

Aga or Mariana Crow
(Corvus kubaryi)

5-Year Review
Summary and Evaluation

U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii

5-YEAR REVIEW

Species reviewed: Aga or Mariana Crow (*Corvus kubaryi*)

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5-YEAR REVIEW

Aga or Mariana Crow/ *Corvus kubaryi*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office:

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(503) 231-2071

Lead Field Office:

Pacific Islands Fish and Wildlife Office, Loyal Mehrhoff, Field Supervisor, (808)
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Cooperating Field Office(s):

N/A

Cooperating Regional Office(s):

N/A

1.2 Methodology used to complete the review:

This review was conducted by staff of the Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (USFWS) beginning July 6, 2005. The Draft Revised Recovery Plan for the Aga or Mariana Crow (*Corvus kubaryi*) was used as the primary source for this review. The draft revised plan was prepared by the Mariana Crow Recovery Team and incorporated all of the available information on the species since 2005. Updated information on the status of the species and its threats were obtained from biologists and land managers on Guam and in the Commonwealth of the Northern Mariana Islands. The evaluation of the status of the species was prepared by the lead PIFWO biologist and reviewed by the Vertebrate Recovery Coordinator. The document was then reviewed by the Recovery Program Leader, Assistant Field Supervisor for Endangered Species, and Deputy Field Supervisor, before submission to the Field Supervisor for approval.

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

USFWS. 2005. Endangered and Threatened Wildlife and Plants;
Initiation of 5-Year Reviews of 33 Species in Region 1. Federal Register
70(128):38972-38975.

USFWS. 2005. Endangered and Threatened Wildlife and Plants;
Initiation of 5-Year Reviews of the Mariana Fruit Bat (*Pteropus
mariannus mariannus*), etc.; Correction. Federal Register 70(158):48433.

1.3.2 Listing history

Original Listing

FR notice: USFWS. 1984. Endangered and threatened wildlife and plants; determination of endangered status for seven birds and two bats on Guam and the Northern Mariana Islands. Federal Register 49(167):33881-33885.

Date listed: August 27, 1984

Entity listed: Species

Classification: Endangered

Revised Listing, if applicable

FR notice: N/A

Date listed: N/A

Entity listed: N/A

Classification: N/A

1.3.3 Associated rulemakings:

USFWS. 2004. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Mariana Fruit Bat and Guam Micronesian Kingfisher on Guam and the Mariana Crow on Guam and in the Commonwealth of the Northern Mariana Islands. Federal Register 69(208):62944-62990.

1.3.4 Review History:

Species status (FY2009 Recovery Data Call [August 2009]):

Declining

1.3.5 Species' Recovery Priority Number at start of this 5-year review:

5C

1.3.6 Current Recovery Plan or Outline

Name of plan or outline: Draft revised recovery plan for the Mariana crow (*Corvus kubaryi*)

Date issued: May 2005

Dates of previous revisions, if applicable: NA

Indicate if plan is being used: Yes. Several of the recovery actions outlined in the recovery plan have been initiated and completed while others are ongoing.

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate?

Yes

No

2.1.2 Is the species under review listed as a DPS?

Yes

No

2.1.3 Was the DPS listed prior to 1996?

Yes

No

2.1.3.1 Prior to this 5-year review, was the DPS classification reviewed to ensure it meets the 1996 policy standards?

Yes

No

2.1.3.2 Does the DPS listing meet the discreteness and significance elements of the 1996 DPS policy?

Yes

No

2.1.4 Is there relevant new information for this species regarding the application of the DPS policy?

Yes

No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes

No

2.2.2 Adequacy of recovery criteria.

2.2.2.1 Do the recovery criteria reflect the best available and most up-to date information on the biology of the species and its habitat?

Yes

No

2.2.2.2 Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?

Yes

No

2.2.3 List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information:

The threats affecting this species (Factors A, C and E¹) are discussed in detail in section F (“Factors in Decline and Current Threats”) of the draft revised recovery plan. Factors B and D are not considered threats at this time.

Downlisting Criterion 1 – Mariana crows or aga occur in 2 populations, 1 on Rota consisting of a minimum of 75 territorial pairs, and 1 in northern Guam consisting of a minimum of 75 territorial pairs [listing factors A and E].

This criterion has not been met because the population in northern Guam consists of only two individuals (J. Quitugua, Guam Division of Aquatic and Wildlife Resources, pers. comm. 2009) and the population on Rota is now believed to consist of 50 to 60 territorial pairs (Berry *et al.* 2008).

Downlisting Criterion 2 - Both populations are stable or increasing based on quantitative surveys or demographic monitoring that demonstrates an average intrinsic growth rate (λ) not less than 1.0 over a period of at least 10 consecutive years [listing factors A and E].

This criterion has not been met because surveys of the Rota population indicate that the population has declined from approximately 1,300 individuals in 1982 (Engbring *et al.* 1986) to 234 breeding adults in 1999 (Plentovich *et al.* 2005) and 170 breeding adults in 2004 (Amar *et al.* 2008). In addition, a recent assessment of aga breeding pairs concluded that only 50 to 60 breeding pairs of aga remain on Rota, a 45 percent decline from the 1999 pair estimate (Berry *et al.* 2008).

Downlisting Criterion 3 - Sufficient Mariana crow or aga habitat, based on quantitative estimates of territory and home range size, is protected and managed to achieve criteria 1 and 2 above [listing factor A].

Preliminary assessments of territory and home range size were developed in 1999 (Morton *et al.* 1999). However, sufficient quantitative estimates of territory and home range size in relation to habitat quality are currently unavailable (USFWS 2005).

Downlisting Criterion 4 - Brown treesnakes (*Boiga irregularis*) and other introduced predators found to be a threat to the Mariana crow or aga are controlled at sufficient levels to achieve criteria 1 and 2 above [listing factor C].

¹ Threats are classified as the following five factors:

- A. Present of threatened destruction, modification or curtailment of its habitat or range;
- B. Overutilization for commercial, recreational, scientific, or educational purposes;
- C. Disease or predation;
- D. Inadequacy of existing regulatory mechanisms;
- E. Other natural or manmade factors affecting its continued existence.

This criterion has not been met; additional research is needed on the introduced predators impacting the population on Rota to determine the level of control necessary to achieve recovery (USFWS 2005). In addition, brown treesnake control on Guam has been limited to small areas and has not achieved the level necessary to allow breeding without intensive management (USFWS 2005).

Downlisting Criterion 5 - Brown treesnake interdiction efforts are in place to prevent the establishment of brown treesnakes on Rota [listing factor C].

This recovery criterion has not been achieved; improved interdiction efforts on Rota are needed to ensure snakes do not become established (USFWS 2005).

Downlisting Criterion 6 - Efforts to resolve Mariana crow and landowner conflicts have been implemented [listing factor E].

This criterion has not been achieved. Conflicts between endangered species conservation and land use on Rota still exist and appropriate measures (e.g., incidental take permits associated with habitat conservation planning) to resolve these conflicts have not been fully developed and implemented (USFWS 2004, 2005; K. Levenstein, University of Washington, pers. comm., 2009).

Delisting Criterion 1 – Mariana crows or aga occur in 3 populations, 1 on Rota consisting of a minimum of 75 territorial pairs, 1 on northern Guam consisting of a minimum of 75 territorial pairs, and 1 in southern Guam consisting of a minimum of 75 territorial pairs [listing factors A and E].

This criterion has not been met; see Downlisting Criterion 1 above.

Delisting Criterion 2 - All 3 populations are stable or increasing based on quantitative surveys or demographic monitoring that demonstrates an average intrinsic growth rate (λ) not less than 1.0 over a period of at least 10 consecutive years [listing factors A and E].

This criterion has not been met; see Downlisting Criterion 2 above.

Delisting Criteria 3 - Sufficient Mariana crow or aga habitat, based on quantitative estimates of territory and home range size, is protected and managed to achieve criteria 1 and 2 above [listing factor A].

This criterion has not been met; see Downlisting Criterion 3 above.

Delisting Criteria 4 - Brown treesnakes and other introduced predators are controlled at sufficient levels to achieve criteria 1 and 2 above [listing factor C].

This criterion has not been met; see Downlisting Criterion 4 above.

Delisting Criteria 5 - Brown treesnake interdiction efforts are in place to prevent the establishment of brown treesnakes on Rota [listing factor C].

This criterion has not been met; see Downlisting Criterion 5 above.

Delisting Criteria 6 - Efforts to resolve Mariana crow and landowner conflicts have been implemented [listing factor E].

This criterion has not been met; see Downlisting Criterion 6 above.

Delisting Criteria 7 - A monitoring plan has been developed and is ready for implementation, to cover a minimum of five years post-delisting, to ensure the ongoing recovery of the species and the continuing effectiveness of management actions.

This criterion has not been met as the species has not met any of the downlisting or delisting criteria.

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

No new information.

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

The most recent variable circular plot analysis for Rota, based on surveys in 2003 and 2004, estimates that aga detections per count station may have decreased by as much as 94 percent over the last two decades (Amar *et al.* 2008). In addition, a recent assessment of aga breeding pairs concluded that only 50 to 60 breeding pairs of aga remain on Rota, a 45 percent decline from the 1999 pair estimate (Berry *et al.* 2008).

Continued monitoring of the aga population on Rota has resulted in updated demographic information. The percentage of nests that produced fledglings between 1996 and 2006 varied from 12 to 50 percent and Mayfield estimates of nest success ranged from 13 to 41 percent (Ha and Ha 2007). Mean clutch size, number of nestlings, and number of fledglings for nests monitored between 1996 and 2006 were 2.59 ± 0.08 SE, 1.42 ± 0.06 SE, and 1.28 ± 0.07 SE, respectively (Ha and Ha 2007;

Lainie Berry, University of Washington, pers. comm., 2008). Survival to one year of age for male and female aga banded on Rota between 1990 and 2006 was 36.8 and 54.1 percent, respectively (Ha and Ha 2006). Annual survivorship for adult male and female aga was 80.6 and 76.1 percent, respectively. First year male survivorship was significantly lower than first year female survivorship, but the reason for this difference is currently unknown.

Finally, the available demographic information was incorporated into a stochastic model for the Rota population. Using the 1999 population as a starting point, the model predicts that the aga population will decline to 32 individuals in 20 years unless survival of adult and juvenile aga is improved (Ha *et al.* 2008).

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

No new information.

2.3.1.4 Taxonomic classification or changes in nomenclature:

No new information.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

No new information.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

No new information.

2.3.1.7 Other:

N/A

2.3.2 Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:

No new information.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:

No new information.

2.3.2.3 Disease or predation:

No new information.

2.3.2.4 Inadequacy of existing regulatory mechanisms:

No new information.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

No new information.

2.4 Synthesis

Since the Mariana crow was listed as endangered in 1984, its status has not improved. The Mariana crow population on the island of Rota currently consists of approximately 60 territorial pairs, a 45 percent decline from the 1999 estimate. This species continues to decline due to the effects of introduced predators (listing factor C), habitat loss and degradation (listing factor A), and landowner conflicts (listing factor E). In addition, the potential introduction of the brown treesnake to Rota also remains a threat because the interdiction efforts for Rota may be insufficient. On Guam, the Mariana crow population currently consists of two males and is not expected to increase until the Rota population is stabilized and the aga's primary predator on Guam, the brown treesnake, is controlled at sufficient levels to allow reestablishment of a viable Guam population.

3.0 RESULTS

3.1 Recommended Classification:

Downlist to Threatened

Uplist to Endangered

Delist

Extinction

Recovery

Original data for classification in error

No change is needed

3.2 New Recovery Priority Number: N/A

Brief Rationale:

3.3 Listing and Reclassification Priority Number: N/A

Reclassification (from Threatened to Endangered) Priority Number: _____

Reclassification (from Endangered to Threatened) Priority Number: _____

Delisting (regardless of current classification) Priority Number: _____

Brief Rationale:

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

- Continue field research to identify sources of adult and juvenile mortality and implement appropriate management measures to increase adult and juvenile survival.
- Conduct feasibility study to identify sources and levels of animosity toward aga and identify appropriate measures to reduce this animosity.
- Develop private landowner conservation initiative projects with appropriate parties on Rota and support conducting other incentive measures identified from the action above.
- Continue aga population and demographic monitoring on Rota.
- Evaluate need to intervene in the Rota population and appropriate method(s) of intervention (i.e., captive rearing and release and/or establishing another wild population) and, if appropriate, support a population intervention program.
- Set aside and protect recovery areas for aga on Guam.
- Continue support of efforts to reduce brown treesnake populations over large areas of Guam.

5.0 REFERENCES

Amar, A., F. Amidon, B. Arroyo, J.A. Esselstyn, and A.P. Marshall. 2008. Population trends of the forest bird community on the Pacific island of Rota, Mariana Islands. *Condor* 110:421-427.

Berry, L., R. Ha, and J. Ha. 2008. Mariana crow pair survey, Rota: Final Report, 2008. Unpublished report submitted to the U.S. Fish and Wildlife Service, Honolulu, Hawaii. 12 pages.

- Engbring, J., F.L. Ramsey, and V.J. Wildman. 1986. Micronesian forest bird survey, 1982: Saipan, Tinian, Agiguan, and Rota. U.S. Fish and Wildlife Service Special Publication, Honolulu, Hawaii. vi + 143 pages.
- Ha, R.R. and J.C. Ha. 2006. Progress report (July 1, 2006-November 30, 2006) on the Mariana crow (*Corvus kubaryi*) and the Rota bridled white-eye (*Zosterops rotensis*) on the Pacific island of Rota. Unpublished report to the Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife, Saipan, CNMI. 21 pages.
- Ha, R.R. and J.C. Ha. 2007. Annual report (July 1, 2006-June 30, 2007) on the Mariana crow (*Corvus kubaryi*) and the Rota bridled white-eye (*Zosterops rotensis*) on the Pacific island of Rota. Unpublished report to the Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife, Saipan, CNMI. 61 pages.
- Ha, R.R., L. Berry, and J.C. Ha. 2008. Annual report (July 1, 2007 – June 30, 2008) on the Mariana crow (*Corvus kubaryi*) and the Rota bridled white-eye (*Zosterops rotensis*) on the Pacific island of Rota. Unpublished report to the Commonwealth of the Northern Mariana Islands Division of Fish and Wildlife, Saipan, CNMI. 52 pages.
- Morton, J.M., S. Plentovich, and T. Sharp. 1999. Reproduction and juvenile dispersal of Mariana crows (*Corvus kubaryi*) on Rota 1996-1999. Unpublished report submitted to the U.S. Fish and Wildlife Service, Honolulu, Hawaii. 28 pages.
- Plentovich, S., J.M. Morton, J. Bart, R.J. Camp, M. Lusk, N. Johnson, and E. Vanderwerf. 2005. Current and historical population status of the Mariana crow (*Corvus kubaryi*) on Rota, Commonwealth of the Northern Mariana Islands. Bird Conservation International 15:211-224.
- U.S. Fish and Wildlife Service. 1984. Endangered and threatened wildlife and plants; determination of endangered status for seven birds and two bats on Guam and the Northern Mariana Islands. Federal Register 49(167):33881-33885.
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- U.S. Fish and Wildlife Service. 2005. Draft revised recovery plan for the aga or Mariana crow, *Corvus kubaryi*. Portland, Oregon. x + 147 pages.

Personal Communications

- Berry, Lainie. 2008. University of Washington, Seattle, Washington.
- Levenstein, Kenneth. 2009. University of Washington, Seattle, Washington.

Quitigua, Jeff. 2009. Guam Division of Aquatic and Wildlife Resources, Mangilao, Guam.

Signature Page
U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of the Aga or Mariana Crow (*Corvus kubaryi*)

Current Classification: E

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

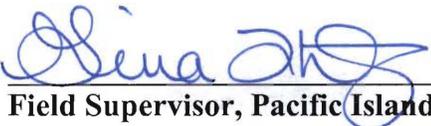
Appropriate Listing/Reclassification Priority Number, if applicable: _____

Review Conducted By:

Fred Amidon, Fish and Wildlife Biologist
Holly Freifeld, Vertebrate Recovery Coordinator
Marilet A. Zablan, Recovery Program Leader
Kit Hershey, Acting Assistant Field Supervisor for Endangered Species
Gina Shultz, Deputy Field Supervisor

Approved: _____

Acting


Field Supervisor, Pacific Islands Fish and Wildlife Office

Date

25 August 2009