

**North American Waterfowl Management Plan Evaluation Team**  
**August 20-22, 1996 Meeting**  
**Ottawa, Ontario, Canada**

The meeting was called to order at 9:00am on August 20 at the Barryvale Lodge near Ottawa, Ontario. All North American Waterfowl Management Plan (Plan) Evaluation Team (Team) members were present (Mike Anderson, Bob Bailey, Rick Baydack, Fred Johnson, Mark Koneff, Jeff Nelson, Jim Ringelman, Clayton Rubec, Mike Tome) except Tom Martin. In addition, David Smith and Greg Thompson represented the 1998 Plan Update Working Group in meeting with the Team on August 21.

First Order Topics

The minutes of last meeting were reviewed and approved.

Progress on the 1996 Annual Report to the Plan Committee

The first day of the meeting was structured to correspond with the outline of the 1996 Annual Report of the Team to the Plan Committee. This outline was developed during the June 1996 Team meeting. Various Team members were assigned responsibility to develop and draft specific portions of the Annual Report. The Team member charged with each section in June, led a discussion at the current meeting on progress which had been made in developing and refining each section. The Team then commented on the approach taken in each section and provided guidance to individual members on developing a final draft.

*Part I. Summary of Evaluation Results: Successes and Limitations*

**Action:**

- 1) Jeff N., Mike A., and Jim R. were assigned primary responsibility for drafting Part I of the annual report to the Plan Committee.
- 2) As described below, other individuals have responsibility for completing and documenting analyses which will be utilized in Part I. The following time-line was adopted by the Team for completing the annual report.

**Sept. 16, Monday** -- Individuals charged to complete and document analyses for Part I must send an electronic copy of their results to Jim, Mike, and Jeff by this date.

**Sept. 27, Friday** -- Jim, Mike, and Jeff send Mark a draft of Part I.

**Oct. 1, Tuesday** -- Mark compiles Parts I, II, and III of the report and submits first integrated draft to Team members for review (Mike A's and

Rick's copies will be delivered to the Omni in Cincinnati).

**Oct. 8, Tuesday --** Mark receives all Team comments on report draft by this date.

**Oct. 11, Friday--** Mark will incorporate all comments by this date and complete a final draft working with Mike T, and Fred J. as possible. This will then be submitted to the Plan Committee along with other materials for their Oct22-23 meeting in Quebec City.

Part I of the Annual Report will be structured to:

- a) Review evaluation status and progress at the joint venture and continental levels
- b) Provide recommendations to Plan Committee based on evaluation feedback currently available
- c) Highlight evaluation success - Where evaluation has made a beneficial contribution to efficient, effective management
- d) Highlight the failure of current management/evaluation frameworks in providing information to reduce uncertainty about fundamental population-habitat relationships (structural uncertainty)
- e) Provide lead-in to Part II.

Several information sources will provide the basis for the review of evaluation status, recommendations and gleanings, and in highlighting successes and failures of current management/evaluation frameworks (a,b,c,d above). These sources are as follows:

- 1) Large-scale retrospective analyses described in the prospectus prepared by the North American Waterfowl and Wetlands Office and the Migratory Bird Management Office, entitled "*Comparison of duck population status in relation to implementation of the North American Waterfowl Management Plan.*"
- 2) Large-scale retrospective analyses being conducted currently by researchers at the University of Guelph, Ontario.
- 3) Joint venture goal consistency analysis -- a non-rigorous assessment of the complementarity and consistency of non-breeding joint venture assumptions and objectives given Plan population objectives.
- 4) Joint venture evaluation reports, where available and pertinent

Following the Annual Report outline, Team members presented updates on the status of each of the above information sources.

NAWWO/MBMO Retrospective Analyses. Mark Koneff and Fred Johnson presented an update on the status of the proposed retrospective analyses. The prospectus describing the analyses was discussed at the June 1996 meeting.

*Survival.* Mark reviewed efforts to develop a conceptual model of the survival process over the annual cycle of mid-continent mallards. The conceptual model provided a basis on which to begin to identify potential broad-scale measures or correlates which might affect habitat suitability on the breeding, migrational, or wintering grounds.

The conceptual model of habitat and environmental effects on the “natural” survival process as well as an initial review of potentially pertinent habitat correlates and available datasets was documented by the NAWWO and MBMO in “*Natural survival: a conceptual model and review of data sources to index model components.*” This document was intended to serve as an update to Team members on progress in collecting data relevant to the proposed retrospective analyses and modeling efforts. The conceptual model proposed that “habitat suitability” in breeding, wintering, and migrational areas affects mallard natural survival either directly (within season, within geographic region) or indirectly (cross-season or cross-region). It defined “habitat suitability” in a particular geographic region as a function of population size (use pressure), potential habitat, and climatic effects.

Lastly, the document reviewed an initial list of potential broad-scale habitat correlates which may be useful in modeling natural survival and recruitment as specified in “*Comparison of duck population status in relation to implementation of the North American Waterfowl Management Plan.*” Potential correlates were suggested based on their ability to provide information about some facet of “habitat suitability,” as defined, during some stage of the annual life cycle. Additionally, correlates had to be readily available for immediate use, that is they had to be largely available as part of an existing digital dataset.

The Team made several suggestions for the future development of both the study prospectus and the document describing the conceptual model and potential habitat suitability correlates and source datasets. It was believed that the following suggestions would make these documents more useful over the next year as the proposed retrospective analyses are completed. It was suggested that additional development take place on the conceptual model of the annual cycle and that the document describing the conceptual model and potentially pertinent habitat correlates and datasets be incorporated directly within the prospectus describing the proposed retrospective analyses. This section would be directly linked to the descriptions of proposed survival and recruitment modeling methodologies. Furthermore, it was suggested that hypotheses about the relationship of each habitat suitability correlate described in “*Natural survival: a conceptual model and review of data sources to index model components*” be made more explicit.

It was noted that the results of the proposed survival modeling would not be available for the annual report to the Plan Committee meeting. Fortunately, however, the Patuxent Wildlife

Research Center has agreed to support the survival modeling efforts in the near future by dedicating staff time of Bill Kendall.

**Action:**

- 3) Mark K. will edit the two documents to merge discussions of the conceptual annual model and data sources with discussions of modeling objectives and methodology presented in the study prospectus. Mark will begin to more explicitly state hypotheses about the relationship of proposed habitat suitability correlates to survival and recruitment and incorporate these within the merged document. Mark will provide an initial draft to Jim R. for suggestions.
- 4) Jim R. and Mark K. will prepare a presentation to be delivered to the Adaptive Harvest Management Working Group in December. The presentation will describe the current thinking among Team members with regards to waterfowl habitat management and ARM, will identify implications of the 1998 Plan Update, will describe current Team efforts to begin to formulate and model hypotheses about the effects of habitat on population processes, and will highlight the intersection among the needs of the harvest and habitat management communities. In addition, the AHM Working will be asked to consider and provide suggestions on the conceptual model of the annual cycle and habitat effects on population processes being developed in Action # 3. It will be critical to develop a conceptual model of broadly endorsed hypotheses in order to proceed.
- 5) The development of a broadly acceptable conceptual model of the annual cycle of mid-continent mallards will not be completed in time for the annual report to the Plan Committee. Instead, the annual report will briefly describe what is being done, why it is being done, and the time frame for completing the work. Jeff N., Mike A., and Jim R. will provide this description as part of their responsibilities for drafting Part I of the report. The merged technical documentation (Action #3) will be included as part of Part III of the annual report.

*Recruitment.* It was noted that many of the same habitat suitability correlates and datasets may be pertinent to the proposed recruitment modeling. As with survival, it is important that a sound, broadly acceptable conceptual model of the annual cycle and habitat effects on population processes throughout the annual cycle be developed to provide bases for the modeling proposed. Mark reviewed the status of efforts to initiate exploratory analyses on potential habitat suitability correlates and on incorporation of appropriate correlates into large-scale explanatory models of the recruitment process.

The Patuxent Wildlife Research Center, the NAWWO, and MBMO have agreed to a 3-way even cost share to support a full-time post-doctoral position. The successful candidate would be housed at the Center and would work directly with PWRC, MBMO, and NAWWO staff in exploratory and descriptive analyses of proposed broad-scale habitat correlates and in refining and conducting the recruitment modeling proposed in the NAWWO/MBMO prospectus.

The funding for this position is currently available and a qualified individual is being sought.

*Abundance/distribution.* Fred summarized progress in completing the descriptive analyses of duck population abundance and distribution which were proposed in the NAWWO/MBMO prospectus. The results of piecewise regressions for each of the 10 principal species in the May survey were discussed. As described in the prospectus, the time intervals used in the regressions corresponded to the 1970s baseline period, an early 1980s pre-implementation period, and a late 1980s to early 1990s Plan implementation period. As noted in the prospectus, the analyses of abundance were purely descriptive and no attempt was made to explain observed patterns. This is in deference to serious limitations inherent in such time-series analyses.

From a purely descriptive standpoint, several patterns in species abundance were evident over the period 1970-1996 which may have implications for future population modeling efforts. Three general patterns in species abundance were noted which seem to correspond to individual species nesting chronologies. Early nesting dabblers, such as mallards and pintails were undergoing a population decline throughout the 1970s which worsened in the early 1980s. These periods of decline were followed by increases over the past several years as the drought was broken on the prairie breeding grounds. Late-nesting dabblers such as blue-wings, gadwall, and shovelers, exhibited relatively stable populations in the 1970s followed by patterns similar to the early nesters in the subsequent two time periods. Finally, later nesting divers such as redheads and canvasbacks exhibited population increases throughout the baseline 1970s, followed by similar patterns of decline then increase. Green-winged teal and scaup did not correspond to these general trends in abundance.

The ability to generalize among species will be an important future management issue as the framework of ARM is utilized in waterfowl harvest and potentially habitat management. Because of the complexity involved in individually managing large numbers of species simultaneously, the challenge to managers will be to identify appropriate groups of species which can be expected to respond to management action in a similar way. Descriptive analyses such as these may improve our ability to make such generalizations.

The Team discussed appropriate approaches to presenting this material within the annual report. It was noted that unsupported conclusions could easily be drawn from the data and results of the analysis, specifically in relation to the impact of Plan implementation on populations. It is important that the annual report present bottomline conclusions from this material so as to avoid potential pitfalls in allowing interpretation by managers unacquainted with the analytic procedures.

***Action:***

- 6) Fred will work with Clint Moore of MBMO to complete the abundance and distribution analyses and write up for inclusion in Part I of the report.

*Past Survival Modeling Efforts.* To give Team members better background and insight

into the scope of the survival modeling (and recruitment modeling) proposed in the NAWWO/MBMO prospectus, Fred reviewed some past joint efforts of MBMO and the PWRC.

Fred discussed the “ultra-structural model” of survival described by Burnham et al. in 1984. Here hypotheses about the relationship between hunting kill and annual survival were built into the model used to address the hypothesis and took the form:

$$S_t = s(1 - ak_t) \quad (1)$$

where  $s$  is survival in absence of hunting,  $k$  is hunting kill rate, and  $a$  is a factor which phenomenologically accounts for the nature of the relationship between hunting and annual survival.

Fred reviewed several conclusions drawn from earlier investigations of survival utilizing this model: a) variation in kill rate explained a significant portion of variability in annual survival ( $a > 0$ ), b) no age-sex or geographic specificity in hunting effect, and c) age-sex specificity was evident in survival, however, geographic specificity was not.

Fred went on to describe past efforts in examining environmental effects on survival. He and Jim Nichols have substituted the representation in equation 2 into the ultra-structural model for  $s$  in accounting for the effects of May ponds (habitat conditions on breeding grounds) on female mallard survival.

$$s = \frac{e^{a+b(E_t)}}{1 + e^{a+b(E_t)}} \quad (2)$$

Structuring  $s$ , or survival in the absence of hunting, as a logit transform, ensures that  $s$  is bounded by 0 and 1. They hypothesized that female survival would be inversely related to may ponds since increased habitat suitability on the breeding grounds would increase reproductive effort and expose hens to greater mortality through predation. They did in fact demonstrate such a relationship, noted age specificity in its strength, and noted considerable geographic variation. This again serves as a reminder to be concerned about geographic and taxonomic scale.

Fred finally discussed the “ultra-ultra structural model” of survival proposed in the NAWWO/MBMO prospectus. He noted that in this model (eq. 3)  $a$  has been dropped. As mentioned above this factor was phenomenological in nature and did not explain the mechanism by which compensation may occur. As expanded in equation 4 this is a mechanistic model of compensation which incorporates the potential affect of ecological processes and has a better chance of being robust to a wide range of real world conditions.

$$S_t = (1 - k_t)S_{post} \quad (3)$$

$$S_t = (1 - k_t) \frac{e^{a + b(N_t) + c(x1_t) + d(x2_t) + \dots + g(N_t, x1_t) + \dots}}{1 + e^{a + b(N_t) + c(x1_t) + d(x2_t) + \dots + g(N_t, x1_t) + \dots}} \quad (4)$$

In equation 4,  $N_t$  is a measure of population size, and  $x1$ ,  $x2$ , etc. are habitat and climatic correlates. Thus this equation incorporates concepts about “density” and density-dependent mechanisms for compensation.

Miller/Nudds Duck Deficit Study. Mike Anderson provided the Team an update on progress in completing the analyses proposed by Miller, Nudds, Bethke, and Gurd in the prospectus entitled “*Duck population monitoring proposal*”. This proposal was reviewed by the Team during the February 1996 meeting and the IWWR subsequently provided part of the requested funds. This study may provide some complementary results to those derived from the retrospective analyses described in the NAWWO/MBMO prospectus.

Mike informed the Team that the funded analyses were behind schedule and that nothing would be available until late October at the earliest. An expected completion date is tentatively scheduled for the end of the year.

JV Goal Consistency Analysis. Mark discussed the status of this analysis. The objective here was to conduct a step-down analysis for the most common ducks and geese. This step down exercise is designed to provide a gross estimate of January populations of individual species and species groups in each joint venture area. These estimates have been derived for each joint venture area, for Mexico, and for non-joint venture areas. Plans to complete this analysis and incorporate it into the report were laid.

**Action:**

- 7) Mark will complete the analysis and write up by September 15 and send to Jeff, Mike A, and Jim R. for inclusion in the report Part I. For each joint venture, stepped-down species January populations will be presented and compared to joint venture population goals. In addition, habitat goals in each joint venture will be presented and cost/acre for habitat conservation efforts in each joint venture described. Given this coarse information, comparisons will be made in the relative January abundances among joint

ventures, the relative magnitude of population “objectives” among joint ventures, and relative differences among the habitat objectives of the joint ventures. The intent is to provide the Plan Committee with an general feeling for the consistency of planning among joint ventures. The limitations of this exercise are evident with a major limitation being the obviously over-simplistic assumption of equality of habitat acres conserved in meeting the needs of waterfowl populations.

Completion of JV Summary Sheets. Rick provided an update on his efforts to complete summary sheets for each joint venture which identify explicit and implicit assumptions and the methodologies (if any) by which regional habitat objectives are linked to the continental population objectives. These sheets had been completed and Rick discussed thoughts on how they might be utilized within the annual report in the context of the 1998 Update. Rick noted that 12 habitat Jvs had been summarized. Of these, 11 joint venture implementation plans presented explicit assumptions while one joint venture plan was based only on implicit assumption. Nine joint ventures listed assumptions supported in some fashion by data.

Nine joint ventures list population “objectives” in some form and 5 of these appear to have utilized a logical step-down approach to the derivation of these abundance levels which were intended to provide a basis for the development of joint venture habitat objectives. Twelve joint ventures described habitat goals and seven of these utilized a logical step-down approach in their derivation. Four joint ventures document specific methodologies by which population objectives were utilized in developing habitat objectives. The implementation strategies in each joint venture, while frequently poorly documented or justified appeared to be logical given the current state of our understanding of large-scale habitat effects on populations. That said, it was noted that many joint ventures do not appear to have completed critical introspections of their activities and objectives, and the purported relationships between their regional conservation actions and effects on populations are poorly developed.

Rick noted that three-quarters of joint ventures reviewed presented habitat objectives in light of a snap-shot of landscape conditions. There is, however, tremendous variation in approaches followed in setting objectives in a landscape context. Rick suggested that the summary sheets be incorporated into the technical appendices of the Team annual report. It was further suggested that they be referenced in Part II of the report when joint venture assumptions are categorized early in this section.

***Action:***

- 8) Mark will share the summary sheets with joint venture coordinators, discuss the intent in developing the summaries (identify potential weaknesses in the biological foundations underlying joint venture implementation activities) and get their perceptions of the material as presented.
- 9) Mark will reference the summary sheets in Part II.

- 10) Rick will provide a narrative of the JV summary for the annual report to Mark. Mark will then distribute to the Team and ensure the information is available by Sept 15 for Jeff, Mike A, and Jim in developing Part I of the report.

JV Evaluation Reports. Jeff and Mike A. described their work with Doug Johnson of the Northern Prairie Science Center in summarizing JV evaluation reports and developing recommendations for the Plan Committee. They organized their efforts toward completing 3 primary tasks: a) provide a status report of JV evaluation progress, b) provide advice to joint ventures and the Plan Committee on the content of future JV evaluation reports, and c) glean any management recommendations possible given current evaluation results. Further development of this topic in the annual report should serve to highlight success and limitations of current implementation and evaluation frameworks. The results of their efforts in summarizing evaluation results currently available are presented in documents attached to these minutes.

***Action:***

- 11) Mark will send copies of the completed annual report to Jvs to demonstrate how their submissions were utilized and to provide coordinators with a sense of the types of information and gleanings which the Team is looking for in evaluation reports.

*Part II. Toward informed waterfowl management*

Fred, Mark, and Mike T. presented an outline for Part II of the report to the Plan Committee. The Team reviewed verbiage and an outline for Part II of the annual report and recommended that the drafting team above keep this section as short, simple, and focused as possible. It is important that this section is not heavy on technical issues and jargon. The key purpose is the describe the weakness of the informal general adaptive approach to management currently being pursued under the Plan and to provide impetus for movement toward a more formal application of the framework of ARM in habitat as well as harvest management. The general outline of this section follows.

- A) Underscore the current basis for Plan management action - foundational assumptions or hypotheses.
- B) Discuss the reasons why fundamental habitat-population relationships are still characterized by uncertainty 10 years into the Plan and nearly a half-century into intensive waterfowl population management.
- C) Discuss current Plan implementation and evaluation frameworks in light of the iterative management cycle of decision-making, monitoring, and assessment

currently espoused under the Plan.

- D) Identify the current Plan management cycle as adaptive.
- E) Describe key concepts of passive and active adaptive management and illustrate with realistic examples related to the Plan.
- F) Discuss key operational/technical/institutional challenges and opportunities in establishing waterfowl habitat management within an ARM framework.
- G) Recommendations to the Plan Committee for establishing an environment which is conducive to moving toward a fully integrated adaptive approach to waterfowl management.

#### Evaluation Team membership

The Team discussed the current structure and function of the Evaluation Team and entertained the potential for a significant broadening of representation on the Team. It was suggested that a broad, inclusive representation including members from each joint venture and flyway, as well as members from key NGOs may be imperative in the future to: a) ensure sufficient diversity in technical backgrounds to progress in developing and implementing an ARM framework for integrated waterfowl management, b) develop ownership among joint ventures and flyways in the eventual management system constructed, c) create a vehicle for communicating Team efforts back to joint venture coordinators, management boards, and flyway councils in a timely and effective manner.

It was suggested that while there may indeed be a need to expand membership of the Team in the future, it is premature to do so now. It will be important for the Team to work through several difficult conceptual and technical issues which arise as a result of the inherent scale dependencies in Plan implementation and evaluation efforts.

#### ***Action:***

- 12) In the near term, develop the manpower to wrestle with technical issues in casting waterfowl habitat management within the ARM framework through formal associations of the NAWWO with MBMO, the PWRC, the NPWRC, cooperative wildlife research units, and other entities.
- 13) Continue to define and conceptualize the spatial scale-issues associated with the habitat management cycle espoused under the Plan.
- 14) Incorporate the idea of an expanded Evaluation Team in the annual report, highlight the

roles this Team would play, advantages in expanding membership eventually, and a suggested time-frame for the expansion.

#### Pacific Coast Joint Venture Evaluation Plan

The PCJV has submitted a new draft evaluation plan based on past Team comments and previously endorsed evaluation plans. This draft was not submitted in time for Team members to conduct a thoughtful review and provide useful comments to the joint venture. Several Team members did note that the plan appeared significantly different from previous versions and that initial reactions were that the joint venture was much closer to a functional product. Since the Team meeting, Mark has been contacted by a joint venture representative requesting an endorsement of the plan conditional on the incorporation of Team comments on the current draft. A similar approach was followed with the EHJV when it was believed that the evaluation plan had been developed to a state very near completion.

#### ***Action:***

- 15) Because the annual report to the Plan Committee is currently of primary concern, Team members were asked to provide written comments on the current draft to Mark by Oct. 31. Mark will then reconcile comments and provide them to the joint venture. Also, indicate whether you feel that this plan is ready for a conditional endorsement qualified on the willingness of the joint venture to comply with suggestions offered by the Team on the most recent draft.

#### Central Valley Habitat Joint Venture Evaluation Plan

Team members briefly discussed the draft CVHJV evaluation plan distributed prior to the meeting. The joint venture has not requested any official action on this plan.

#### ***Action:***

- 16) Mark will prepare a letter for Chair signature to the CVHJV which requests information about the joint ventures intentions to submit the plan to the Plan Committee.

#### Ducks Symposium and the North American Conference

The Team discussed the potential to host an evening workshop on ARM and integrated waterfowl habitat and harvest management at the Ducks Symposium in Baton Rouge in February of 1997. The general consensus was that the state of technical development of Team ideas was not adequate to warrant close scrutiny from the scientific community at the present time.

The Team did see some potential merit in developing a paper to be delivered at the North American Wildlife and Natural Resources Conference in March of 1997. The high level administrative audience at this Conference suggests that this venue may be more appropriate at

this time. The paper would essentially follow the outline of the annual report to the Plan Committee. It would present a similar message to a similar audience: a) some important progress in evaluation but not much, b) some reasons why, and c) a framework to do better in the future.

***Action:***

- 17) Rick will submit a short abstract for the Team's presentation at the Conference. The drafters and presenter will be worked out at a later date. Mark tentatively agreed to assist in drafting the document at a minimum. The deadline for papers is in February.

Next meeting

The next meeting was scheduled for the week of January 20. The general location will be on the Gulf Coast and a portion of the meeting will be dedicated to assisting the GCJV in initiating evaluation planning.

***Action:***

- 18) Jeff and Mark will explore accommodations at Eagle Lake, Cajun Outback (former name), and Rockafeller.
- 19) Mark will contact Greg Esslinger to provide the next meeting date so that he can begin to solicit the participation of MERT members and key members of the research community.

Plan Update Working Group

The Team met with Greg Thompson and David Smith of the Plan Update Working Group. David and Greg updated the Team on the charge and progress of the Group and requested Team assistance in developing specific issues related to the Update Working Group report to the Plan Committee. The Team then took the opportunity to review their outline of the annual report to the Plan Committee and give the Working Group a feeling for how the Team envisions the Plan evolving. The question about Plan Committee expectations for this Update was posed. Dave Smith summarized potential options in approaching a 1998 Update as: a) status quo until 2001, b) Plan as a primer for refinement of ideas about the next phase in waterfowl management, and c) initiation of a new or redefined Plan in 1998.

Dave went on to summarize the potential role of the Team in the 1998 Update. The role identified was three-fold. First, the Team might assist in developing the strategy in the 1998 Update to improve science in waterfowl management. Second, the Team can assist in summarizing the current state of our understanding about the effect of the Plan on target populations. Finally, the Team can assist the Working Group in developing issues of biological foundation related to the Update. The Working Group members additionally noted several difficult issues related to the Update in order that the Team might factor these questions into their

thinking in developing their recommendations to the Plan Committee. These questions were: a) the Plan's 15 yr horizon is nearing completion, what's next?, b) Currently populations of many species are above Plan objectives yet < 20% of Plan habitat goals have been achieved, how is this reconciled?, and c) how best can we ensure that Plan habitat objectives are functionally linked with population objectives?

Numerous implications of the Team recommendations to the Plan Update debate were discussed including the ability of the Update to set the stage for the next phase in integrated waterfowl habitat and harvest management. The notion of "institutionalizing" an espoused adaptive management cycle for habitat and harvest management in the future was introduced and the current flyway review being conducted by the IAFWA suggested as the beginnings of a formal, institutionalized approach to integrated harvest and habitat management.

It was noted that it would be prudent to at a minimum develop the reports of the Team and the Working Group such that recommendations of the Team can be arrived at by selectively working through the issues, options, and implications identified in the Working Group report. Currently, foundational issues identified by the Plan Committee and refined by the Working Group are all variations of a common theme. That common theme is that they all relate to the basic issue that managers do not understand fundamental relationships between habitat and population processes and that formal structures are not in place which will rectify this situation.

After Working Group members had departed, the Team formulated a plan to more explicitly link the reports of the Working Group and the Team so as not to confuse issues presented to the Plan Committee. The Team noted again that all the issues under biological foundation related to the common concern about the adequacy of habitat goals of joint ventures. The Team suggested that the Working Group could defer development of foundational issues to the Team's annual report to the Plan Committee. The Team's report will highlight the success, failures, and limitations of current approaches to Plan management and evaluation and will focus on the inherent structural uncertainty about population response to habitat at a large scale and the inadequacy of current Plan implementation and evaluation frameworks in addressing this uncertainty.

It would also be possible for the Working Group to develop the Foundational section following the same format of issue, option, and implications. This would ensure that the Team's report effectively develops and refines ideas about an option for addressing the primary foundational issue related to the structural uncertainty about population-habitat relationships.

***Action:***

- 20) Mark will present to the Working Group the Team recommendations for the Biological Foundation section detailed in the preceding text. Mark will also highlight the implications of the Team's recommendations to issues developed under the Working Group report section, "Positioning for the Future."
  
- 21) Mark will discuss with Ken Williams the potential to contract with Dave Case to assist in

tailoring the Team's report to a non-technical audience and help develop a strategy to effectively communicate Team ideas in the future to a broad audience.