

**Report on U.S. Fish and Wildlife Service's
Implementing Recovery for Endangered Forest Bird Species in Hawai'i Workshop
Hilo, Hawai'i
October 8-10, 2008**

Background:

The U. S. Fish and Service (Service) has received contradictory information over the population status of the Hawai'i 'akepa in a portion of the Hakalau Forest National Wildlife Refuge (Refuge) – a major stronghold of the endangered Hawai'i 'akepa – over the last several years. It was deemed necessary to clarify the current status of the Hawai'i 'akepa and other endangered Hawaiian forest birds at the Refuge for development of efficacious management alternatives in the 3-year Comprehensive Conservation Plan (CCP). The Regional Director obtained the assistance of the U.S. Geological Survey's (USGS) Dr. J. Michael Scott in conducting a review of available information on the Hawai'i 'akepa, and decided to hold a workshop with partner agencies, renowned forest bird researchers, and statisticians to further expand this review.

Process:

Working with Dr. Scott, the eventual moderator of the workshop, employees in both the National Wildlife Refuge System and Ecological Services programs of the Service prepared a draft agenda for the workshop that included purposes and objectives, major discussion topics, potential speakers, etc. From a group of invitees developed by the Service and USGS, volunteers to serve on a workshop steering committee were selected. These individuals and their affiliations were:

1. Dr. Sheila Conant (Steering Committee Chair) University of Hawai'i- Mānoa;
2. Dr. Leonard Freed, University of Hawai'i- Mānoa;
3. Dr. David Leonard, Hawai'i State Division of Forestry and Wildlife;
4. Dr. Loyal Mehrhoff, USGS-BRD;
5. Dr. J. Michael Scott, USGS-BRD; and
6. Gina Shultz, Deputy Field Supervisor, FWS-Ecological Services Honolulu Office.

The steering committee pared down the agenda from a broader scope in terms of both geographic area and species to focusing on the endangered Hawaiian forest birds found at the Refuge. It was hoped that although focusing on the Refuge, much of the information shared at the workshop would be applicable to these species throughout their ranges and to the broader Mauna Kea and Hawai'i Island ecosystems or forest bird survey methodology in general. Originally development of a step-down work plan for the Recovery Plan for Endangered Hawaiian Forest Birds was an objective, but with the narrowing of the workshop focus it was decided that the Refuge CCP would capture most of those actions for these species in that geographic area.

The final workshop purposes and objectives were:

- 1) Identify and prioritize management needs and activities, including research, at Hakalau Forest National Wildlife Refuge to recover endangered Hawaiian forest birds;
- 2) Incorporate identified needs and activities in the Hakalau Forest 15-year Comprehensive Conservation Plan; and
- 3) Extrapolate Hakalau-specific information to the broader Mauna Kea area and other geographic areas and bird species and suites of birds as appropriate.

The final workshop agenda is included at the end of this report for reference. This report was shared with all meeting participants on October 24, 2008, for 2 work weeks for their concurrence for accurate representation of their contributions and overall outcomes.

The major points or conclusions of each presenter are as follows:

Day 1 – October 8

Stieglitz: Meeting outcome will provide products that will assist in setting management alternative priorities for the Refuge CCP. The products from the workshop will include a ‘white paper report’ from the workshop, an action plan, and a summary evaluation from the participants. The products will be sent to the participants for review and evaluation.

Bohan: Protection, reforestation, and restoration are vitally important for endangered plants and animals found on refuges. Adaptive management, research, and partnerships will provide the refuge with input and information needed to protect endangered species. The CCP will provide a plan for the future direction of management of endangered species at the refuge and provide avenues for staffing and funding to accomplish the management actions. The refuge is interested in and committed to obtaining input from other agencies and the public in the development and implementation of the CCP.

Pratt: “Population status of threatened and endangered forest birds in Hawai‘i” Hawai‘i’s native forest birds have suffered great losses over the last 200 years with almost 50 species lost to extinction due to habitat loss, predation, competition, and avian disease. Mosquito-borne avian diseases have almost completely eliminated native forest birds below 1500 meters on all islands, making high elevation habitat essential to protecting forest birds. The Refuge contains critically important high elevation habitat. The Hawai‘i Interagency Data Base Program team (USGS-BRD) has analyzed forest bird survey data collected on all of the Hawaiian Islands since 1976. These data show that throughout the State there is one consistent theme: forest bird populations in managed areas are stable or increasing; forest bird populations in nonmanaged areas are stable or decreasing.

Scott: Conservation in Hawai‘i has been building on a foundation of research and management over the last 30 years to protect endangered species and prevent extinctions. Because of its isolation and progress in the field of conservation, Hawai‘i is the “window

to the future” for endangered species. Important tools are needed to move forward (research, habitat restoration). It is of utmost importance to get the research information to the people that make funding decisions. Policy changes will allow for funding for research that is needed to make management decisions on a temporal and landscape scale.

Camp: “Densities and trends in Hakalau Forest Birds” The Refuge was established in 1985 to protect native forest birds and their habitat. Refuge forest bird surveys were conducted between 1987 and 2007. The USGS-BRD Interagency Database Program team analyzed all Refuge forest bird survey data using a Bayesian approach to log linear regression. They tested for changes in bird densities in 3 study areas: previously heavily grazed middle elevation forest, upper elevation pasture that was reforested and lower elevation relatively intact forest. They found that densities of the ‘elepaio and the endangered ‘akiapola‘au and creeper increased in the middle area forests. All other forest bird species showed stable trends in the middle area with no evidence of decline as seen elsewhere in Hawai‘i. Trends for alien birds were also stable except for the house finch, which is declining. However, short term trajectories for some native species (‘elepaio, ‘amakihi, ‘akepa, ‘i‘iwi, and ‘apapane) at middle elevations from 1999-2007 showed a decline, whereas the Japanese white-eye showed a stable to increasing trajectory. At lower elevations creeper and ‘akepa showed increasing trajectories, and densities have declined for the other native species. In the upper pastures densities increased for three common native species--‘amakihi, ‘i‘iwi, and ‘apapane--and two alien species—Japanese white-eye and house finch. We advise caution on relying on short-term trajectories to assess population status. These trends show some of the first results of habitat improvement for forest birds in Hawai‘i. Also, 1) There was no change in detectability for ‘akepa or ‘amakihi over that time span, 2) long term population trends for all native species in forested areas showed no decreasing trends, and 3) Hawai‘i ‘akepa showed stable to increasing densities over the study time period. Additional analytical techniques, such as species habitat models and spatial pattern analysis should also be used in the future.

Freed (I): “Chewing lice and competition from Japanese White eye are synergistically starving every native species at Hakalau Forest NWR” Food competition from an increasing population of introduced Japanese white-eyes in the Pua ‘Ākala area, and the resultant increase in chewing lice, have synergistically increased food requirements and reduced food levels for all native birds at the Refuge. All life history parameters of ‘akepa (fledgling mass, bill length, fat levels, feather degradation, call rates, breeding success, sex ratio of young, juvenile survival, and adult survival) have become significantly lower, making the population non-viable as reflected in a shift in lambda to significantly less than one. The ‘akepa at the 1650 m site, with lowest number of white-eye, still appears to be viable based on fledgling mass. Mist-netting data show that the white-eye is replacing the ‘akepa at elevations between 1900 and 1770 m. The decline became more severe between 2006-2008 at these elevations, which represent the former site of highest density of the ‘akepa on the Refuge. There are also changes in numbers and begging behavior of the endangered Hawai‘i Creeper. Control of white-eye numbers is essential to reverse the decline of the ‘akepa and other forest birds.

Freed (II): “When Methodologies collide: Issues of scale, assumptions of models and appropriate analysis” Two study sites on the Refuge appear to be at different stages of effects by Japanese white-eyes. No decline in ‘akepa has been detected at the Pedro study site as occurred at the Pua ‘Ākala study site after 2005. Pedro previously had a much lower density of ‘akepa associated with lower number of big trees with cavities for nesting. Based on mist-netting in the 1990’s, ‘akepa and white-eye appeared to be at comparable density. Survey of birds during March 2008 revealed more white-eye than ‘akepa. More Japanese white-eyes, or longer exposure to the same increase in white-eyes, might be necessary to generate the same competitive effect observed in higher density areas such as Pua ‘Ākala. The early stages at Pedro may be revealed by the absence of calling by ‘akepa and mate feeding observed in silence. The Pedro site might be especially important for determining if there is a delayed response to white-eye increase in lower density ‘akepa populations that may be previously limited by cavities more than food.

VCP methodology is based on numerous assumptions. Some of these assumptions may be being violated, which may lead to misleading conclusions. Fixed plot surveys may be more accurate than VCP. With any statistical analysis, violation of assumptions of a model can lead to erroneous results. One problem involves scale. A decline in one section of the refuge, analyzed separately, may not be apparent when the refuge is analyzed as a whole. Analyses should be performed for separate portions of the Refuge, especially where endangered birds used to be common.

Gorreson: “Time series analysis of spatial patterns in species abundance at Hakalau Forest NWR” Two questions need to be answered: 1) are Hawai‘i ‘akepa populations in decline at Hakalau?, and 2) are Hawai‘i ‘akepa in competition with Japanese white-eyes? Forest bird survey data collected 1977-2007 were analyzed using Spatial Analysis by Distance Indices (SADIE). The data show that Hawai‘i ‘akepa have strong cluster-gap patterns. They are centered in the south of the Refuge (Pua ‘Ākala area). Japanese white-eyes are highly variable with moderately weak patterns and are mostly centered in the north of the Refuge but eruptive patterns do occur in some years, which weakened between 1987 and 1998 but have stabilized since 1999. Japanese white-eye distribution does not show consistent association with ‘akepa distribution. There is no evidence that ‘akepa are declining or that Japanese white-eyes are displacing ‘akepa.

Garton (I): “Interspecific competition between ‘akepa and Japanese white-eye in Hakalau NWR” Four different models were used to analyze the refuge forest bird survey data: 1.) the Null model (No density dependence); 2.) The Ricker model (density dependence on N_{t-1}), 3.) the Gompertz model (density dependence on $\ln N_t$), and 4.) the Theta model (density dependence on N_t^θ). Each of the models shows different levels of competition between ‘akepa and Japanese white-eyes, but none of these models show any significant effect. Because these effects are minor, it is difficult to tease out the other environmental factors that may have other negative effects. Through modeling it appears that environmental parameters that benefit ‘akepa also benefit Japanese white-eyes.

Day 2 – October 9

Horne: “Distance estimation of abundance: Assumptions and possible sources of bias”

Distance sampling is a good way for estimating forest bird abundance because it can provide unbiased estimates and is relatively easy and inexpensive to implement.

Distance sampling assumes that: 1) the density of animals (forest birds) is homogenous in the area surveyed, 2) the probability of an individual being detected is related to the distance from the observer, and 3) that all individuals at close distances are observed.

Increased detectability of individuals in a population, due to possible changes in behavior of stressed individuals, affects abundance estimates based on distance sampling. While increased detectability results in more individuals being counted, estimates of abundance are unaffected by the change as long as the probability of detection at close distances is one (or does not change). However, if greater detectability also results in a greater proportion of detections at very close distances, then estimates will be affected by changes in detectability. Even if detectability changes over time, trend analyses based on these abundance estimates remain valid if the changes are random about some constant mean. In this case, the abundance estimates become an index and the changes in detectability are subsumed in observation error. If there are systematic changes in detectability over time, abundance estimates can be corrected using recently developed paired observer methods.

Garton (II): “Adaptive Management of the ‘akepa and Japanese white-eye” Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Garton compared two different adaptive management definitions from Walters’ (1986) Four Fundamentals of Adaptive Management of Natural Resources, and the Williams, Szaro, & Shapiro(2007) 9 Step Program used by USDI. By using several predictive mathematical models (with different sensitivities, and changing the parameters of the model, i.e., habitat improvement (reforestation, removal of grazers etc.) removing predators), predictions can be made on the potential consequences of each management action. With a Time Series Model, predictions show that both ‘akepa and Japanese white-eye densities increase with positive habitat changes, removal of Japanese white-eyes will actually reduce ‘akepa densities, and that, if the current management continues, it is unlikely that ‘akepa will go extinct within the next 30 years.

Dennis: “Analysis of population trend: Getting the details right” Regression of log-abundance of a population versus time is often used to estimate the population's trend. It is not widely realized that such regression carries implicit assumptions about how the trend and the variability in the population abundances arise. If the statistical model does not adequately describe the process by which the data are produced, the trend estimate can be seriously in error. Three different models for estimating population trend are described and are different stochastic versions of the exponential growth model: 1) observation error only, 2) environmental process noise only, and 3) a state space model which combines both observation error and process noise. Each model leads to a different statistical calculation for obtaining estimates of model parameters, including

trend, for time series abundance data. Log-abundance regression turns out to correspond to deterministic exponential growth with observation error only that is, model 1. In computer simulations, model 3 provides confidence intervals for trend that remain valid when data are generated under models 1 and 2. Confidence intervals calculated with models 1 or 2; however, fail miserably when data are generated under each other or under model 3. The hugely volatile Hawai'i 'akepa data (conforest time series) analyzed with model 3 yield a wide 95% confidence interval for trend that contains zero. The analysis suggests that the time series abundances contain substantial amounts of both environmental process noise and observation error. Building a density dependent model for this data set with environmental driving variables included might produce results more useful to management.

Duffy: "Rightsizing the Ark: Exclosures for Hawaiian Forest Birds" To protect native species, we need to fence at a scale appropriate to protect landscapes that will conserve bird populations large enough to survive at the scale of centuries, or we are wasting our time and money, and should spend it on other organisms. We have to operate at the appropriate scale, and this information needs to be presented to funding agencies and policy makers. With global warming, highland forests won't be safe from avian malaria. Fencing and removing feral ungulates at the upper and mid elevations will create buffers where mosquitoes cannot breed, helping to keep mosquitoes at lower elevations and outside of the refuge.

In the late afternoons of October 8 and 9, Dr. Scott led discussions of the days' presentations.

The focus on October 8 was identifying major threats to the forest birds at the Refuge. Dr. Scott used a multi-voting technique for workshop participants to describe and rank the immediate threats to forest birds at the refuge. Each attendee was given the opportunity to vote for any of the "Threats to Hawaiian forest birds" decided upon earlier in the workshop. The threats identified, and their ranking of importance by participants was:

Immediate Threats to Hawaiian Forest Birds at Hakalau Forest NWR

Feral Ungulates (24 votes)
Lack of Habitat (21)
Invasive Plants (12 votes)
Predation (7 votes)
Data Insufficient to meet Management Needs (8 votes)
Parasites (2 votes)
Interspecific Competition (1 vote)
Avian Disease (no votes were received, so removed from list)

The focus on October 9 was identifying and prioritizing major management actions and research necessary to recover the forest birds found at the Refuge. These management

actions and research (collectively, activities) were also ranked using a multi-voting technique as follows:

Management Actions (Priority Ranked by Voting)

1) *Grazers/browsers (Habitat destruction/mosquito production) – High (overall 24 votes)

- Fence construction, maintenance, and removal of animals (combined total = 30 votes)
- See Research Priorities

2) Habitat Restoration – High (21 votes)

- Revegetation of pasture land (15 votes)
- Improve ‘ohi‘a densities (7 votes)

3) Invasive plants – High (overall 12 votes)

- Continue invasive species control (blackberry, banana poka, gorse) (11 votes)
- Prevent and eliminate incipient weeds (2 votes)
- See Research Priorities

4) Monitoring and Data Needs – High (overall 8 votes)

- See Research priorities
- Delivery of technical information (2 votes)

5) Predation – Medium (overall 7 votes)

- See Research priorities

6) Parasites – Low (overall 2 votes)

- Incipient invasive parasites, true population counts, de-louse birds (2 votes)

7) Interspecific competition – Low (overall 1 vote)

- See Research priorities
- Identify ectoparasites/mites

Research Priorities (Priority Ranked by Voting)

1) Monitoring and Data: Expand point counts/banding data – 15 votes (combined primary counter training (8 votes), consider use of a B-Bird (Breeding Biology Research and Monitoring Database) system (<http://www.umt.edu/bbird/info.htm>) (7 votes), and threat surveillance (1 vote))

2) Predation: Investigate effects of rats on forest birds (9 votes); rodent population index (2 votes) – 11 votes

3) Invasive Plants: Develop effective biocontrols – 8 votes

4)*Grazers/Browsers: Predator proof fencing – 7 votes

5) Invasive Plants: Develop more efficient control methods and registration of herbicides – 4 votes

5) Determine the effects of global climate change at the Refuge – 4 votes

6) Develop more effective cat control techniques – 2 votes

6) Determine effects of ectoparasites on non-endangered bird populations – 2 votes

7) Experimental control of Japanese white-eyes – 1 vote

*Caveat: Activities to construct an ungulate proof fence and a predator-proof fence caused some confusion amongst the participants. Dr. Scott obtained consensus that these activities could be combined with a third separate but related activity of removing feral ungulates.

Conclusion:

A workshop evaluation was distributed to all participants on October 24, 2008. Of the 37 participants, 11 provided evaluations (= respondents). A number of Service employees, as organizers of the workshop and authors of this summary, did not provide written evaluations, so the response rate is actually higher than it initially appears. A summary of the evaluations is attached as Appendix A. In short, however, findings of the evaluations were:

Overall the perception of the workshop organization and format was entirely positive. However, some respondents felt the workshop purpose and objectives fluctuated too much in advance of the workshop, were unclear, or were known but unstated. While this was in part a result of ‘adaptive management’ of the agenda and a deliberative process by the steering committee, more, earlier input from potential participants would help address this criticism for future workshops.

The presentations themselves were largely felt to be very informative and address the workshop purpose and objectives, given the previously mentioned concerns about those objectives. The amount of time allotted to presentations was generally thought adequate, and the facilitation by Dr. J. Michael Scott very good.

Regarding present and future management and research management actions at Hakalau Forest NWR, respondents were generally positive. Some thought, however, that we had merely validated current management actions – a positive in the eyes of the refuge staff and this author – but others saw this as “reinventing the wheel” and unnecessary.

The field trip on Day 3 was very positively received.

In summary, the workshop was very useful in clarifying the status of the endangered Hawai'i 'akepa, with most respondents supporting the interpretation of survey data indicating stable or increasing population trends. In turn, this finding validates the substantial investment of resources and energy at the Hakalau Forest NWR over the last 20 years, specifically the fencing/ungulate removal, reforestation, and invasive species removal programs. Finally, the priority activities (management actions and research) identified at the workshop will be used during the development of the Hakalau Forest National Wildlife Refuge CCP and provide a road map to guide Service staff in the management and recovery of Hawaiian forest birds at Hakalau Forest NWR.

Future workshops should be designed with special attention to purpose and objectives, leaving additional time to address the “what is not known” question and develop priority research to answer that question, and ensure early input from all potential participants and stakeholders (especially on workshop purpose and objectives).

Appendix 1

Summary of Evaluation of Hawaiian Forest Birds Workshop

October 8-10, 2008

Hilo, Hawai'i

Total number of participants: 37
Total number of participants who completed evaluation forms: 11
Total number of participants who provided comments on workshop notes: 2

1. The organization/format of the workshop was (*please check one*):

<u>Day One</u>	<u>Day Two</u>	<u>Day Three</u>
Excellent 5	Excellent 4	Excellent 7
Good 6	Good 5	
	Adequate 2	

Comments or Suggestions:

- *It is too bad that more empirical studies were not included.*
- *The field trip was a terrific idea as it gave participants from outside Hawaii and those within the state but less familiar with Hakalau, a great on-the-ground view of the refuge's success with restoration and the richness of the bird community. We saw perhaps a dozen akepa!*
- *This was pretty close to the most informative 3 days I've ever spent in the Service – perhaps in my entire 15 year Fed. Career. Well done to have the room filled with those who know these species and conservation issues the best.*

2. The time allotted for presentations and discussions was (*please check one*):

Sufficient **11** Insufficient Excessive

Comments or Suggestions:

- *There were some presentations where discussion was cut off early, but not sure that could be helped without eliminating a presentation or going significantly over time.*
- *I appreciated that there was plenty of time for questions and discussion in addition to presentations. Michael Scott did an excellent job guiding the discussion.*
- *I think the time allotted was just right.*

3. The presentations and discussions adequately addressed the workshop purpose and objectives. (*please check one*)

Strongly Agree **3** Agree **6** Disagree **1** Strongly Disagree

Appendix 1

Comments or suggestions:

- *Some excellent presentations on point count methodology – I learned quite a bit. The weakest parts of the workshop were the presentations on competition from white-eyes and ectoparasites – most likely because the data were unverified, highly controversial, and not supported by excessive census data from the refuge.*
 - *Did a good job of not allowing discussion to focus solely on the controversy between Lenny and others, which likely would not have been productive. I was not fully aware of the underlying impetus for the workshop prior to Day 1, and it might have helped to have presented in advance the information that now appears at the beginning of the notes (although I understand there was some evolution of the focus of the meeting in the weeks leading up to it, so perhaps there was not time).*
 - *This is a loaded statement! In all honesty the stated purpose and objectives kept changing and were never very clear, and from the get-go were counfounded by other well known but unstated objectives, so I'll refrain from checking a box here. For a workshop ostensibly about management priorities as well as research, the presentations mostly treated data analysis and population and trend modeling -- and in fact addressed the unstated objectives better than the stated ones. It seems that what we had, especially from the University of Idaho participants, was primarily a live performance of contributions to the most recent external review of the survey data from Hakalau to address the Japanese white-eye-Hawai'i 'akepa questions. This was interesting, but I'm not certain it was what best served the participants of this workshop.*
 - *Too much time was spent on addressing the competition issue.*
 - *There were conflicting data sets and more time should have been used to resolve the conflicts.*
 - *This is a difficult question to answer because the workshop purpose was not entirely clear. On the one hand, the workshop seemed focused on whether or not the interspecific competition between Akepa and White-eyes is something to be concerned about, and on the other hand the workshop was also trying to address all management and research priorities for Hakalau. I think we accomplished the former but were less successful on the latter.*
 - *Because so much discussion focused on Lenny Freed's concerns about 'akepa, I think he should have spoken more about his data and spent less time critiquing census methods. Plenty of other people did the latter. Lenny changed topics at the last minute, so this was hard to control, but I think we needed to see and hear more of the actual data.*
4. Management needs and activities, including research, at the Hakalau Forest National Wildlife Refuge were properly identified and prioritized to recover endangered Hawaiian forest birds. *(please check one):*
- Strongly Agree **3** Agree **7** Disagree Strongly Disagree **1**

Appendix 1

Comments or suggestions:

- *A little too much emphasis on reinventing the wheel. Most of the management needs and activities were identified and prioritized in the Forest Bird Recovery Plan and it was reassuring that these have not changed since the plan was finalized. As someone from the workshop pointed out – the most important management needs can be summarized as “Build fence, kill pigs, plant trees, count birds”. The refuge has been doing this well the past 20 years and FWS support for the activities should continue.*
 - *I agree only in that the “process”, such as it was, on the second day clearly demonstrated that a room full of Hawaiian forest bird experts with years or decades of experience do not believe that investigating (or acting on) potential interspecific competition as a threat to endangered birds is a priority. I don’t think the results of this workshop lead to a big shift in activities or emphasis at Hakalau, but maybe the view from the Refuge is different...*
 - *I think the priorities were properly identified. Funding to implement is still the question to be resolved.*
 - *How could the audience ignore the fact that lambda for the akepa was significantly less than one?*
 - *I do not think we properly identified management needs for the refuge in the sense that we reaffirmed collectively that the Refuge is very much on the right track. I think we could have done a much better job at identifying research priorities. With much of the refuge staff present, it would have been very useful to ask them to come to the meeting with a list of what they see as research priorities. What data would be helpful in understanding whether their management actions are achieving success? What projects would be useful understanding whether additional management actions are necessary? It would have been great to outline and prioritize specific projects and then collectively think about where the funding could come from to support them.*
 - *I think we did a pretty comprehensive job, certainly enough to provide pretty specific guidelines for the development of the CCP.*
 - *I believe it would be worthwhile to identify additional lines of field investigation to validate Dr. Freed’s claims regarding competition from white-eyes and parasitism from ectoparasites. If biologist from the mainland could be encouraged to conduct relevant field studies here, that would bring independence to the findings and generate interest in the wider scientific and conservation communities.*
5. Do the results of this workshop clearly define future research and management actions at Hakalau Forest NWR? *(please check one):*
- Strongly Agree **2** Agree **7** Disagree **1** Strongly Disagree **1**

Comments or suggestions:

- *Seems to me the results just validated what the Refuge is already doing, ES is already helping to fund, and what the wider forest bird conservation community already has identified has priorities – in about the same order.*

Appendix 1

- *Yes, for forest birds. Need to have similar discussions relative to plant species management. This was an excellent group of people to address the forest bird issues. I wish we also could have used this group to look at forest bird research and management needs statewide.*
- *They identified management but not address research. There should have been a session on what we need to know that we don't know at present.*
- *There is still a lot of work to be done to “clearly define” research management in the Comprehensive Conservation Plan, but this workshop gave us a very good start.*
- *To me the management actions were more clearly defined than the research actions. I felt that the discussion of research actions did not go far enough beyond what is already being done or considered, and there was no blueprint drafted for follow-through on the few resulting recommendations. Lack of funding, more specifically lack of adequate funding sources, may be discouraging initiative for research.*

Additional Comments:

- *This was an effective venue to try to settle conflicting interpretations of current population trends for Hawaii Akepa and other endangered birds at Hakalau. I hope the majority opinions were clearly heard by USFWS officials.*
- *Overall, a good job of staying on schedule and not letting talks go over. The initial talks occurred ahead of schedule. If possible, this also should be avoided, particularly if people might need to come & go during the workshop.*
- *Refuge staff and officials from Honolulu and region need to direct the workshop to focus discussion on their most significant needs.*
- *I think the discussion should have had very specific questions and objectives spelled out before it started. That would have helped focus our identification of needs and priorities and given us a bit more time to talk about them. Still, between Mike's moderating and Ken's note taking, we did a very good job.*
- *Seemed to me to be a well-organized workshop. The field trip also went extremely well---it was great to see all those birds!*
- *Make explicit any implicit objectives or drivers, and make sure all the key stakeholders are present.*
- *It's a good thing the scope of this workshop was changed, very near the last minute, to Hakalau only (rather than the whole Big Island, or Big Island and Kauai etc.), because the State was represented at the workshop by a total of one person (from DOFAW administrative office).*
- *Ensure that all participants have a 100% clear understanding of the purpose/objectives, the contributions expected of them, and the specific methods that will be used to meet objectives, make decisions etc. To achieve “buy in” or wide agreement, it isn't enough to have a good moderator for individual presentations and discussions (which we did have); the facilitator has to move the whole group toward achieving a small number of very clear objectives, present – up front – a well-defined process or processes for doing that, and resolve procedural concerns or differences of opinion along the way. In this case, the ad hoc “process” we undertook on the second day was reasonably effective, but I think that was largely because the task was*

Appendix 1

a no-brainer for this group, and wide agreement about priorities for forest bird research and conservation already existed. That process was conducted in an extemporaneous manner and without clear explanation of how the results would be used, and would have backfired in a group that was divided over the topics under discussion.