaining ongoing information feedback would certainly challenge agency budgets. Understanding the relationships among bird distribution, vital rates and biological resources provides managers the information required to efficiently allocate resources. A coordinated, large-scale satellite and conventional telemetry study of representative species in conjunction with traditional banding, population and harvest surveys is needed to track within-season and annual movement patterns, monitor body condition, and estimate survival rates.

The NSST has an opportunity to play a lead role in developing a better understanding of the effects of habitat variation on population demography in order to link regional habitat objectives to continental population objectives, and assess NAWMP progress while accounting for uncontrolled environmental variation.

Given the uniqueness and differences among JVs, how will JVs define and monitor *K* in making a contribution to assessments that can be rolled up to the continental scale? How will JVs address the comparability and standardization issues in habitat monitoring to define *K*? Common modeling frameworks may foster the linkages and inform the design of resource monitoring initiatives. Again, cooperation in terms of modeling and monitoring, synergy and cost-effectiveness in shared planning and assessment are of considerable importance. The primary question to be answered is "*Is the sum of JV activities providing an accurate estimate of K that provides a linkage to an assessment the continental scale*"?

Environmental monitoring programs coordinated or integrated with waterfowl surveys are needed to evaluate hypotheses about the influence of habitat, weather, and management actions on population status. As a precursor to the development or enhancement of environmental monitoring strategies, alternative hypotheses about the nature of regional environmental influences on populations must be specified. These hypotheses should be codified into models that predict population responses to environmental changes. Model-based monitoring strategies might then be defined to allow discrimination among models that predict different population responses to environmental conditions or management actions. Considerable forethought will be necessary to develop population, habitat (i.e., resource), and weather monitoring protocols at appropriate spatial and temporal scales. Model-based monitoring programs might be developed, for instance, to better understand the effects of a local-scale habitat treatment, the effects of a suite of management treatments at a landscape level, or the effects of precipitation patterns and habitat availability on waterfowl at a regional scale. Coordinated environmental monitoring may be closely tied to the population monitoring protocol (e.g., counting wet ponds while counting birds) or utilize different methodologies such as classification of remotely sensed data or summarization of weather reporting station data. Modeling efforts producing alternative models that contain weighted values of habitat parameters affecting *K*, in addition to variable coefficients for environmental conditions, climate, etc. may be our destiny.

The NSST will encourage more regular reporting and discussion of biological progress within JVs, among JVs, and between the Plan Committee and the JVs. But the NSST will be successful in its charge *only* if strong parallel technical committees are leading this work at the JV level.

In light of the relative autonomy shared by JVs, will we agree to make linkage of assessment from the JV level to the continental level a required component of JV implementation planning? Will supervisors support full engagement of JV Science Coordinators with the NSST?

In terms of tracking accomplishments, geographic specificity will be needed in tracking systems to better monitor accomplishments. Flyway Technical Sections, State Representatives and the Service's Habitat and Population Evaluation Team representatives need to be involved as well.

To improve the coordination of national/continental and regional assessments, the issues may be addressed by developing JV Science Coordinator workshops by flyway and among breeding, migration or wintering JV collaboration. Should JV Science Coordinator workshops be grouped by flyway, as has been suggested at the Central Flyway, or by annual cycle-life requisite needs (i.e., breeding, migration, wintering JVs)? The latter would facilitate standardization of habitat and population monitoring protocols that could be rolled up to evaluate continental population assessment.

Addressing Uncertainty:

There are several types of uncertainty that impact the ability of waterfowl managers to make optimal resource allocation decisions while implementing the NAWMP. First, planners are faced with an incomplete understanding of ecological processes that determine the influence of habitat, climate, and human disturbance (e.g., hunting pressure) on waterfowl survival and recruitment. Waterfowl harvest managers have termed this "structural uncertainty." There is structural uncertainty at every level of the strategic planning process. An example is the current lack of knowledge about the nature and form of density-dependence in waterfowl populations. A basic tenet of equilibrium theory is that at any given time, a given habitat has a population threshold, often termed its "carrying capacity." When the population climbs above that carrying capacity, survival and/or recruitment are negatively affected.

Presently, waterfowl managers have only a rudimentary understanding of the carrying capacity of individual habitat blocks. They know even less about how habitat carrying capacity, waterfowl abundance, and climatic forces interact to influence vital rates at regional and population-wide scales. This lack of information obviously compromises the manager's ability to provide an adequate area and distribution of habitats to minimize density dependent effects.

Using a passive approach, managers can propose a suite of alternative models which codify and encompass the range of some important management uncertainty. They then use monitoring programs to track changes in waterfowl demographics as well as pertinent habitat and environmental parameters. As model predictions are compared with observations, managers can evaluate the suitability of their competing models. Alternatively, a single model might be developed to best summarize current understanding, and the results of monitoring programs would be used to adjust this single best model over time.

Environmental variation is a pervasive influence on waterfowl populations. Planning for "average" or "good" conditions, as were observed in the 1970's, presents challenges for many JVs. The question arises whether JVs should target "average conditions" or plan for "worse case scenarios".

Some JVs appear to be planning for worse case scenarios. This strategy might be effective only where such infrequent events have a disproportionate influence on long-term viability of continental populations. Conversely, other JVs view Plan objectives based on "average environmental conditions" as fundamentally inconsistent with waterfowl ecology in terms of how most duck populations respond to dynamic environments. Plan goals should be expressed more explicitly in terms of ranges of population objectives representing poor and good conditions.

With reference of global climate change, we must consider how NAWMP continental objectives might change The Plan Committee should solicit and support independent and (or) NSST studies of these broad-scale challenges, and advise JVs to consider these issues in conservation plans.

The NSST must be charged with the task of planning for the effects of climate change, valuing natural capital, understanding linkages among major biomes and furthering our ability to assess socio-economic drivers of land-use decisions.

A second approach views the process of management itself to reduce planning uncertainties with active experimentation. This approach may be most useful to evaluate either uncertainties associated with a particular management treatment or to a suite of treatments applied to a landscape. Managers proceed with habitat conservation with the dual objectives of meeting conservation targets and reducing uncertainty to improve future decisions. Again, a model suite that incorporates the range of some important uncertainty is necessary, as are population and environmental monitoring programs to measure response to habitat manipulations.

Directed research, as a third approach, will continue to be an important means of testing planning assumptions and reducing uncertainties. Both of the first two approaches are interrelated with, and dependent upon, directed research. It is likely that both retrospective analyses and observational studies will contribute to the development of useful planning models and to the specification of monitoring protocols. Where lack of baseline data inhibits the development of models for conservation planning, directed studies may be the most efficient means to develop basic life history, range and movement, resource availability, and resource utilization databases. In addition, focused research may be the most practical means to parameterize conceptual models in order to develop more useful empirical models of habitat-population interactions.

Waterfowl Conservation in the Context of "All Bird" Management:

In 1986, the NAWMP existed as the sole continental-scale conservation enterprise. In part because of the Plan's success, the North American Bird Conservation Initiative (NABCI) and its associated bird initiatives, along with other new broad fish and wildlife partnerships, have emerged to compete for staff and funding.

The 1998 Plan Update specifically recognized these developments and recommended the integration of all birds into the planning framework for Joint Ventures, while emphasizing the continued waterfowl focus of the NAWMP itself. Recognition and identification of differences in habitat requirements through specific planning for other bird groups facilitates integration and fine tuning of management actions at the local level (e.g., Integrated Bird Conservation). The PC also indicated

in the 1998 Update that while other groups would lead all-bird planning, on-the-ground planning should be coordinated at the JV or local level. To facilitate this, the JVs were encouraged to undertake Integrated Bird Conservation and their internal staff resource allocation has reflected that change.

In the document *2004 NAWMP – Strengthening the Biological Foundation*, the NAWMP intended to broaden partnerships with other migratory bird conservation initiatives and provide support and encouragement for conservation partnerships with communities. A notable challenge was espoused within the 2004 update that "*…The NAWMP Community…must now reaffirm its basic commitment to the science and conservation of waterfowl and their habitats while participating in broader stewardship efforts for other birds and the global environment.*"

Initial concerns about the addition of non-waterfowl species to JV responsibilities included the concern that money would be diverted from waterfowl projects to other bird groups and that technical capabilities and program delivery would be hampered. Concerns have emerged that the JVs are experiencing a loss of focus on waterfowl objectives exacerbated by a lack of additional resources for expanded mandates. In fact, no large scale funding mechanism has been developed for other bird conservation initiatives. Most Flyways have expressed strong concern that all-bird initiatives and the delivery of projects to benefit multiple bird groups should not be funded by dedicated NAWMP funds for waterfowl (habitat) conservation.

There is a concern that NAWCA project proposals for waterfowl habitat conservation may be disadvantaged because of the requirement for an all bird component. There is a sense in the NAWMP community that diversion of funds to other bird groups will be detrimental as long as significant waterfowl habitat objectives remain unachieved.

The need for significant input of new and non-competing resources enabling on-the-ground habitat conservation actions for birds other than waterfowl and wetland-obligate species remains a high priority for the NAWMP community and its other bird conservation partners.

The Plan Committee has tasked the NSST with promoting effective strategies for adaptive management among partners and for communicating successful approaches to planning and evaluation to other bird initiatives. The NSST will encourage more regular reporting and discussion of biological progress within JVs, among JVs, and between the Plan Committee and the JVs. But the NSST will be successful in its charge *only* if strong parallel technical committees are leading this work at the JV level.

The waterfowl management community must define its approach to develop future monitoring activities while maintaining or increasing operational programs. The challenge to address unmet waterfowl population and habitat management needs, such as for declining species including sea ducks, northern pintails and scaup, while addressing non-waterfowl priorities and coordinated all-bird monitoring seems ominous. The NSST needs to clearly articulate what NAWMP needs and plans are, link that with the Flyway Comprehensive Surveys List and results of the Division of Migratory Bird Management Monitoring Task Force.

The NSST should prepare an overview document describing priority waterfowl needs and proposed approaches to address those needs as a medium for communicating with state and federal agencies

and other bird initiatives on issues related to monitoring. This overview document could present strategies for meeting waterfowl monitoring needs. Strategies could include both habitat and population (demographic) monitoring efforts. The document could communicate priority waterfowl needs in considering any proposals for new monitoring efforts in cooperation with NABCI.

Understanding variation in vital rates, identifying which vital rates are most responsible for population change, and quantifying how vital rates vary across landscapes and time, are all critical to informing conservation planning and management. A great deal is known about waterfowl vital rates because band recovery rates allow estimation of annual survival and harvest rates. For smaller, nongame birds only gross population trends based on surveys that index populations are known. While mark-resighting studies of mortality and natality are coming to fruition, the precision of these estimators is often poor and the monitoring period brief, thus making it difficult to ascertain long-term temporal changes or variation. Integrated planning for migratory birds must recognize the strengths and deficiencies in understanding demography and vital rates of various species, and planning will occur based on different levels of knowledge that can only be improved over time.

Proposed "all bird" monitoring activities should first answer some questions "*What are the monitoring objectives*"? "*Which populations are to be monitored*?" "*At what scales will monitoring be planned and how will that complement JV monitoring at scales that address linkages to a continental assessment?" "With what level of precision shall the monitoring efforts be implemented?" "How will we link habitat monitoring with population monitoring?"*

The NSST has deemed that planning and conservation implementation are most efficient when tailored to ecological regions with relatively homogeneous waterfowl communities, habitats, species-habitat relationships, and threats to habitats. Consequently, the NSST had modified ecological units known as "Bird Conservation Regions" to better reflect the abundance and diversity of waterfowl across North America. These "Waterfowl Conservation Regions" (WCRs) are the Plan's geographic units for prioritization at the regional scale. Waterfowl conservation regions cover the continent, yet they are smaller than flyways and most JVs, and they are more homogeneous than flyway states and most JVs, making them more tractable planning units.

Despite the advantages WCRs provide, they are not a panacea for prioritization or for depicting areas of critical importance to continental waterfowl populations. In more arid parts of the continent, there can be considerable heterogeneity among landscapes and particularly within WCRs in more arid parts of the continent. The Plan Committee and the NSST anticipate that JV strategic planning will account for this heterogeneity. When more spatially refined information is available, it should take precedence over coarse continental-scale assessment. The Plan community, represented by the NSST, will report these improvements in regular updates of prioritization products as one aspect strengthening the biological foundation for waterfowl conservation.

As the number of JVs has expanded and as individual JVs have grown beyond the ecologically based regions envisioned in 1986, the Plan Committee and the NSST believe it is prudent to provide guidance from a continental perspective that can be used by managers throughout North America. For this purpose, the NSST developed priority species lists from each WCR to help Plan partners target their conservation efforts on the species with the greatest conservation need in that WCR in the appropriate phase of their annual cycle.

No single survey, during either breeding or nonbreeding seasons, adequately assesses distributions of ducks or geese across the continent-wide extent of the Plan. This lack of information poses challenges for the strategic conservation of habitats across North America and requires that data from diverse surveys be merged to depict these patterns of seasonal distribution and abundance. Unfortunately, there are practical limits to the number of survey databases that can be combined in a systematic assessment, and there are limits in the spatial resolution of data from the widespread surveys that are most useful for continental assessment. Inevitably, these limitations affect the results of species prioritization at regional scales. Therefore, priority species lists provided are viewed as a starting point for JV planning at regional scales. It is hoped that these lists will help JVs make conservation decisions based on a better understanding of the regional significance of a particular waterfowl species within the continental context of all species of North American waterfowl.

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APPENDIX A – HISTORICAL NSST DOCUMENTS

NAWMP Science Support Team Mission:

To help strengthen the biological foundations of the North American Waterfowl Management Plan and facilitate continuous improvement of Plan conservation programs.

Specific Objectives:

1. **To foster continuous improvement in the effectiveness of NAWMP actions through the establishment of iterative cycles of planning, implementing and evaluating conservation programs at both the continental and joint venture levels.**

The key conceptual shift is to view planning, implementation and evaluation as integral components of management. Accomplishing this objective will require the adoption of adaptive management at both the joint venture and continental levels. The NSST will strive to institutionalize such continuous improvement in management performance. At the JV level, this will result in the establishment of management cycles that assess the costs and benefits of various conservation techniques, test key planning assumptions, and monitor progress toward attainment of JV goals and objectives. Necessarily, JV technical teams will lead these efforts supported by advice and coordination from the NSST. Strong, effective JV technical teams and management boards will be essential for success. Establishing a body like the NSST at the JV level is one option for the Joint Ventures to consider.

2. **To conduct large-scale studies of landscape variation and waterfowl demography.**

Relatively little assessment has been accomplished by the NAWMP partners at scales larger than individual Joint Ventures. Redressing this shortcoming will be an important step in strengthening the biological foundations of NAWMP, and this will become a high priority for the NSST. coordination of JV monitoring and assessment activities, both within and among countries, will be necessary to ensure a coherent, consistent approach to biological planning and evaluation, and essential for analysis of waterfowl/habitat relationships at large spatial scales (e.g., the prairie pothole region, or the mid-continent wintering grounds). Such coordination will have the added benefit of facilitating sharing of ideas, experience, and perhaps resources among the involved JVs.

Key activities for the NAWMP partner agencies to accomplish include monitoring waterfowl populations (e.g., breeding pair estimates, survival rate estimates); monitoring habitat trends throughout North America, but especially in regions vital to waterfowl populations; facilitating tests of key biological assumptions underlying Plan activities; and testing hypotheses about the general relationships between variation in landscape attributes and waterfowl population dynamics.

The NSST, with support from the Plan's National offices, will lead this effort. In the United States, the AMAT group of the USFWS is strongly positioned to provide leadership and some resources to accomplish these tasks, but AMAT will require assistance from the Canadian and Mexican federal wildlife agencies and other JV partners.

3. **To report annually to the Plan Committee and the Plan partners generally on the status of the biological foundations of the Plan, evaluation results and implications for future conservation activities.**

An important annual task of the NSST will be to report to the Plan Committee and other Plan partners on the biological effectiveness of Plan activities. These reports will draw on both reports of progress by the JVs and original and commissioned research by the NSST. Other special analyses may be undertaken from time to time on behalf of the Plan Committee. Conversely, the NSST will serve to elaborate and reinforce any biological guidance from the Plan Committee to the Joint Ventures.

To: NAWMP Evaluation Team

From: Mark Koneff

Subj: June Meeting and related materials

Hi all. Here's an update on the June meeting and some related stuff. We will be meeting on June 10 and 11 in Minneapolis, MN. We have reserved a block of rooms and a meeting room at the Sheraton Inn at the Minneapolis Airport, under U.S. Fish and Wildlife Service. For those of you who make your own travel arrangements, here's the information ...

Sheraton Inn
2500 East 79th Street
Bloomington, MN 55425
612-854-1771 FAX:612-851-8682

We expect that Doug Johnson from the Northern Prairie Science Center and Fred Johnson of the Office of Migratory Bird Management (MBMO) of the Service will also be in attendance. Bob Trost has officially accepted the position of Pacific Flyway Representative and has had to abdicate his seat on the Team. We are not yet certain who his replacement from MBMO will be. Either Tome or myself have talked to all Team members, excluding Trost and expect everyone else to be present in June. Also, a reminder that the August meeting is still scheduled for the week of the 19th somewhere near Ottawa. Clayton R. and Bob B. are coordinating these arrangements.

I met last week with Fred Johnson, Jim Dubovsky, Clint Moore, and Bill Kendall of the Population and Habitat Assessment Section (PHAS), MBMO to discuss the retrospective analyses that we had suggested at the last meeting. I think we made excellent progress in laying the framework for these analyses. I am currently working on a summary of the meeting. I will get this out to you all as soon as all of the meeting participants are comfortable with its contents. We still have no official endorsement from the Office of Migratory Bird Management related to Fred's or PHAS's participation in the retrospective analyses, but I am still hopeful that this will not be a problem.

I've enclosed an "open letter" from myself to the Team which lays out some personal reflections about the continental assessment of the Plan and Adaptive Resource Management. I jotted this down originally as a way to organize my own thoughts on the subject and shared it with Mike Anderson in attempt to reconcile my thoughts with common sense. Mike seemed to think that there was at least some food for thought in the document and suggested I send it to the rest of the Team for consideration for the June meeting. There are certainly conclusions in the documentation that are debatable and I hope we get a chance to discuss some of these in June. At Mike's suggestion, I've added some underlining which hopefully catches certain key points.

Finally, we are starting to think of a specific agenda for the June meeting. We'll try to provide more structure for this meeting than last. I will, of course, circulate the agenda when a draft is completed. See you all soon.

North American Waterfowl Management Plan Continental Assessment:
An Open Letter to the NAWMP Evaluation Team
from M. Koneff

North American waterfowl management has a rich legacy of laws to protect populations from over-exploitation and regulate sport harvest, duck stamp programs and non-profit organizations devoted to raising funds for habitat protection, restoration, and enhancement, and an international infrastructure for continental coordination. Building on this legacy, the North American Waterfowl Management Plan (Plan) represents another great achievement, particularly when measured by the number of partners involved or resources expended ($893 million). Despite Plan partner accomplishments, we close the first decade of Plan implementation still uncertain about the ability of Plan management actions to ultimately achieve its population goals.

This uncertainty is in large part a result of long-standing questions about basic critical relationships between continental waterfowl population processes (survival and recruitment) and the quantity and quality of North American waterfowl habitats. Without addressing these key gaps in understanding, we cannot evaluate the *a priori* hypotheses or assumptions upon which Plan objectives and conservation strategies were based. These *a priori* hypotheses, drawn at both the continental scale and the regional scale of joint venture areas, provide the foundation for the geographical priorities of the Plan and the logic by which habitat conservation goals and strategies were derived for priority habitat areas. In many cases these foundational hypotheses are implicit.

Since the ultimate goal of Plan habitat conservation is to provide sufficient habitat to increase and maintain waterfowl populations, these hypotheses, at their most primal level, relate habitat conservation and management to the key determinants of continental population size: survival and recruitment. Thus, any critical evaluation of Plan implementation and resource allocation is dependent on assessment of the direct, cross-seasonal, or interspatial relationships between survival, recruitment, and habitat. By understanding better how and under what suite of environmental conditions, regional habitats impact continental populations, we can more effectively assess the role of Plan implementation in specific joint ventures, and can identify theoretical "bottlenecks" to population growth or maintenance and conditions which might trigger population bottlenecks.

Two fundamental questions present particularly troublesome problems for managers in allocating resources among Plan priorities and in evaluating the impacts of Plan actions:

(1) What is the role of wintering and migrational habitat in population survival and recruitment (potential cross-seasonal effects) processes and how does this vary in response to population size and environmental conditions in various wintering and migrational areas (potential interspatial effects)?

(2) What is the relationship between upland conditions on the breeding grounds and duck recruitment, hen survival, and subsequent population size and how does this relationship vary in response to spatial clines in water conditions throughout major breeding areas?

It is one important role of the Continental Assessment to address these fundamental gaps in scientific understanding that confound attempts to place the activities and priorities of the North American Waterfowl Management Plan in perspective with a constantly changing continental landscape and the highly dynamic waterfowl populations it supports.

Why are *Fundamental Questions in Waterfowl Management Still Questions?*

North American waterfowl have been studied more intensely than any other taxonomic group on earth. North American waterfowl managers have devised and implemented population monitoring schemes designed to track annual variation in species continental population sizes which sample vast regions of the continent and are unprecedented in modem wildlife management. Marking studies have also provided a wealth of recovery/resighting data which is useful in estimating population survival rates, as well as in identifying "manageable" subpopulation units. Moreover, intense research and monitoring have been on-going for nearly 50 years. Given this effort, it is initially difficult to comprehend biologists' inability to more definitively identify the dynamic effects of habitat on the growth and decline of continental waterfowl populations. The extreme complexity of the continental system being managed has understandably contributed to these information gaps, as has the cost and logistical difficulty associated with studying processes operating at such broad-scales. In addition to these more obvious problems, unfortunate properties of existing broad-scale monitoring data sets limit the ability of retrospective analyses using historical data to better describe key population processes and broad-scale factors affecting these processes. To understand why we do not know more about these functional relationships, it is important to examine the purpose for which the current system of waterfowl population monitoring was developed, and the historical use of the data in guiding management action. The monitoring programs in place today were developed primarily as tools in the regulation of waterfowl sport harvest.

Since the development of monitoring programs and the evolution of appropriate data analysis procedures, harvest regulation has essentially followed a general adaptive approach to management. The general adaptive approach to management involves an iterative cycle of resource monitoring, biological assessment, arid decision-making. Through monitoring programs, resource status (waterfowl population size and wetland conditions) is updated annually. Then through an assessment process, managers attempt to provide a sound biological basis for a decision on harvest regulation given the data collected during the prior monitoring efforts. Assimilating the conclusions of the assessment, managers arrive at an appropriate harvest decision given the resource status. Historically, decisions on harvest regulations, while taking into account current habitat and population status were somewhat subjective and did little to resolve long-standing debates about the role of harvest regulation in population management. Over time the regulations process had evolved into a fairly conservative, risk-aversive process in which regulated harvest opportunity tightly tracked changes in population size.

The conservative harvest management process which had developed since the 1950s unfortunately had ramifications on the study of continental waterfowl population dynamics by affecting the usefulness of the monitoring data sets currently available to managers. This is a result of autocorrelation over time among environmental, population (density-dependent), and management (harvest) effects which has been injected into the data sets as harvest regulations chased populations (Nichols et al. 1995, Walters 1986, Williams and Johnson 1995). For instance, when consecutive drought years leave the prairie pothole region very dry, overall recruitment of mallards plummets, and continental population size declines to a low level. The conservative harvest management action would be to restrict harvest on mallards significantly. When environmental conditions again favor mallard production, and population size increases, it is impossible to discern the extent to which this recovery is a result of management, the extent to which it is due to improved habitat conditions, and the role of density-dependence throughout the population decline and recovery cycle. Walters (1986) labels this situation a "confounding of environment versus management" and notes that over time it can evolve into divergent views

over the fundamental role of management.

With Current Limitations How Can a *Continental Assessment of the Plan Proceed?*

Regardless of the unfortunate situation described in the previous section, waterfowl managers are still blessed with a tremendous base of scientific literature assembled primarily since World War II. This information, in conjunction with the large monitoring and marking data sets currently available, provide a wealth of data from which plausible hypotheses about key relationships between the quantity and quality of continental waterfowl habitats and population processes can be developed.

The North American Waterfowl Management Plan Evaluation Team (Evaluation Team) has been charged to address the need for a Continental Evaluation of the Plan. Although the Evaluation Team developed a framework for joint venture evaluation following the general adaptive approach to management over 4 years ago, methods to evaluate the overall continental impact of the Plan and provide guidance for future resource allocation have been slow to develop. The Evaluation Team is currently studying the potential for elements of the formal "Adaptive Resource Management" framework to assist in addressing fundamental gaps in our understanding of survival-recruitment-habitat functional relationships. Clarifying these relationships is thus considered one of the objectives of the Continental Assessment since they are foundational to the objectives and strategies of the Plan. It is currently unclear whether it is feasible to expect that these procedures could assist in an evaluation of the "effect" of Plan implementation on continental waterfowl populations, however, we might expect to at least be able to infer the relative magnitude of Plan impact given the habitat-population relationships which can be identified over time, tracking information on Plan accomplishments and properly structured habitat monitoring efforts which provide information on cumulative landscape change in key habitat areas.

What's Adaptive Resource Management, and How Can It Help Us in the Continental Assessment?

Adaptive Resource Management (ARM) is a formal, quantitative application of the general adaptive approach to management that explicitly recognizes the uncertainty about management effects and actively seeks to provide information which is useful in learning about the underlying dynamics of the system being managed (Williams and Johnson 1995). This definition of ARM refers to what has become known as "Active Adaptive Management" and is contrasted with "Passive Adaptive Management" (Walters and Holling 1990). Passive Adaptive Management involves the use of historical data to construct one "best" model of the dynamics of a managed system which is assumed "correct" and provides a basis for management decisions. The setting of waterfowl harvest regulations has followed the passively adaptive approach to management, with its associated disadvantages, as already described.

Walters (1986) lists several basic components of an actively adaptive management strategy: (1) a bounded set of potential management actions, (2) a suite of alternate quantitative system models which predict system response to management based on different hypotheses about system dynamics, (3) representation of uncertainty and methods to track it through time in relation to management actions, and (4) explicit, dual management objectives that account for short-term benefits associated with resource production and long-term benefits to resource

utilization which can be expected as a result of understanding the system better. The key differentiation from passive strategies is that active strategies incorporate learning as a specific goal of management, to the extent that the information obtained will help managers meet the traditional management objectives (Williams and Johnson 1995).

In 1995, the U.S. Fish and Wildlife Service began implementation of Adaptive Harvest Management (AHM), which employs the framework of Active ARM in the regulation of waterfowl harvest. AHM was developed cooperatively over a period of several years by the AHM Working Group, a committee of Federal and State government agency and non-profit conservation organization representatives with stakes in the regulation process. Consistent with the components of an active strategy, the Working Group identified a limited set of potential management options (regulations packages), a suite of models which quantify different hypotheses about population dynamics and the affects of harvest management, an uncertainty measure for each model, and an explicit objective function (an equation representing harvest management objectives).

The objective function describing harvest management objectives which was developed by the AHM Working Group consolidates two potentially competing objectives of waterfowl management: maintenance of populations and maximization of harvest opportunity. The objective function, by weighing both these factors quantitatively, eliminates disagreement based on different perceptions about relative dominance of these issues. The Working Group used the population goals of the Plan as a benchmark by which to assign relative weight to harvest versus population growth. When populations are near Plan goals, the objective function places greater emphasis on harvest opportunity. The population objectives of the Plan were chosen for this - purpose because they are supported by the federal governments of Canada, Mexico, and the U.S., and they were originally established to permit acceptable levels of harvest and maintain populations consistent with other non-consumptive purposes (Anonymous 1986, Williams and Johnson 1995).

The actual methods by which AHM determines optimal harvest management actions are computationally complex and have been elsewhere described (Williams 1988, 1989; Lubow 1995). The ultimate goal of the process is to select regulations packages in the present that will maximize, to the extent possible, both present and future harvest while remaining consistent with the stated objectives of management. Explicit in this approach is the realization that the optimal management solution will only be achieved by identifying the model which performs best in describing population dynamics and the effects of harvest (Williams and Johnson 1995). The AHM process is structured such that information which will identify the most appropriate system model accrues over time. The rate at which this "learning" can occur is highly dependent on the adequacy of the models in the alternative model suite. Therefore, a search to improve the predictive abilities of the models is on-going, with current emphasis being placed on the incorporation of habitat parameters and better representation of the effect of these parameters on populations.

It has been suggested that the conceptual framework of ARM and AHM could be similarly applied to the management of waterfowl habitats (Evaluation Team unpublished report. Johnson et al. 1996). In applying an ARM framework. formal linkages would be developed between Plan implementation and evaluation/assessment. While the concept is logical and intriguing, many formidable technical, logistical and institutional challenges exist which will be difficult to overcome in practice. These difficulties loom even larger when the time required to implement and learn from such changes is considered. The North American Waterfowl Management Plan

established an initial 15-year horizon for implementation. May of 1996 marks the 10th anniversary of the signing of the Plan and a decade of habitat conservation action. In general, implementation has lagged behind the rates needed to achieve Plan habitat goals by 2001, the original target for meeting those goals. While conservation activities have lagged behind schedule overall, Plan partners have made tremendous strides, to date dedicating nearly $900 million to meeting Plan conservation objectives. Federal funds, while only a fraction of this total, have been dedicated to the Plan and associated conservation programs and are important partnership seed monies which are in jeopardy of being lost or significantly reduced during an era of downsizing. The tremendous expenditures to date and the threats to future fiscal partnerships add an air of urgency to the development of effective evaluation mechanisms at both the joint venture and continental scale which provide feedback for any needed mid-course changes in Plan priorities or implementation strategies.

Several challenging technical and institutional obstacles exist which would appear to thwart a swift application of the ARM framework to waterfowl habitat management. The major technical obstacles relate to the differences in large-scale population response to habitat versus harvest management and a lack of habitat monitoring programs to provide timely feedback on habitat status for assessment. The impact of a particular set of annual harvest regulations on waterfowl populations is relatively rapid and is confined to the subsequent hunting season. Monitoring programs in place can provide timely data to assist in discriminating the impact of the harvest management action on the population. This is contrasted with the situation which exists for waterfowl habitat management where conservation actions are often protracted, population response to actions may not be immediately detectable at any scale, and for which monitoring programs do not exist to track changes in overall landscape conditions with respect to Plan - conservation activities. In addition to these formidable technical issues, the decentralized decision-making process and the diffusion of management authority over many jurisdictional levels which characterize the Plan and waterfowl habitat management in general severely constrains management "control" and coordination. This is unlike the situation faced in harvest management where a central, controlling authority exists (Johnson et al. 1996).

With time, patience and persistence managers could overcome many of the obstacles to a true application of ARM for waterfowl habitat and harvest management. However, what is the potential for the ARM approach to assist with continental assessment of the Plan in the near--term? Waterfowl harvest and habitat management have converged on identical goals which place explicit value on both the maintenance of populations and the maximization of harvest opportunity. The AHM Working Group continues to emphasize the need for improvement of the AHM model suite by better describing the effects of habitat on population dynamics. The same fundamental questions regarding the nature of habitat-population relationships plague the Evaluation Team and other Plan partners as they attempt to evaluate progress and provide guidance on implementation priorities. Taken together these factors suggest a opportunity to "piggyback" the efforts of the AHM Working Group and the Evaluation Team in order to address these fundamental questions by augmenting the existing model suite used in AHM with alternative hypotheses about the dynamic effects of habitat on waterfowl populations.

While the obstacles already discussed make it unlikely that the ARM process would permit the discrimination of the specific effect of Plan conservation actions on continental populations, it may be possible to shed light on problematic questions about broad-scale habitat-population relationships. If a goal of the Continental Assessment is to address these fundamental questions, then it is not critical to identify a "detectable effect" of habitat conservation versus environmental and human development activities on populations. The lack of the centralized

management authority which would be necessary to intentionally and in a coordinated fashion, perturb the system at scales large enough to produce measurable effects on populations is also not a barrier to addressing these fundamental questions. In a sense, we can get the system perturbations necessary to learn about habitat-population relationships for "free." If the cumulative landscape effects of habitat conservation and management habitat losses through development and temporary but often dramatic fluctuation in available habitat due to environmental conditions are considered analogous to a "management action", then tremendous informative variation exists within the system which would be useful in learning about these fundamental relationships by utilizing the ARM conceptual framework.

Ability, in the near-term, to extend this framework further and at least draw inferences about the relative continental impact of Plan activities would be dependent on the methods used to incorporate data on waterfowl habitat quantity and quality into the AHM models. For instance, habitat in major waterfowl habitat areas can be monitored and incorporated into model parameters as correlates to habitat conditions or, given reallocated survey effort, it may be possible to monitor and estimate actual habitat availability. While correlates to habitat quantity and quality (i.e., precipitation and drought indices in major habitat areas) may be useful in learning about these fundamental relationships, it would be difficult to infer anything about the relative magnitude of Plan effects on populations. However, it is feasible that current monitoring efforts could be restructured to provide reasonable estimates of actual waterfowl habitat availability in key breeding, migrational, and wintering areas at some appropriate time interval. Functional relationships identified through the ARM process between waterfowl survival and recruitment and estimated habitat availability would then tend to be more "mechanistic" in that they relate actual habitat, rather than a correlate of habitat, to population response. Simulations - using newly identified "mechanistic" relationships between habitat and populations would be useful in identifying how the importance of various habitats and habitat areas changes with geographic and temporal variations in landscape conditions, population size and harvest. Such simulations therefore could provide a means to draw inferences about the appropriateness of Plan goals (how much habitat and where?) and the relative magnitude of Plan impacts with respect to net landscape change.

Conclusion

There are obvious advantages to more formal integration of waterfowl habitat and harvest management. While obstacles exist, there are presently significant opportunities for partial integration of these efforts which could provide needed information to improve harvest regulation as well as Plan implementation. The information needs for effective assessment of the impact of harvest regulation and Plan associated habitat conservation have converged. To address these needs, the North American Waterfowl Management Plan Evaluation Team and the Adaptive Harvest Management Working Group should combine efforts to study methods to incorporate appropriate habitat parameters and critical hypotheses about the effect of habitats on waterfowl population processes into population models. If appropriate estimates or correlates of habitat can be developed and key hypotheses regarding the effect of habitat on population processes can be codified into quantitative models, the models competing in AHM could be augmented with these relationships. By adding these factors to the competing models, "learning" rates for harvest management could be improved while simultaneously addressing several critical needs of the continental assessment of the North American Waterfowl Management Plan.

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APPENDIX B – HISTORICAL NSST MEETING MINUTES

NAWMP Science Support Team
Fresno Room, Capital Plaza Holiday Inn
Sacramento, California
November 4 - 5, 2003

The NAWMP Science Support Team met in Sacramento CA, on November 4&5, 2003. The agenda and an attendance list are attached. The following notes are not intended as meeting minutes but to serve as documentation of the major topics discussed and agreements or decisions.

1. Pintail Action Group(PAG) ----- Draft Terms of Reference(TOR) for the PAG were circulated prior to the meeting and briefly discussed. There was agreement that the NSST will serve as both a filter and a conduit between the PAG and the Plan Committee. Reports, recommendations, requests, etc. emanating from the PAG will come through the NSST. The PAG revised the TOR at their breakout meeting in Sacramento to incorporate a few suggestions from NSST members to more clearly define how the PAG will deal with issues associated with harvest regulation without usurping roles of Federal agencies, Flyways Councils, and states. The revised TOR were accepted by the NSST and are attached to these notes. PAG membership will be open to any who wish to participate. Each of the 3 countries will have representatives of the Plan Co-Chairs to reflect "official" views of the FWS, CWS, DGVS and Mexican Subcommittee. For the U.S. that person will be Bob Trost(Ken Richkus, alternate) from the FWS; for Canada, Dale Caswell from CWS, and for Mexico, Alberto Lafon of the Mexican Subcommittee on Waterfowl. Each of the 4 Flyway Councils will be asked to consider designating official PAG members, but that will be at their option. (NSST Flyway reps will take this request to the Councils) The PAG needs to remain action oriented and not become a large unwieldy group, but communicate widely with the waterfowl community on their activities.

2. Monitoring ------ Mark Koneff presented an overview of his recent assessments of waterfowl monitoring needs (prepared for the 2003 NAWMP and NABCI Monitoring Committee), news of a proposal for "coordinated bird monitoring", and news of the creation of a monitoring task force by the FWS Division of Migratory Bird Management. Mark asked for input from the NSST, as all these issues need vetting by a larger group of waterfowl experts to fully represent the NAWMP and waterfowl community. Aside from the need of greater involvement from waterfowl interests, the main discussion issue was: How does the waterfowl community define its approach to developing future monitoring activities while maintaining existing operational programs? More directly, how do we address unmet waterfowl needs and not be swept by the tide of non-waterfowl priorities or "coordinated bird monitoring"? The NSST needs to clearly articulate what NAWMP needs and plans are, link that with the Flyway comprehensive surveys list and results of the DMBM monitoring task force. The NSST should prepare an overview document

describing these waterfowl needs, priorities, and proposed approaches as a medium for communicating with state and Federal agencies and other bird initiatives on issues related to monitoring.

This overview could be a vision document describing an over-arching strategy for meeting waterfowl monitoring needs. This strategy would include both habitat and population (demographic) monitoring efforts. It may not be smart to totally disengage from NABCI monitoring efforts and this document will help communicate a waterfowl approach for considering any proposals for new monitoring efforts. Any proposed monitoring activities should first answer 3 questions; what populations? At what scales? With what precision? Further issues for the monitoring strategy are how do you link habitats with populations? What are the objectives? This document will initially NOT be in great detail but this becomes how NAWMP communicates with others on the monitoring issue. Seth will draft a short letter/memo to Plan Committee outlining the intent of NSST to produce the vision document, circulating first with NSST, the final for the PC to endorse and forward to agencies/orgs for support. Mark Koneff will lead in preparing the document but will ask individual NSST members for input and support.

3. Regional Planning Objectives.------Mark Koneff has distributed his work on derivation of county-level mid-winter abundances and distribution. This product has been used as a planning baseline by some of the wintering joint ventures and may be used by others in the future. The maps associated with Marks's work were provided for illustrative purposes only and do not represent a new information product of the NSST. The question discussed by the group was: Do we want an "official" set of regional planning targets, produced by the NSST, to be the basis for all joint venture planning efforts. Answer- no, individual joint ventures may elect to use these data but there is no requirement that any joint venture use this approach, they may develop their own basis for planning if they have other information that provides a better biological foundation in that joint venture. Mark will re-label, caveat, and provide this information for future use on request by individual JVs. A sub group (those joint ventures using this approach) will continue to explore further work to improve this product and its application.

4. NAWMP Progress Assessment-------Mike Anderson gave a presentation describing the current draft framework for a comprehensive NAWMP assessment effort, providing background on the Plan Committee's thinking to date on desired outcomes and logistics. Significant discussion followed. Clearly, there is a need to limit the scope and sharply define framework in order for the effort to be feasible. Biological outcomes seem to be readily addressed, institutional outcomes are a lot less defined and more difficult to engage productively. The NSST believes the assessment should include an institutional component (PC, NSST, JVs, etc.) and should result in critical examination of the value and role of the PC itself. Is there a need to strengthen linkages between Flwway Councils and the JVs?

How exactly will we do this with the JVs? We believe the process should include some combination of reporting by JVs and meetings/interviews with key JV people. We need to think about who from JVs should be involved. This needs further thought and scoping

to make sure that the right range of expertise is involved. The assessment should stimulate critical thinking, and self assessment by JVs, not be a "rating" exercise by some outside group. The outcome is not a grade; but help ensure regional conservation efforts are appropriately connected to the overall NAWMP, so no key opportunities are falling through the cracks. Evaluations should be done in context of JV implementation plans, and the imperative of revising and improving on those plans, based on external factors as well as learning about the effectiveness about what the JV's and partners have been doing. The assessment should be a way to help JVs critically review where they are and want to go. The results should be built upon with revised JV plans.
The PC/NSST should look at the continental picture; seek synergy among JVs and/or between continental and regional scales. JVs provide information that may allow a roll-up assessment. We need to discover together where we stand, any deficiencies, and the work that remains to be done.

The Assessment Steering Committee needs to think about how NAWCA Councils and field-level managers can participate. A disconnect with field-level managers (both public and private) must be avoided.

OUTCOMES

Where are we in relation to where we need to be?…… (landscape conditions)….
KNOWING this is really the outcome we need in number 1 – not simply an accounting of accomplishments.

Biological vs. programmatic. This is a pivotal point of focus. Should not be a programmatic assessment.

A plan-wide consensus about expectations of JVs, and the institutional barriers to the fulfillment of those expectations. (wildlife / agr, among partners).

We envision an assessment framework consisting of outcomes, with more specific sub-ordinate outcomes and questions, with a set of measures and data sources to help answer those questions. The logic flow is purpose, to outcomes, to questions, to measures (and associated data).

Stakeholder Meeting discussion:

There should be a meeting of the PC, NSST, and JVs to discuss the desired outcomes of the assessment and finalize the scope and approach. Kickoff to the assessment itself, ….a major event…. We need broad turnout.

•Outcomes of Stakeholder meeting

Consensus of the Assessment framework
Consensus on the Assessment process and schedule
Consensus on leadership, and involvement

Commitment in principle of resources and staff to do this
Commitment to communicate plans back to regional partnerships
Initial discussion of the institutional issues?

•Participants?

Plan Committee, NSST, JV Board and technical leaders (numbers?), NAWCA members/staff, some key researchers

•Structure / organization?

Opening presentations (PC, NSST, others?)
Facilitated discussion of assessment framework, process, schedule,

•Preparations?

Work ahead of time with management board participants
Distribution of prospectus and draft framework ahead of time.
Joint PC / NSST meeting needed first

•Logistics?

1st or 2nd quarter?

Consensus was that we need to meet again with the PC to frame this and decide on next steps.

Jim D, Seth, Rex, Al, Tina,……work to revise this, Rex draft the letter to the PC. Both pieces reviewed, revised and sent to full NSST for review within one month….. first week of December.

Elements of the Waterfowl Assessment:

The assessment should address at least the following questions:

1. Are regional JV waterfowl goals and objectives clear, biologically well founded, and linked to continental NAWMP goals and objectives?

2. What progress has been made toward achieving those biological goals and objectives?

3. Assess the validity and strength of JV biological foundations.
   3.1. Having factors limiting important target populations been identified?

3.2. Are JV partners examining their key planning assumptions?
3.3. Is needed monitoring in place?
3.4. Are biological models and planning tools being developed, used, and refined through adaptive processes?

4. Are effective feedback and re-planning processes in place and working?

5. Are JV partners communicating what they are learning to one another and to other JVs who might put the information to work? Are the JVs and national partners acting on new information as it emerges?

6. Are regional partners actively identifying key knowledge gaps and acting to address them?
   6.1. Is there adequate scientific support in place to address knowledge gaps? If not, what additional support is needed from the Plan Committee and NAWMP community?

7. Continentally, is there adequate integration of the regional parts?

8. Are there outstanding population or habitat monitoring issues over-arching the individual JVs that are not being addressed? If so, what needs to be done?

Outcomes	**Questions**	**Measures**	**Data**
A continent-wide estimate of where are we in relation to where we need to be re landscape conditions	1, 2	Empirical or model based estimates of status & needs	JV reports & interviews
PIE processes in place	3.1 – 3.4, 4, 5	PIE in place	Interviews
Updated regional goals	4	Done (<2 yr) or underway	JV reports
Recommendations to Plan partners r.e. outstanding needs	4, 6	Needs assessment completed	Renewed goals & cost estimates; science needs ID
Renewed working relationships	5, 6, 7, 8	Monitoring & assessment plans; NSST engagement	Interviews, expert opinion?

This Table comprises the outcomes and questions settled on for outcomes 1 and 2:

Outcomes	**Questions**	**Measures**	**Data**
1. Regional and continent-wide estimates of landscape conditions today, and the future conditions necessary to achieve Plan population objectives, given the recent historical range of environmental conditions and harvest rates.	Does the partnership have a long-term vision of landscape conditions that are predicted to sustain waterfowl population at goal levels? Does the partnership have a recent estimate of current landscape conditions and the difference between those conditions and their long-term vision? What are the major threats / uncertainties to the attainment of this regional vision? Are these being evaluated and addressed? Has the partnership explicitly accounted for uncontrolled environmental variation in assessing progress toward population objectives? Elaborate the meaning of, and implications for Plan goals of "average environmental conditions". Are the resulting regional JV waterfowl goals and objectives clear, biologically well founded, and linked to continental NAWMP goals and objectives? What resources are needed to achieve these goals? Will the sum of the JV parts equal success for the Plan? Are there important gaps?	Empirical or model based estimates of status & needs	JV reports & interviews

	Are the species JVs providing the information necessary to estimate habitat conservation needs, and understanding the sources of variation in population growth, for their species of concern?		
2. Adaptive processes of planning, implementation and evaluation are working at regional and continental scales	a) What limiting factors affecting target populations been identified? b) Identify how JV partners are examining key planning assumptions c)Asses the adequacy of monitoring in place to support adaptive processes. d) What biological models and planning tools being developed, used, and refined through adaptive processes? 4. What feedback and re-planning processes are in place? 5.Are partners acting on new information as it emerges? How are implementation plans updated? 6.Are Plan partners identifying key knowledge gaps and acting to address them? 7.Is there adequate science support (people, funding) in place? If not, what additional support is needed?		
4. Recommendations are made to Plan partners r.e. outstanding needs for both habitat conservation and			

monitoring and assessment needs [this will flow from 1 & 2 above]			

Below is scoping table on Institutional Issues:

Outcomes	**Questions**	**Measures**	**Data**
5. Relationships among the key institutional structures are strengthened and clarified relative to roles, responsibilities, and relationships to renew the vitality of the NAWMP within the conservation community.	Key institutional components of the Plan include the PC, the NSST, JVs and NAWCA Councils. Does the composition of the PC, JV management boards, and NAWCA Councils adequately represent the breadth of the key NAWMP institutional structures and implementation partners and their interests? (Does your form follow function?) Do the PC and JVMB and NAWCA Councils adequately influence key implementation partners and programs? Is the current NAWMP infrastructure adequate for achieving NAWMP goals and objectives? Are the JV partnerships able to allocate adequate resources for waterfowl, i.e., in a climate of numerous competing agendas (e.g., in an "all bird world)? What limitations are there and how might these be addressed? …..Does the PC do this? …...Do NAWCA Councils do this? Is NAWCA functioning adequately		

	to achieve NAWMP objectives? Is the relationship between JVs and field-level habitat managers adequate to ensure strategic implementation of the NAWMP at local scales? Are JVs adequately articulating research and monitoring needs and are they engaging the research community? Is the research community responsive? If not, why not? How do the PC and JV adequately communicate their goals, objectives, and strategies to partners and the larger community of habitat managers including other federal and state agencies, and private land owners? Is the lack of PC influence over resources (i.e., money and staff) an impediment to strong relationships with JVs, Flyway Councils, and others? What is or should be the value added of the PC to Joint Ventures? How can the PC provide greater value to JVs, Flyway Councils, and others? Is a more rigorous JV and PC reporting system needed to strengthen their relationship?		

NAWMP Science Support Team
Fresno Room, Capital Plaza Holiday Inn
Sacramento, California
November 4 - 5, 2003

Tuesday - November 4

8:00 Introductions and Agenda Review

8:20 Pintail Action Group (Attachments A & B)

New approach to NAWMP conservation issues
Draft Terms of Reference
Links to the NSST and others
PAG membership and priorities

Actions: Finalize TOR and membership

9:30 Break

10:00 Monitoring Issues (Attachments C, D & E)

Comprehensive Monitoring Review
"Coordinated Bird Monitoring"

Actions: Identify appropriate NSST involvement in development and review of emerging monitoring initiatives

11:00 Regional Planning Objectives - Status Report (Attachment F, Tables 1-4)

12:00 Lunch (on your own)

1:30 NAWMP Progress Assessment (Attachments G & H)

Charge from Plan Committee
Scoping document from Halifax
Discussion on Assessments scope and content

3:00 Break

3:30 Development of recommendations for Plan Committee

Actions: Address items raised in memo from Plan Committee and scoping document

5:00 Adjourn

Wednesday- November 5

8:00 Draft NSST Business Plan and Operational Approach (Attachment I & J)

Is the NSST fulfilling its mission?
What are our expectations?
How can we be more effective?
What are long term and short term priorities?

Actions: Recommendations for Plan Committee/Others

9:30 Break

10:00 Old Business/Status reports from Joint Ventures and NSST Work groups

10:30 Status of 2003 NAWMP

Overview of 2nd Draft Consultation; Technical Issues including population delineation, objectives, and prioritization

12:00 Lunch (on your own)

1:30 Status Report from Mexican Advisory Subcommittee on waterfowl and their habitats

2:30 Report from PAG breakout (if needed)

3:00 Break

3:30 Parking Lot issues/ other items identified during meeting

4:00 Review of action items and commitments

4:30 Adjourn

Meeting Attendees:

Seth Mott	USFWS
Mark Koneff	USFWS
Mike Anderson	PHJV
Alberto Lafon	Univ Chihuahua
Julio Carrera	Mexico
Jim Dubovsky	USFWS
Al Hanson	CWS
Mike Johnson	ND Game&Fish
Ron Reynolds	USFWS
Barry Wilson	GCJV
Tim Jones	ACJV
Brian Sullivan	PLJV
Robert Mesta	Sonoran JV
Eduardo Gomez	Sonoran JV
Kathy Dickson	CWS
Andre Breault	PCJV
Eduardo Carrera	DUMAC
Peter Perrie	CA DFG
Fred Johnson	USFWS
Bob Trost	USFWS
Tom Aldrich	UT DFW
Kristen Chodachek	IN DFW
Dale Caswell	CWS
Red Hunt	NAWMP
Ron Holbrook	CVHJV
Michael Miller	USGS
Bobby Cox	USGS
Ken Richkus	USFWS
Bill Uihlein	LMVJV
Tina Yerkes	UMGLJV
Dave Duncan	CWS
Bob Clark	CWS
Karla Guyn	DUC
Jim Devries	DUC
Rex Johnson	USFWS

NAWMP Science Support Team
Bismarck, North Dakota
October 10-11, 2001
Meeting Notes

The purpose of the meeting was to discuss work undertaken by NSST Working Groups on technical information for the next NAWMP update, explore the conceptual approaches used to develop that information, reach consensus on outstanding issues, and identify tasks that need to be accomplished prior to the Update. All existing NAWMP Joint Ventures were represented except San Francisco Bay and Upper Mississippi/Great Lakes. Three of the four Flyway Councils was represented by a member of their respective Technical Sections. (See list of Attendees)

Seth Mott, Rex Johnson and Mark Koneff were the organizers of the meeting. Ron Reynolds and the staff of the Bismarck HAPET Office provided the meeting space and refreshments.

Agenda

Day One

8:00 **Welcome, Introductions, Logistics**

8:15 **Report from the Plan Committee Meeting**
Guidance on the 2003 Update

9:00 **Population Objectives**
Report from the Working Group on possible approaches to setting continental objectives

13:00 **Further discussion on population objectives, finalize procedures and approach for determining population objectives, identify data gaps, assign tasks for completion**

15:30 **Proposal for a NAWMP Science Forum**

Day Two

8:00 **Prioritization**
Report from the Working Group on possible approaches to establishing species and geographic priorities

9:00 **Discussion**

13:00 **Further discussion on prioritization, finalize procedures and approach for determining waterfowl priorities for conservation,**

identify data gaps, assign tasks for completion

15:00 Habitat Objectives and their role in the 2003 NAWMP

Seth Mott gave a brief report on the Plan Committee meeting held in Wichita. The Plan Committee believes the 2003 Update document should be a review of the first 15 years of the NAWMP, highlighting the accomplishments and advances contained in the original Plan and the two subsequent Updates. The 2003 document should also establish the challenge and commitment for waterfowl conservation for the future. There is still uncertainty regarding a specific timeframe to be addressed in the 2003 document however the Plan Committee believes that the NAWMP should by a continuous endeavor for the advancement of waterfowl conservation. While not retreating from the partnership and landscape visions of the 1998 Update, the Plan Committee wants the 2003 update and future focus of the Plan Committee to be on waterfowl and improving the scientific foundations of our conservation actions.

Mark Koneff gave a report from the Population Objectives Working Group and lead a discussion on this topic:

Concerning population objectives in the 2003 NAWMP, t**he NSST agreed to the following**:

A) Objectives should be...

1) Communicable --- easy to understand and communicate,
2) Consistent -- with Flyway mgt plans, with the scale at which we are currently managing a species (continental population or subpopulations),
3) Comparable - quantitative, monitoring program to track parameter, scalable to account for uncontrolled environmental variability when appropriate.

B) Objectives will continue to be based on abundance, rather than some other metric such as density.

C) In the 2003 NAWMP we will describe the philosophy and the general process of scaling continental objectives to regional population objectives, and the relationship of regional habitat objectives and conservation strategies to regional population objectives. This is essentially the conceptual planning process we are all familiar with. There are several good JV case studies that could be presented in the NAWMP to illustrate this process.

D) We were comfortable with the notion of scalable objectives that enable the factoring out of uncontrolled sources of environmental variation so that objectives can be more easily compared to monitoring results. More exploratory work will be conducted...see below.

E) It will be important to specify in the 2003 NAWMP the criteria and process used in reviewing and revising NAWMP population objectives.

F) We will identify specific monitoring programs that are used to track population status in relation to objectives. We will also describe monitoring needs for those species/populations for which we have been unable to set objectives because of inadequate monitoring.

G) We will no longer include goals in the NAWMP which are impossible to compare with monitoring results. In particular, the 62 million breeding population, and 100 million fall flight general duck goals will be dropped with Plan Committee approval.

Some Specific Tasks identified for further attention include:

A) Questions for Jose Guevara and other Mexican NSST members:

1) Can you identify monitoring necessary to establish populaton objectives for the masked duck, muscovy, and black-bellied and fulvous whistling ducks?

2) Do you wish to recognize the Mexican duck as a distinct stock in the 2003 NAWMP? Official U.S. policy presently says that no Mexican ducks occur north of the U.S.- Mexico border.

3) If you wish to recognize the Mexican duck, can you identify monitoring programs necessary to establish a population objective for these birds?

B) Seaducks - Tim Bowman will provide a description of monitoring necessary to establish objectives for all seaduck species. A brief discussion about concerns over seaduck population status will also be provided.

C) Black Duck - Jim Wortham will discuss the black duck population objective with the BDJV. Presently a mid-winter objective of 385,000 black ducks is used. Given that operational breeding population surveys now occur annually in eastern Canada and the U.S., the BDJV has had discussions about converting the black duck objective to a breeding population objective. Several initiatives are underway through the BDJV that may have bearing on this issue.

D) Eastern Mallards -- Mark Koneff with contact Jerry Serie regarding the development of a population objective for eastern mallards. Eastern mallards are now identified and managed as a distinct stock. According to the review criteria we have established, a population objective should be established for eastern mallards. This issue will undoubtably require significant discussion and debate among the Atlantic Flyway Council and the Division of Migratory Bird Management. Unfortunately the Atlantic Flyway Council was unrepresented at the NSST meeting.

E) Mottled duck - Barry Wilson will review monitoring programs and will recommend monitoring necessary to establish a population objective for Mottled ducks.

F) Wood duck - Mark Koneff will contact Jim Kelley.

G) Presentation of duck objectives in the 2003 NAWMP -- Mark Koneff will prepare tables for 2003 NAWMP according to consensus on their structure that was reached at last week's meeting. This structure is as follows...

Table 1: will present Mid-continent estimates, Other surveyed area estimates (eastern surveys and certain state surveys), and Unsurveyed area estimates. Bob Trost and Andre Breault will take the lead in estimating populations of all waterfowl species outside currently surveyed areas using methods similar to those used in past for mallard population derivations.

Table 2: will present duck population goals with manner of presentation similar to the 1998 Update. Eastern mallards may be included. Species/populations represented in Table 1 but not in Table 2 are not presently monitored sufficiently to establish population objectives. Monitoring programs and monitoring needs will be described in accompanying text. Additionally, scalable objectives will be identified in the Table 2, and additional detail provided regarding their derivation in the text.

H) Geese and Swans - Tim Moser, representative from the Arctic Goose JV, will coordinate with the USFWS Flyway representatives to review goose and swan objectives for consistency with Flyway plans, to document the name of the survey by which population status is tracked, and to describe additional monitoring needs for geese and swans. The 2003 NAWMP should include maps of the breeding and wintering distributions of recognized goose and swan population. Mark Koneff will compile these maps with the assistance of Tim. Mark Koneff will also look to Tim Moser and the USFWS Flyway representatives to update population status and trends information for the goose and swan tables following the 2002/3 surveys.

I) Distributional Objectives -- we will recapture, from the 1986 NAWMP, the general principle/desire to maintain the historical distribution and diversity of waterfowl, both for the sake of population resiliency and recreational opportunity. Additionally, in the narrative of the 2003 NAWMP, we will describe the breeding duck "carrying capacity" that should be maintained in the U.S. and Canada. This is particularly important in relation to long-term maintenance of populations in the face of uncontrolled weather variations in the Prairie Pothole and Parkland Regions. Rex Johnson, Ron Reynolds, Dale Caswell, Mike Anderson, and Mark Koneff will make recommendations on these carrying capacities and document methods and assumptions.

J) Scalable Objectives -- Mark Koneff will continue to explore bird abundance-environment (specifically PDSI) relationships for possible inclusion of scalable objectives in the 2003 NAMWP.

If possible, information from items A-J specified above should be submitted to Mark by January 31, 2002. This would be prior to the next NSST meeting and would give us a chance to review everything as a group before incorporation into the draft 2003 NAWMP in the spring. If specific tasks take longer to accomplish, we'll have to work out a new deadline.

Mike Anderson and Seth Mott discussed a proposal to conduct a NSST Science Forum

The idea of conducting a NAWMP/NSST Science Forum was discussed and approved at the Plan Committee meeting. The purpose of the Forum would be to:

1. Improve mutual understanding about biological foundation issues between the Plan Committee and the NSST.
2. Further the dialog between the Plan Committee and the JVs about NAWMP's biological foundations and waterfowl conservation needs.
3. Clarify important knowledge gaps & adaptive processes that ought to be addressed in the 2003 revision of the North American Waterfowl Management Plan**.**
4. Share and consolidate knowledge of how evaluations and re-planning have improved JV effectiveness

A draft outline of the proposed forum (see attachment) was discussed. Based on comments from the entire group, Mike Anderson will revise the outline. Seth will circulate this among the NSST and seek concurrence on moving ahead with planning the Forum. The general intent is to hold the forum at a time in the Update process that can provide input to the Plan Committee and drafting team.

Rex Johnson gave a report from the Species and Geographic Priorities Working Group outlining suggested approaches for development of NAWMP priorities and lead a discussion on this topic:

Highlights of Rex's report:

The Plan Committee has asked the NSST to define Plan priorities at a scale that provides species and geographic guidance to Plan partners working at the Joint Venture and BCR level .

Why Prioritize? 1. Refocus conservation delivery, 2. Communicate species and region priorities to NAWCC and others, 3. Affirm Plan's Biological Foundation

The prioritization strategy should reflect the reasons that the public values waterfowl – concern for rare or declining species and socio-economic importance (species important for recreation or cultural reasons)

Continental-scale prioritization

1. Population Trend - Calculate slope on each species trend, 1955-2000
   (+ slope) = 1 (0 or no slope)=2 (- slope, or unknown)=3

2. Socio-economic Importance - (use a species % of continental sport harvest As a surrogate measure of importance)

0-1% = 1 (e.g., oldsquaw)
1-10% = 2 (e.g., pintails, scaup)
>10% = 3 (e.g., mallards, green-winged teal)

Continental-scale prioritization – species priority score = sum of trend score and harvest score

some examples
Mallards - 2 + 3 = 5
Pintails - 3 + 2 = 5
Gadwall - 1 + 2 = 3
White-winged scoter - 3 + 1 = 4
Ruddy Duck - 1 + 1 = 2

Preliminary Results:

Highest (5)	Moderately High (4)	Moderate (3)
Mallard	American Wigeon	Gadwall
Northern Pintail	American Green-winged Teal	Northern Shoveler
Black Duck	Blue-winged and Cinnamon Teal	Greater Scaup
Lesser Scaup	Redhead	Ring-necked Duck
Wood Duck	Canvasback	Barrow's Goldeneye
	Common Goldeneye	Bufflehead
	Oldsquaw	
	Harlequin	Low (2)
	Common Eider	Common Merganser
	King Eider	Red-breasted Merganser
	Spectacled Eider	Hooded Merganser
	Steller's Eider	Ruddy Duck
	Black Scoter	
	White-winged Scoter	
	Surf Scoter	

Geographic prioritization

Use Bird Conservation Regions as geographic units for prioritization analysis

Score each BCR for each species by summing a qualitative score for % of continental population, density, and threats to habitat. Priority is determined by using the summed scores to determine relative BCR ranks for each species. Separate analysis is conducted for breeding and wintering periods.

Example: Breeding Gadwall

BCR	Percent Score	+	Density Score	+	Threat	=	Total	Priority
5	2		2		4		8	Moderate
6	4		2		3		9	Mod. High
8	2		2		2		6	Moderate
9	5		5		2		12	High
10	4		3		2		9	Mod. High
11	5		5		5		15	High
12	1		1		4		6	Moderate
13	1		1		4		6	Moderate
14	1		1		2		4	Low
15	2		3		2		7	Moderate
16			3		2		8	Moderate
17	4		5		2		11	Mod. High
18	2		3		3		8	Moderate
19	2		2		4		8	Moderate
21	1		1		2		4	Low
22	1		1		5		7	Moderate
23	2		2		5		9	Mod. High
30	1		2		4		7	Moderate
33	2		2		1		5	Low
34	2		2		1		5	Low
35	1		1		1		3	Low
36	1		1		4		6	Moderate

Relationship with PIF assessment scores - Relationship with PIF assessment scores - During the discussion on how to develop the threats to habitat score for each BCR, Mike Carter proposed that the NSST adopt the PIF species assessment methodology but sum only the fields NAWMP thinks are appropriate. While there was some agreement that using a similar approach for determining threats to habitat scores had merit, the discussion turned toward a general critique of the PIF process in regard to its use for determining waterfowl priorities. The group generally agreed that using a common assessment methodology for all birds may lead to an inappropriate comparison of priorities across different bird initiatives. To prevent this, the group believes that waterfowl should not be included in PIF-generated species assessment analysis.

Unresolved Issues for Geographic prioritization

How to consider migrational areas ?

Should we generate a single map of geographic priorities by weighting species by continental ranks and then aggregating species maps?

Prioritization Decisions and Action Items:

Continental Species Prioritization:

We will foot-note species with populations that are (1) rare or significantly below an accepted population goal; or (2) stable or increasing species with a large allopatric populations in decline.

For prioritization analysis we will lump greater and lesser scaup

Jeff Drahota will get Mexican harvest data (needs review by Mexican NSST)

Rex/Seth will get trend data for Mexican endemics via consultation with Mexican NSST members

Bob Trost, Tim Moser., Dale Caswell, Guy Zinner– Provide goose subspecies/population mean harvest estimates

Tim Moser. – get goose subspecies/population trends from status report (use goose subspecies/population list from 1998 update + W. High Arctic Brant)

The following information is needed from Mexico:

1. Provide an estimate of long-term (full period of record for the species) and short-term trend for muscovy, masked duck, fulvous whistling duck, and black-bellied whistling duck. If trend can't be estimated quantitatively, qualitatively assess trend as: **DECLINING, UNKNOWN, STABLE,** or **INREASING.**

2. Report any of these species for which the mean annual sport harvest in Mexico is >125,000 birds (and provide an estimated mean Mexican harvest for species that occur in the US and Mexico - if possible. Ideally, means should be estimated for the period 1980-1999)

Geographic prioritization

Bob Trost, Tim Moser., Dale Caswell, Guy Zinner will get the percent of each goose subspecies/population wintering in each BCR (use colony sites where appropriate for breeding) – if percent is not available classify importance of each BCR as High, Moderately High, Moderate, Low (and absent)

Tim Bowman will do the same for breeding and wintering sea ducks.

We will modify BCR boundaries by using species range maps (breeding and wintering) to remove areas from BCRs that are beyond a species' normal range.

Insert critical (major) staging areas into species priority maps and into overall geographic priorities maps

We will aggregate species geographic priorities by season. Keep ducks, geese and swans separate and keep breeding and wintering separate.

We will review PIF threat scores – adjust and use – submit revisions to PIF/RMBO.

Eventually, review PIF parameter scores and request that waterfowl not be total scored in a common data base.

The following information is needed from Mexico:

1. Estimate the number of birds of each species listed in the 1998 NAWMP wintering in each Mexican BCR. Do the same for the breeding season. If quantitative estimates are not available, qualitatively describe the importance of each BCR for breeding and wintering waterfowl by species listed in the 1998 NAWMP - describe the number of birds in each BCR as **HIGH, MODERATELY HIGH, MODERATE, AND LOW**. Do this only for BCRs in the primary range of the species. No more than 1/4 of the BCRs in the primary range may be assigned to the **HIGH** category and no more than 1/4 may be assigned to the **MODERATELY HIGH** category.

2. Assess threats to breeding habitats and wintering habitats for each species that breeds or winters in Mexico using the following criteria: (Keep lists for breeding and wintering seasons separate)

Very Low (1) - Expected future conditions better than historic conditions - possibly becoming a problem species because of habitat enhancement

Low (2) - Expected future conditions similar to historic conditions - no known threats

Moderate (3) - Slight to moderate decline in future habitat abundance or quality but current conditions similar to historic conditions - or - future conditions expected to be stable but significant losses of habitat have already occurred.

Moderately High (4) - Severe past or predicted deterioration or decline in habitat availability or quality.

High (5) - Extreme past or predicted deterioration or decline in habitat availability or quality - species in danger of regional extirpation.

Return all comments/data to Rex Johnson – rex_johnson@fws.gov
USFWS
21932 State Highway 210 East
Fergus Falls, MN 56537
218-736-0606

Habitat Objectives

The group briefly discussed how habitat objectives should be portrayed in the 2003 NAWMP. Habitat objectives included in the 1994 and 1998 Updates were derived by

individual Joint Ventures without the benefit of a common approach for linking continental population goals with habitat objectives. Even those Joint Ventures that took the lead in developing links between NAWMP goals and JV objectives now find it judicious to revise their objectives using knowledge gained from research, monitoring, and assessment. The 2003 NAWMP, in meeting the Plan Committee's goal for improving biological foundations, will discuss in detail approaches to regional biological planning that link with continental NAWMP goals. Most Joint Ventures, however, will not be able to provide new or revised habitat objectives that result from these approaches before publication of the 2003 document. Consensus of the group was to include in a table current JV habitat objectives, while stressing the need for all JVs to conduct recurrent strategic planning using NAWMP guidance and contemporary biological information and knowledge.

Next Meeting

There was no determination of the next meeting date. It will be determined by the progress made on the tasks identified above and the development and organization of the Science Forum. Until then, we will communicate as needed by email.

Meeting Attendees

Seth Mott	U.S. Fish and Wildlife Service
Tice Supplee	Arizona Game and Fish
Mike Carter	Playa Lakes Joint Venture
Mike Anderson	Ducks Unlimited Canada
Mike Johnson	North Dakota Game and Fish
Andy Schollett	Northern Great Plains Joint Venture
Ron Reynolds	U.S. Fish and Wildlife Service/PPJV
Guy Zenner	Iowa Dept. Natural Resources
Dale Caswell	Canadian Wildlife Service
Bob Trost	U.S. Fish and Wildlife Service
Chuck Loesch	U.S. Fish and Wildlife Service
Mark Koneff	U.S. Fish and Wildlife Service
Rex Johnson	U.S. Fish and Wildlife Service
Al Hanson	Canadian Wildlife Service
Jim Wortham	U.S. Fish and Wildlife Service/BDJV
Tom Aldrich	Utah Division of Wildlife Resources
Tim Bowman	U.S. Fish and Wildlife Service/SDJV
Mike Eichholz	Central Valley Habitat Joint Venture
Tim Moser	U.S. Fish and Wildlife Service/AGJV
Andre Breault	Canadian Wildlife Service
Chuck Hayes	U.S. Fish and Wildlife Service/ACJV
Randy Wilson	U.S. Fish and Wildlife Service/LMVJV
Barry Wilson	Gulf Coast Joint Venture
Jeff Drahota	U.S. Fish and Wildlife Service/RWBJV

NAWMP Science Forum
Statement of Purpose and Outline
September 25, 2001

NAWMP Science Forum – Building understanding and consensus for 2003

Purposes

1. Share and consolidate knowledge of how evaluations and re-planning have improved JV effectiveness.
2. Improve mutual understanding about biological foundation issues between the Plan Committee and the NSST.
3. Further the dialog between the Plan Committee and the JVs about NAWMP's biological foundations and waterfowl conservation needs.
4. Clarify important knowledge gaps & adaptive processes that ought to be addressed in the 2003 revision of the North American Waterfowl Management Plan.

Who Should Attend?

North American Waterfowl Management Plan Committee

NAWMP Science Support Team

JV Coordinators, Management Board members, Technical Committee members (1 or 2 people from each JV)

Approximately 50 people altogether

When?

Tentatively, 3 days in early January 2002

Where?

TBA - Somewhere in the southern U.S., with good airline connections and a local volunteer for logistical support.

Preliminary Agenda

Day 1

0800 - 0830 Introduction – Setting the Stage

Reports from Habitat Joint Ventures Planning—Implementation—Evaluation Using learning cycles to improve program delivery:

At a minimum, each JV should:

Give a 5 minute presentation identifying a biological assumption that underlies their JV implementation strategy.

Describe an example of how learning has changed an aspect of JV implementation.

Identify a key issue of biological uncertainty for investigation in the near future.

To the extent time is available, longer presentations that provide more detail on specific planning/evaluation approaches taken by individual Joint Ventures will be considered.

0830 – 1600 Reports from each habitat JV

1600 – 1630 Mexico: NAWMP Progress, Plans and Needs

<u>The Needs of Problematic Species</u>

1630 – 1650 Sea Duck Joint Venture Progress and Information Needs

DAY 2

0800 – 0830 Arctic Goose Joint Venture Progress and Information Needs

0830 – 0900 Black Duck Joint Venture Progress and Information Needs

0900 – 0930 Northern Pintails

0930 – 1000 Scaup

Break

1020 – 1050 Climate Change and Waterfowl Conservation

1050 – 1120 Over-Arching Issues of Continental Importance for Waterfowl

1120 – 1150 Synergies between ARM for the North American Waterfowl Management Plan and Adaptive Harvest Management

Lunch

1300 – 1330 Waterfowl Population Monitoring Improvements and Future Needs

1330 – 1350 Institutional Frameworks and Process Needs for Effective Adaptive Management of Plan Programs

1350 – 1400 Wrap up – Where to from here?

Break

1420 – 1700 (First Breakout Sessions)
North American Waterfowl Management Plan Committee
NAWMP Science Support Team
Day 3

0830 – 930 NSST Recommendations for the Plan Committee Regarding the 2003 Plan Revision

930 –1030 (Second Breakout Sessions)
North American Waterfowl Management Plan Committee
NAWMP Science Support Team

Break

1100 – 1200 Final Joint Session: Next steps in Preparing the 2003 Plan Revision

Afternoon: Travel home

Evaluation Team urges the heads of the U.S. and Canadian NAWMP Offices to make recommendations on Team membership before the October 1994 Plan Committee meeting.

The time to offer Mexico representation on the NAWMP Evaluation Team was discussed. It was agreed that membership on the NAWMP Evaluation Team should not be offered until the Mexican partners have completed implementation planning. The possible need to change the terms of reference for membership to the NAWMP Evaluation Team was discussed in order to accommodate future Mexican involvement. It was decided that the terms did not need to be revised but it should be added that future Mexican members will be appointed by the Mexican NA WMP director.

Action Items -- 1) the U.S. and Canadian NAWMP offices will be briefed as to the interest of NA WMP Evaluation Team members in future involvement on the Team 2)draft letter to . directors of the U.S. and Canadian NAWMP offices which describe the potential need to add text to the terms of reference for Team membership which indicate that any future Mexican representatives would be appointed by the Mexican director of the NAWMP.

Chairmanship of the NAWMP Evaluation Team

A motion was made and seconded that Mike Tome of the North American Waterfowl and Wetlands Office continue as the chair of the Team.

Role of the NAWMP Evaluation Team

The memo drafted as a result of last Team meeting (but not sent) regarding prioritizing joint ventures for evaluation was discussed and its background was reviewed. Some concern was expressed that the memo could be construed as the NAWMP Evaluation Team giving up on a continental evaluation of the NAWMP. However, the intent of the memo had been to get past the minutia of joint venture evaluation plans and to focus attention on several key joint ventures which will make or break the NAWMP. The memo was intended to present the idea that in order to evaluate the overall continental success of the NAWMP, certain information from several key joint ventures was required. Team members felt that the intention of the NAWMP Evaluation Team to shift focus from individual joint venture evaluation plans to establishing a mechanism to begin to continentally evaluate the success to the NAWMP should be communicated to the NA WMP Committee, possibly as part of the annual report. The NAWMP Evaluation Team needs to evolve beyond individual joint venture evaluation plans, to a body to gather critical scientific information and to develop the necessary linkages among joint venture evaluation efforts to report on the continental progress of the NAWMP.

like evaluation. They felt that a coordinated evaluation of the JV will not happen unless NGOs begin to feel pressures for feedback from their funding sources.

Mike Miller and Bob MacLandress recognized the limitations of the current draft of the CVJV plan with respect to providing a background and theoretical framework for the CVJV. They agreed to complete these important parts of the evaluation plan. They were also very receptive to suggestions of ways to more efficiently organize the evaluation issues of the plan. The Team suggested the writers should consider reorganizing and consolidating the projects/evaluation issues. They suggested that large lists of projects can be intimidating to management boards.
Mike Miller questioned the expectations of the Team with regards to examining the linkage between JV population and habitat objectives. The Team clarified by explaining that "population objectives" of ducks in wintering joint ventures are really only useful in developing habitat objectives. This is due to the fact that goals for ducks in the NAWMP are stated as breeding populations and no clear relationships exist to predict the number of birds on certain wintering grounds based on breeding populations. The intent of developing population objectives using 1970s data is to provide a basis, in conjunction with assumptions on limiting factors in the JV, for the formulation of habitat goals.

Action:

1. Team will provide specific written comments on the CVJV evaluation plan to Mark Koneff. Mark will consolidate the comments and send along to Mike Miller and Bob MacLandress.
2. Mark Koneff will send a listing of the NAWMP Evaluation Team members and their addresses and phone numbers to Mike Miller.
3. Mark Koneff will check with Bob Streeter on current availability of the $30,000 budgeted by NAWWO for evaluation coordination.
4. The Team will devote time into developing a strategy to convince the CVJV management board about the need for evaluation in the CVJV.

Evaluation of the North American Wetlands Conservation Act (NAWCA)
At the request of Bob Streeter, Mark Koneff discussed recent amendments to the NAWCA which require a continental scope planning and evaluation effort to ensure that appropriated and matching funds are being spent in a manner which provides the desired positive impacts on wetland dependent migratory bird populations. Mark mentioned that North American Wetlands Conservation Council (NAWCC) staff have been charged with the development of the wetland conservation plan and evaluation strategy. Bob Streeter, NAWCC Coordinator, requested that the Evaluation Team consider ways in which it could aid/facilitate the NAWCA evaluation planning process.

understood. To the extent that they are, Adaptive Management provides a link to habitat condition through model parameters. Bob Trost agreed to brief Bob Streeter on the harvest regulations setting process and to discuss the events at the SRC meeting.

Action:

1. Bob Trost will brief Bob Streeter on the annual harvest regulations process and the implications of the discussions at the Jan. 1995 SRC meeting.

NAWMP Continental Evaluation First Step

The Team initiated a process to begin to take a continental perspective in evaluating the NAWMP and the role of Joint Ventures in that evaluation. The goal of this process is to draft a report to the NAMWP Committee summarizing the planning, implementation, and evaluation activities that have gone on under the NAWMP to date and provide guidance on the progress and direction of the NAWMP and individual joint ventures as well as to identify major evaluation issues which are essential for effective evaluation of the NAWMP and which transcend joint venture boundaries.

The Team discussed the goals of the JV process. First was to answer 2 questions. Do the goals and objectives and strategies hang together to support the goals of the NAWMP? Do the biological assumptions upon which JV implementation is based make sense? What are the priority evaluation needs of joint ventures and continentally? Upon completion of this process, the Team will prepare a report to the Plan Committee which will summarize its findings plus will identify regions/areas where progress is lacking to the point of being limiting.
Jim Ringelman presented 4 possible alternatives in this continental approach (link breeding JV to Winter and Migration JV*)*
Benchmark Approach-- compare present winter/migration habitat with that in 1970-79 to assess relative habitat availability.

Energetic Approach-- match winter objectives from energetic conversions ... *K* issues.

Convert breeding ground goals into use/day goals.

Do Nothing-- assume breeding grounds limiting population growth and increasing winter habitat has no effect.

Bottleneck-- designing migration and winter habitat needs based on worst case scenario ... large fall flight, drought.

Bob Trost felt Jim's ideas were good, but suggested that the process begin with some basic accounting of *JV* and NAWMP goals to see how well they hang together. The following table was developed ...

North American Waterfowl Management Plan Evaluation Team Minutes of January 31 to February 3 Meeting in Sacramento, CA

Population Goal Accounting -- Do pop. objectives of JVs coalesce to overall NAWMP goals?

JV	Breeding	Wintering
PHJV	20.8 Million	
PPJV	6.8 million	
LMJV		8.7 million
GCJV		13.0 million
CVJV	0.5 million	4.7 million
EHJV	?	
Other	22.4 million	
Outside Survey	11.0 million	
Total	61. 5 million	

The suggestion was made that we should be examining the results of the May survey by specific transect/segments that are within the joint venture boundaries. It was pointed out that the boundary of the PHJV is very much in question. It was also suggested that the Team in reporting to the Plan Committee should emphasize the continental picture in population response to varying habitat conditions-- include information on and show relationships between northern breeding areas, the PHJV, and the PPJV. How do populations change in these joint ventures in response to varying conditions. In reporting to the Plan Committee the Team should point out where the NAWMP is relative to the population goals but should emphasis the variable nature of continental waterfowl populations and should stress other measures of progress such as recruitment rate on the breeding grounds. The report to the Plan Committee should also put weight on the population goals for the surveyed area vs. the continental goals since no information is available to address the continental goals.

Wintering/Migratory Joint Venture Population Analysis and Accounting

Jeff Nelson and Mark Koneff presented an analysis of dabbler winter numbers and distribution derived from MWI and harvest data. The analysis followed a similar approach to that used in the Lower Mississippi Valley JV Evaluation Plan. The intent was to compare wintering JV habitat objectives with the estimated number of wintering birds given the NAWMP population goals are met and winter distribution of birds is the same as it was in the 1970s. It is hoped that this approach will provide a means to begin to evaluate the adequacy of wintering JV habitat objectives from a strictly energetic (foraging habitat) perspective.

Several assumptions are implicit in this approach to linking breeding JV*s* to wintering and migratory JV*s*. First, it is assumed that winter distributions in the future will be the same as in the 1970s. Secondly, this approach assumes that what we observe is what is needed --

i.e., foraging habitat. Third, this approach assumes that use days are convertible to management objectives. Lastly, it is assumed that mid-winter inventory data and harvest data provide a reasonably unbiased picture of the winter distribution of waterfowl.

Action:

1. Mark will continue the national level analysis expanding it to include divers, and geese with the cooperation of Jeff Nelson, Jim Ringelman, and Bob Trost. Need to clarify which population goals are used in the analysis. Mexico will continue to be included in the analysis.
2. The subgroup will consider ways of incorporating migratory JVs into this analysis. One method suggested was to use waterfowl count by month at NWRs as wells as banding data to construct migration corridors and migration curves and use this information to predict use days on migratory JVs.
3. Upon completion, analysis results will be presented with a summary table and methods section. There is opportunity to fine tune the analysis with inclusion of species specific population data and region specific differences in parameters.
4. Bob Trost will provide the subgroup with monitoring data for the spring migration period -- special surveys, as well as data from waterfowl surveys on NWRs in the fall.

Assumptions in Linking Wintering JVs to Breeding JVs in a Continental Perspective
• The Lower Mississippi Valley JV assumed that foraging habitat is limiting wintering waterfowl populations in the Lower Mississippi Valley Joint Venture. Several other JVs have begun to carry over this assumption in the development of their evaluation plans. The suggestion was made that this perhaps is a "continental evaluation issue or assumption" that needs to be brought before the Plan Committee. If foraging habitat on the winter grounds is not limiting populations and would not given current habitat availability and meeting the goals of the NAWMP, or if the importance of foraging habitat as a limiting factor varies by joint venture, major changes in. the implementation of the NAWMP could be in order.

Action:

1. In the report to the Plan Committee, the following should be identified as "evaluation issues critical to the continental evaluation of the NAWMP" ...
Does habitat limitation exist on any wintering/migratory joint venture?
Is foraging habitat really the limiting factor on wintering/migratory grounds?
How does habitat limitation on the wintering grounds effect continental waterfowl populations? Winter or migration mortality? Body condition and reproductive success ? Ability of populations to respond to or take advantage of changing environmental conditions?

2. In the report to the Plan Committee, provide suggestions on how to facilitate the examination of these questions.
3. Establish a subgroup of experts to hold wintering ground workshop. Team representation will be Jeff N .• Jim R.• Bob T .• and Mike A. Others who will be asked to attend are...Ken Reinecke, Mike Miller, Loren Smith, Leigh Frederickson, Al Afton, and Mike Conroy. The meeting is to be held near Memphis, TN in April. This workshop is to take a critical look at the assumptions of wintering and migratory joint ventures, consider whether use-days is an appropriate index to resource demand, review the rationale and evidence for food limitation in these joint ventures and links to waterfowl demographics, discuss how indices to resource demand are convertible to management actions, and brainstorm ways in which hypotheses about wintering resource limitations could be tested with respect to effects on waterfowl demographics.
4. Letter to Joint Venture Coordinators (wintering and migratory) -- provide us with any data or references they can that could be used to compare present waterfowl habitat quality and quantity with that· in the 1970s.

Assumptions on the Breeding Grounds
Management can alter production rates on a landscape scale.
Management can increase breeding population size on a landscape scale.
Host of assumptions that are associated with the use of the Mallard Productivity Model in planning.
Little time was left to spend on the breeding grounds. General consensus was that the goals appeared to make sense and hang together from an overall NAWMP perspective. The NAWMP Evaluation Team believes that the correct problems have been identified in joint venture plans and that explicit and implicit assumptions related to factors limiting waterfowl production are supported by current literature.
Eastern Habitat Joint Venture and the Black Duck Joint Venture
Bob Bailey reviewed the historical development of the Eastern Habitat Joint Venture. This JV was originally established as a migratory joint venture targeted at black ducks. Bob expressed concern that the goals of the JV currently have been distorted from the original intent of the JV. The EHJV currently cites a lack of brood habitat as limiting waterfowl populations in eastern Canada. The Team questioned the validity of this assumption. The current EHJV implementation plan promotes the JV as a waterfowl breeding JV rather than a migratory JV focused particularly on black ducks.
The Evaluation Team discussed how to question or challenge the current track of the EHJV in a constructive fashion. The Team felt that they were justified in challenging the assumption that brood habitat is limiting waterfowl populations in eastern Canada. They were aware of no evidence to support this assumption and in fact were aware of some contradictory

evidence. Further, this major assumption driving joint venture implementation is not tested in their evaluation plan. Secondly, the Team feels that the JV should be asked to demonstrate how the goals of the EHJV/BDJV are complementary with the goals of the NAWMP. Lastly, some consideration and future analysis should be given to combining portions of the EHJV, ACJV, LGL/SLBJV, and the BDJV. This analysis and recommendation should be based on the inconsistencies that are apparent in the approach of the different JVs and common problem that the JVs have...black ducks.
The following issues were discussed as being incorporated in the report to the Plan Committee. These issues will be revisited at the summer 1995 meeting of the Evaluation Team.

The issues are:

Inconsistencies of NAWMP goals and EHJV goal for black ducks.
Transition of EHJV from staging/migration to breeding JV --brood habitat assumption.
Progress on "what can be done now" with respect to black duck populations.
Given that a monitoring program is operational for black ducks -- possibility exists to merge EHJV,LGL/SLBJV maybe part of ACJV. The BDJV could focus on evaluating success of the merged habitat JV.

Action:

1. This issue will be revisited at the next meeting. The goal will be to decide upon what recommendations to make to the Plan Committee.

Next meeting:

Meeting locations proposed were Sackville in the Canadian Maritimes or in the PCJV. Meeting will be scheduled sometime in August. Potential dates of 14-18 were proposed.