

## **ADDENDUM TO ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE O'AHU 'ELEPAIO**

### **INTRODUCTION**

In June 2001, the U.S. Fish and Wildlife Service (the Service) published a proposed rule to designate critical habitat for the O'ahu 'elepaio (*Chasiempis sandwichensis ibidis*) under the Endangered Species Act of 1973, as amended (the ESA). Because the ESA also calls for an economic analysis of the critical habitat designation, the Service released a *Draft Economic Analysis of Critical Habitat Designation for O'ahu Elepaio* (DEA) for public review and comment in August 2001.<sup>1</sup>

After considering additional information and public comments on the proposed rule and the DEA, the Service made five revisions to the critical habitat designations for the O'ahu 'elepaio, reducing the area by a total of 510 acres.<sup>[1]</sup> All of the revisions were for biological reasons.

This Addendum to the DEA addresses the implications of these revisions on the findings in the DEA, and presents revised estimates of economic impacts where appropriate. Certain topics addressed in the analysis were revisited and additional information was gathered. Also, public comments specific to the DEA were considered in preparing this Addendum. Specific topics covered include:

- Changes in the methodology to more fully describe and explore the baseline conditions.
- Changes made by the Service to the critical habitat designations and resulting changes in the economic impacts.
- Quantification of economic impacts for military areas.
- The impact of the designation on property values specific to Moanalua Valley.
- Cost to property owners of investigating the implications of having all or a portion of their property located in a critical habitat.
- Minor corrections to the DEA.

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1. Copies of the *Draft Economic Analysis of Critical Habitat Designation for the O'ahu 'Elepaio* are available from the Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service, Honolulu, Hawaii.

- A summary table showing low and high estimates of economic impacts that are attributable to the listing of the 'elepaio and its critical habitat designation.

## **METHODOLOGY**

Section 6 of the DEA describes the methodology that was used in analyzing the economic impacts of the proposed 'elepaio critical habitat. As indicated, the focus of the DEA was on economic costs and benefits over and above those resulting from a baseline scenario that includes the regulations and requirements associated with the listing of the 'elepaio as endangered (p. 6-6). Background information on this baseline includes "... projected section 7 consultations, project modifications, and associated costs and benefits that would be attributable to the presence of the O'ahu 'elepaio"—i.e., the economic impacts resulting from the listing of the 'elepaio (p. 6-4).

In this Addendum, the methodology was modified to more fully describe and explore the baseline conditions attributed to the listing of the 'elepaio. The results are summarized in the final subsection below, which presents high and low estimates of economic impacts. The low estimates include impacts associated with areas that are considered to be unoccupied by the 'elepaio (i.e., those additional impacts generally associated with the critical habitat designation but not its listing). The high estimates include impacts associated with the entire critical habitat (i.e., those impacts generally associated with both the listing of the 'elepaio and its critical habitat). Although costs and benefits are characterized, they are not quantified for projects and activities in cases where: (1) the economic impacts attributable to both the listing and the critical habitat are expected to be small, (2) the probability that the impacts will occur is small, (3) the impacts are highly speculative, or (4) data needed to quantify the impacts were not reasonably available.

This change in methodology is consistent with the planned modification discussed in the Foreword to the DEA, and is consistent with the ruling of the Tenth Circuit Court concerning the analytical approach used by the Service to estimate economic impacts (see Foreword and Section 6 of the DEA).

## **CHANGES TO THE CRITICAL HABITAT DESIGNATION AND RESULTING CHANGES IN ECONOMIC IMPACTS**

Briefly described below are the five reductions in the critical habitat areas from the units given in Section 1 of the DEA, and the resulting changes in economic impacts from those given in Section 7. All of the areas are unoccupied by 'elepaio.

**Unit 1, Schofield Barracks West Range (about 119 acres)**

The easternmost "spike" of Unit 1, located southeast of Pu'u Pane and covering 119 acres, was removed because the area is very dry and has little suitable forest for 'elepaio.<sup>[1]</sup>

This area is part of the safety zone for Schofield Barracks West Range (see pp. 7-27, 28). As indicated in the DEA, no training activities take place in this area and none are planned. Also, no significant improvements are located in this area and none are scheduled.

The DEA indicated that the proposed critical habitat designation was likely to have little economic impact on military activities. This is still the case, but since the critical habitat land area has been reduced by 119 acres, the economic impacts will be even less. Thus, this reduction in acreage results in no significant change to the DEA.

**Unit 2, Palehua-Mauna Kapu Road (about 77 acres)**

At the southern end of Unit 2, a corridor extending roughly 328 feet (about 100 meters) on each side of Palehua-Mauna Kapu Road, and totalling 77 acres was removed from the critical habitat designation.<sup>[1]</sup> Of this area, 59 acres are private land and 17 acres are in the Nanakuli State Forest Reserve. This area is drier and more developed than previously realized by the Service and does not contain suitable forest for 'elepaio.

This corridor includes the upper portion of the Palehua communications complex which, as discussed in the DEA, is the largest complex of communications towers on O'ahu (see pp. 7-17 to 7-21). Critical habitat designation would not affect the operations and maintenance of existing man-made facilities, but it would require section 7 consultation for major modifications or additions to existing towers and appurtenant structures, or to develop new ones.

Since the area being removed from critical habitat does not include suitable forest for the 'elepaio, redrawing the boundary precludes unnecessary section 7 consultation costs for communications modifications or additions at Palehua.

**Unit 2, Nanakuli Valley (about 153 acres)**

At the southern end of Unit 2, about 156 acres were removed from critical habitat designation because the area is very dry and has no forest.<sup>[1]</sup> Of this area, 153 acres are State land at the upper reaches of Nanakuli Valley, and a little over 2 acres are Federal land (NAVMAG Lualualei) near the ridgeline separating Nanakuli Valley and Lualualei Valley.

This area has no known or planned improvements or economic activities. Its removal from critical habitat requires no change to the DEA.

**Unit 3, Keaiwa Heiau State Recreation Area (about 121 acres)**

About 121 acres of Keaiwa Heiau State Recreation Area (SRA) were removed from proposed critical habitat Unit 3.<sup>[1]</sup> The area includes the developed portion of the SRA, including roads, picnic areas, bathrooms, etc. (see p. 7-14).

As discussed in the DEA, this area amounts to an unmapped hole in critical habitat Unit 3. Redrawing the boundary of the unit to exclude the improved portions of the SRA makes this explicit and precludes the potential of unnecessary section 7 consultation costs.

**Unit 5, The Harold L. Lyon Arboretum (about 40 acres)**

At the upper end of Manoa Valley, about 40 acres of Lyon Arboretum, including the planted garden and gravel road, were removed from critical habitat Unit 5.<sup>[1]</sup>

As discussed in the DEA, this area amounts to an unmapped hole in Unit 5 (see p. 7-15, 16). Redrawing the boundary of the unit to exclude the managed portions of the Arboretum makes this explicit and precludes the potential of unnecessary section 7 consultation costs.

**U.S. MILITARY ACTIVITIES**

Additional information is provided below on the economic impact of the 'elepaio listing and critical habitat designation on military activities (see pp. 7-26 to 7-31 of the DEA for the original discussion).

**Makua Military Reservation**

Expensive studies and changes in operations have occurred or will occur at Makua Military Reservation but, as explained below, little or none of these changes are due to the 'elepaio or its critical habitat designation.

As mentioned in the DEA, maneuver and live-fire training was suspended in Makua Valley in September 1998 following several wildfires that had been ignited by military personnel using live ammunition (p. 7-26), and following a letter from Malama Makua (a community organization represented by Earthjustice Legal Defense Fund) concerning its intent to sue the Army to require a comprehensive Environmental Impact Statement (EIS) before resuming live-fire training.<sup>[2]</sup>

In preparing to resume training, the U. S. Army (the Army) worked with the Service to study the impact of the fires on rare flora and fauna, and prepared an Environmental

Assessment costing nearly \$350,000. This effort included a formal programmatic consultation that addressed training and all other program activities in the valley and all listed species in the area, including the 'elepaio and other vertebrates, invertebrates and plants.

A second lawsuit was filed in December 2000 to require an EIS instead of an Environmental Assessment.<sup>[3]</sup> But following the terrorist attacks of September 11, 2001, the Army and Malama Makua reached an out-of-court settlement on October 4, 2001 to allow live-fire training in the valley.<sup>[4-11]</sup>

The settlement requires the Army to prepare a comprehensive EIS within 3 years, addressing (1) biological resources (the valley contains at least 44 endangered species, including two birds, a bat, a snail, and 40 plants); (2) cultural resources (41 historic and cultural sites and more than 150 historic features); and (3) soil, air, groundwater, and surface-water contamination associated with live-fire training. The Army estimates that the EIS could cost as much as \$3 million. In addition, the Army must establish a technical assistance fund of \$50,000 to enable the community to hire independent experts to evaluate studies conducted for the EIS. Further, the Army will be required to undertake long-term air and ground-water monitoring. Finally, the community will have limited access to visit cultural sites in the valley, and to observe military training exercises there.

Live-fire operations will take place on 456 acres (11%) of the 4,190 acres leased by the state to the Army, and concertina wire will be used to keep soldiers out of sensitive areas. Under the settlement, 37 company maneuver Combined Arms Live-Fire Exercises (CALFEXs) will be allowed over the next 3 years; unexploded ordnance will be cleared from an area extending 3,000 feet from the highway into the valley; ordnance will be delivered by air when weather permits and helicopters are available; and when ammunition is transported by land, the Army will avoid peak traffic hours and hours when children are traveling to and from school.

A maximum of 150 soldiers will be allowed to fire weapons at any one time, compared to the 600 soldiers who often used the valley in the past. To better control fires in this dry valley, less incendiary ammunition will be used, and training will not be allowed when dry, windy conditions present a fire hazard. Also, two 300,000 gallon water tanks, a helicopter with a dump bucket, and a 20-person fire-fighting force will be in place. These fire-control measures will be in addition to the fire breaks and control of vegetation growth along them as discussed in the DEA (p. 7-27).

After the EIS is completed, and depending upon the findings in the EIS, training and fire-fighting operations could be subject to more changes.

Over the next decade, the cost to the Army and other involved agencies of changing training operations, drafting the EIS, environmental monitoring, etc., will amount to mil-

lions of dollars. However, little or none of this cost will be attributable to the 'elepaio because the Army has already consulted with the Service on the 'elepaio and, within the next 10 years, the Service anticipates no new or additional consultations involving the 'elepaio or its critical habitat. Furthermore, none of the recommended mitigating actions resulting from the formal programmatic consultation were due to concerns about the 'elepaio. Instead, the costs will be attributable to: good land stewardship as embodied in requirements under the Federal Integrated Natural Resources Management Plans (INRMPs), addressing community concerns to prevent or limit environmental and cultural damage, and the presence of the many other listed species in the valley.

The DEA raised the possibility that if the fire cannot be reduced sufficiently to safeguard the 'elepaio and its habitat, then mitigation may be required and could possibly include rodent control (p. 7-27). However, recommendations from the consultation do not call for rodent control.

### **Schofield Barracks**

Over the next decade, the Service anticipates that the Army will initiate a formal programmatic consultation covering the Schofield Barracks lands, including West Range, South Range and East Range (see pp. 7-27 to 7-29 and pp. 7-30 to 7-31). The consultation would include all activities on all of the Schofield Barracks lands, and all the listed species (including the 'elepaio and its critical habitat, and other vertebrates, invertebrates and plants). Given that the consultation will be formal, complex, and will involve multiple activities, multiple species and at least three large areas, the costs could be \$50,000 or more (based on the equivalent of multiple consultations as specified on p. 7-4). No biological assessments are anticipated since the military lands have been surveyed. Due to the presence of a great many other listed species on the Schofield Barracks lands, only a fraction of this cost would be attributable to the 'elepaio and its critical habitat, with a high estimate amounting to \$12,000. The low value, which reflects the cost attributable to the 'elepaio critical habitat but not its listing, is about \$8,000, or about 70% of the total cost for both the listing and the critical habitat. This percentage is based on the amount of land at the three Schofield Barracks ranges that is considered to be unoccupied critical habitat for the 'elepaio.

As discussed in the DEA (p. 7-28), anticipated changes arising from critical habitat designation might include increased efforts at fire control at Schofield Barracks West Range. This is the only one of the three ranges at Schofield in the critical habitat that has a history of occasional fires that threaten the 'elepaio. As with Makua Valley, the fires are the result of live-fire training at a lower elevation, but the fire hazard at West Range is less severe than it is at Makua Valley since West Range is on the wetter, windward side of the mountain.

Increased efforts at fire control might include controlling growth of the exotic trees and shrubs that burn most readily (e.g., eucalyptus and casuarina); providing an adequate source of water to extinguish fires; using a helicopter with dump buckets (possibly shared with Makua Military Reservation); better fire detection and reporting; faster response times in extinguishing fires before they become large; improved training of firefighters; and more firefighters on standby. Assuming that staffing is increased by 10 firefighters, trainers, and other personnel at \$60,000 per person per year (including overhead), the cost increase could amount to about \$600,000 per year. However, only a portion of this cost would be attributable to the 'elepaio and its critical habitat. Instead, the cost would be attributable to good land stewardship as embodied in requirements under the Federal INRMPs, and to the presence of the many other listed species in the affected area.

The high allocation to the 'elepaio and its critical habitat is estimated at about \$75,000 per year, or about 12.5% of the total annual cost of increased fire control. This percentage is based on half of the cost allocated to listed species and half to the INMRP (i.e., fires should be controlled even if no listed species are in the area), and 25% of the former allocated to the 'elepaio. The low value, which reflects the cost attributable to the 'elepaio critical habitat but not its listing, is about \$24,000, or about 32% of the total cost for both the listing and the critical habitat. This percentage is based on the amount of land at Schofield Barracks West Range that is considered to be unoccupied critical habitat for the 'elepaio.

If the risk of fire cannot be reduced sufficiently to safeguard the 'elepaio and its habitat then, as discussed in the DEA (p. 7-28), mitigation may be required and could possibly include rodent control. The cost of rodent control could reach about \$51,000 per year for West Range, based on about 1,302 acres considered occupied by the 'elepaio (see p. 7-27) and rodent control costs of \$39 per acre per year (see p. 7-6). The costs could be significantly lower if aerial drops of rodenticide are approved (see pp. 7-5 and 7-6). Also, a portion of the cost would be attributable to the other listed species in the 'elepaio critical habitat that would benefit from the rodent control.

The low estimate for rodent control, which reflects the cost attributable to the 'elepaio critical habitat but not its listing, would be zero because rodent control would not be needed in unoccupied areas where 'elepaio are not present. Furthermore, if the risk of fire can be reduced sufficiently to safeguard the 'elepaio and its habitat, then rodent control would not be needed even in the occupied portion of the critical habitat.

#### **Naval Magazine Pearl Harbor, Lualualei Branch (NAVMAG PH LLL)**

As above, the Service anticipates that, over the next decade, the U.S. Navy will initiate a formal programmatic consultation covering Naval Magazine Pearl Harbor, Lualualei Branch (NAVMAG PH LLL) (see pp. 7-29 to 7-30). The consultation would include all activities on all of the NAVMAG PH LLL lands, and all the listed species (including the

'elepaio and its critical habitat, and other vertebrates, invertebrates and plants). Given that the consultation will be formal, complex, and will involve multiple activities, multiple, species and large areas, the costs could be \$40,000 or more (based on the equivalent of multiple consultations as specified on p. 7-4). No biological assessments are anticipated since the military lands have been surveyed. Due to the presence of a great many other listed species within NAVMAG PH LLL, only a fraction of this cost would be attributable to the 'elepaio and its critical habitat, with a high estimate amounting to \$10,000. The low value, which reflects the cost attributable to the 'elepaio critical habitat but not its listing, is about \$3,000, or about 28% of the total cost for both the listing and the critical habitat. This percentage is based on the amount of land at NAVMAG PH LLL that is considered to be unoccupied critical habitat for the 'elepaio (see p. 7-29).

As discussed in the DEA (p. 7-28), anticipated changes arising from critical habitat designation might include increased efforts at fire control. However, since no live-fire training occurs at NAVMAG PH LLL, the risk of fire is lower than it is at Makua Military Reservation or at Schofield Barracks West Range. And because munitions are stored at NAVMAG PH LLL, fire control is already at a high level of effort (e.g., the base hosts a full-service fire station). The cost of the fire control would be allocated primarily to safety, with little or none of the cost allocated to the 'elepaio, its critical habitat, or the many other listed species at NAVMAG PH LLL.

If the risk of fire cannot be reduced sufficiently to safeguard the 'elepaio and its habitat then, as discussed in the DEA (p. 7-29), mitigation may be required and could possibly include rodent control. The cost of rodent control could reach about \$47,000 per year for NAVMAG PH LLL, based on about 1,200 acres considered occupied by the 'elepaio (see p. 7-29) and rodent control costs of \$39 per acre per year (see p. 7-6). The costs could be significantly lower if aerial drops of rodenticide are approved (see pp. 7-5 and 7-6). Also, a portion of the cost would be attributable to the other listed species in the 'elepaio critical habitat that would benefit from the rodent control.

The low estimate for rodent control would be zero for the same reasons as given for Schofield Barracks. This low estimate of zero is regarded as more likely than the high estimate because consultations are expected to conclude that the risk of fire to 'elepaio and its critical habitat are too low to require mitigation in the form of rodent control. As mentioned above, the risk of fire is low because no live fire training is conducted, and because there is already a high level of effort to control fires to safeguard munitions.

### **Kawailoa Training Area**

The Service also anticipates that, over the next decade, the Army will initiate a formal programmatic consultation covering the Kawailoa Training Area (see p. 7-30). The consultation would include all activities on all of the Kawailoa Training Area lands, and all the

listed species (including the 'elepaio and its critical habitat, and other vertebrates, invertebrates and plants). Given that the consultation will be formal, complex, and will involve multiple activities, multiple species and large areas, the costs could be \$40,000 or more (based on the equivalent of multiple consultations as specified on p. 7-4). Due to the presence of a great many other listed species within Kawaihoa Training Area and the fact that about 75% of the training area is outside the critical habitat, only a fraction of this cost would be attributable to the 'elepaio and its critical habitat, with a high estimate amounting to \$5,000. The low estimate, which reflects the cost attributable to the 'elepaio critical habitat but not its listing, is the same as the high estimate since the land at Kawaihoa Training Area is considered to be unoccupied critical habitat for the 'elepaio (see p. 7-30).

Because the helicopter training at Kawaihoa Training Area appears to have no adverse impact on 'elepaio or its habitat, critical habitat designation is unlikely to require any project modifications (see p. 7-30).

### **Fort Shafter**

Finally, the Service anticipates that, over the next decade, the Army will initiate a formal programmatic consultation covering Fort Shafter (see p. 7-31). None of the consultation costs would be attributable to the 'elepaio or its critical habitat since no program activities occur within the critical habitat.

## **IMPACT ON PROPERTY VALUES, MOANALUA VALLEY**

### **Concern over Property Values**

As stated in the DEA, “All of the private lands [proposed for critical habitat] are in mountainous areas having difficult access and terrain, and are within the state’s Conservation District where land-use controls severely limit development and most other land uses. Thus, the proposed critical habitat designation would result in little or no loss of potential development or any other economic use that could affect private property values (p 7-33).”

However, one commenter noted that portions of Moanalua Valley “... are fairly accessible with gentle slopes that were once extensively grazed and had residences located thereon. Thus, ... [designation of critical habitat] could very well limit the future options for use of the property and would adversely affect future property values.”<sup>[12]</sup>

Because the situation in Moanalua Valley differs somewhat from the general situation addressed in the DEA section on property values (pp. 7-32 to 7-34), the impact of the critical habitat on the value of the land within this valley is addressed below.

### **Background Information on Moanalua Valley**

Moanalua Valley is a long narrow valley that extends 5 miles into the Ko'olau Mountain Range. Conceptually, it can be viewed in three sections: (1) the developed section closest to the ocean ("the ocean end") that extends about 1.5 miles into the valley and which has a developed valley floor that narrows from about 0.4 mile at the valley entrance to about 0.1 mile at the end of the developed area, (2) a very narrow undeveloped middle section that extends about a half mile inland from a residential area to the forest line, and (3) a very narrow undeveloped section that extends another 2.2 miles inland from the forest line into the mountains ("the mountain end"). Only the mountain end falls within critical habitat Unit 3, of which the extreme upper third is occupied by 'elepaio.

Access to the middle of the valley and to the mountain end is provided by a narrow 4-wheel-drive gravel and partially paved road that repeatedly crosses through Moanalua Stream.

Portions of the valley were used to graze cattle in the early 1900s, and the mountain end contains the remains of at least one home that existed during this period. While the ocean end of the valley was developed in the 1960s, the middle and the mountain end were not developed, presumably because of high infrastructure costs for little developable land on the narrow valley floor.

In the 1970s, the valley was considered for a section of freeway to connect the south and windward (northeast) sides of the island, but the project was moved to another valley because of strong community pressure in favor of saving Moanalua Valley due to its natural beauty and cultural resources.

Currently, the mountain end of the valley is used for nature tours and pig hunting, and the landowner has no plans to develop it or to introduce agricultural activities.

### **Development Potential and Current Land Value**

The middle of the valley and the mountain end are in the Resource Subzone of the state's Conservation District (see p. 3-8), and are zoned Preservation by the county. Also, the mountain end of the valley is within the area managed by the Ko'olau Mountains Watershed Partnership (see pp. 3-16 to 3-17); this watershed must be protected in order to provide a sustainable supply of potable water on O'ahu.

These state and county land-use designations prevent urban development and most other economic uses of the mountain end of the valley. As a result, the probability that this portion of the valley will be urbanized over the next 50+ years is nearly zero.

The limited economic potential is reflected in the low assessed market value of the entire 2,906-acre parcel (which includes both the middle of the valley and the mountain end): an average of about \$1,100 per acre.<sup>[13]</sup> However, the narrow valley floor undoubtedly has somewhat higher land values than the steeper sides of the valley.

### **Impact of Critical Habitat on Land Management, Current Land Uses, and Potential Economic Land Uses**

As discussed in the DEA, critical habitat designation would not require any additional land management to benefit the 'elepaio (see pp. 7-5 to 7-7). Furthermore, the designation would not affect the nature tours and pig hunting that take place in the valley. Finally, the designation would not prevent urban development or agricultural use of the valley, assuming unrealistically and for the sake of argument that the appropriate state and county land-use approvals and permits were granted. In the extremely unlikely event that such activities were approved, projects having Federal involvement—e.g., a permit from the Army Corps of Engineers for drainage into a waterway, or a Federal cost-sharing grant to improve the land so as to benefit the environment—would require section 7 consultation with the Service and possibly project modification to prevent or limit adverse impacts on the habitat of the 'elepaio. Projects that do not have Federal involvement would not be subject to consultation or project modification.

### **Impact on Property Values**

Even though critical habitat designation would neither require additional land management nor prevent a higher economic use of the mountain end of the valley, the designation could lower property values somewhat if the landowner, potential buyers and potential lessees perceive or fear that the designation could require expensive land management, restrict use of the land, require expensive project modifications, or cause long project delays or other problems. The loss in value could be temporary or permanent, and would last as long as the perception or fear persists.

However, a loss in property value (if any) would be very small because the designation would result in little or no loss of potential development or any other economic use. As discussed, the existing state and county land-use controls amount to a heavy layer of regulation that severely limits potential development and other economic uses of the land. Even without these restrictions, development potential would be limited by high infrastructure costs for a small amount of buildable land. Critical habitat designation amounts to a comparatively light layer of additional management that would not further reduce potential economic use of the land, nor would it impose any additional land-management costs on the landowner.

## **COST TO PROPERTY OWNERS**

Private landowners own approximately 25,800 acres of the entire 'elepaio critical habitat, with all but 3 acres owned by just 23 major landowners.<sup>[14]</sup> Taking into account the location and mountainous terrain of the parcels as well as the nature of the landowners (corporations, estates, trusts, non-profit and charitable organizations, etc.), an estimated 10 to 15 of the landowners may investigate the implications of having all or some of their land in the critical habitat. The cost to each of them is estimated at about \$4,000 (see p. 7-34), thus bringing the total cost to about \$40,000 to \$60,000.

## **MINOR CORRECTIONS TO THE DEA**

Two corrections to the DEA should be noted, although neither of them change the assessment of economic impacts.

### **Honouliuli Preserve**

The correct acreage figure for Honouliuli Preserve is 3,692 acres, not 3,962 acres (see page 3-17).

### **Schofield Barracks East Range**

East Range is no longer used for live-fire training (see p. 7-30).<sup>[15]</sup>

## **SUMMARY OF ECONOMIC IMPACTS**

For various economic activities located in the designated 'elepaio critical habitat, Table Add-1 summarizes the low and high estimates of economic impacts that are attributable to the listing of the 'elepaio and its critical habitat designation. For the most part, the low estimates of economic impacts reflect the 'elepaio critical habitat designation but not its listing as an endangered species, while the high estimates reflect both the listing of the 'elepaio and its critical habitat designation.

As indicated in the table, most of the costs are zero or relatively small. This reflects (1) the limited economic activity in the critical habitat due to mountainous terrain, poor access, state land-use controls designed to protect O'ahu's watershed and other resources; and (2) limited Federal involvement for many activities. The greatest costs would fall on the U.S. military and on private landowners who may investigate the implications of having all or a portion of their land in a critical habitat.

Benefits of preserving 'elepaio would be substantial, but the allocation of the benefits to the 'elepaio listing and its critical habitat is undetermined.

**Table Add-1. Summary of Costs and Benefits Attributable to the O'ahu 'Elepaio Listing and its Critical Habitat**  
(10-year estimates)

CH = critical habitat    C&PM = consultation and project modification    PCEs = primary constituent elements    n.e. = not estimated

Activity	Low Estimate	High Estimate	Explanation	Page(s)
<b>Private Land Management Costs</b>	None	None	No special land management required by the listing or CH.	7-5 – 7-7
<b>Game Hunting</b>				
State-managed land: Cost of C&PM	Minor	Minor	Consultation required due to Fed funding. Potential for significant costs, but most of it will be attributable to listed plants that are at risk from game mammals.	7-7 – 7-13
Private lands: Cost of C&PM	None	None	No consultation required since no Fed involvement.	7-10
<b>State Parks, Recreation Area &amp; Campground:</b> Cost of C&PM	None	None	No consultation required since no Fed involvement in O&M or improvements. Also, improved areas lack PCEs.	7-13 – 7-15 & Add-4
<b>Harold L. Lyon Arboretum:</b> Cost of C&PM	None	None	No consultation required since no Fed involvement in expansion of garden into CH.	7-15, 16 & Add-4
<b>DLNR Nursery &amp; Staging Area:</b> Cost of C&PM	None	None	No consultation required since no Fed involvement in O&M or improvements. Also, improved areas lack PCEs.	7-16
<b>Satellite Tracking Facility:</b> Cost of C&PM	Minor	Minor	Fed involvement, but no consultation or minimal consultation for O&M of man-made features (no PCEs). Also, no known plans for expansion or additions.	7-16
<b>Communications Facilities:</b> Cost of C&PM	Minor	Minor	Fed involvement, but no consultation or minimal consultation for O&M of man-made features (no PCEs). Known plans for new structures are for areas outside the CH. New structures inside CH (if any) would have a small footprint.	7-17 – 7-21 & Add-3
<b>Power Transmission Lines:</b> Cost of C&PM	None	None	No consultation required: (1) no Fed involvement in improvements, (2) not required for O&M, and (3) no known plans for new power transmission lines across CH.	7-21, 22
<b>Farming and Ranching:</b> Cost of C&PM	None	None	No farming or ranching occurs on land in the CH designated as Agriculture, and none is anticipated.	5-3
<b>Water Systems:</b> Cost of C&PM	None	None	No consultation required: (1) no Fed involvement in O&M or in known improvements and (2) not required for O&M.	7-22, 23

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(10-year estimates)

(continued)

CH = critical habitat    C&PM = consultation and project modification    PCEs = primary constituent elements    n.e. = not estimated

Activity	Low Estimate	High Estimate	Explanation	Page(s)
<b>Trails, Roads &amp; Helicopter Landing Areas</b>				
Federal Lands: Cost of C&PM	Minor	Minor	Fed involvement, but no consultation or minimal consultation for O&M of man-made features. Also, no known plans for access improvements.	7-23, 24
Other Lands: Cost of C&PM	None	None	No consultation required: (1) no Fed involvement in O&M or in known improvements and (2) not required for O&M.	7-24
<b>Urban and Other Development: Cost of C&amp;PM</b>	None	None	No urban or other development anticipated in CH.	7-24 – 7-26
<b>U.S. Military Activities</b>				
<u>Makua Military Reservation</u>				
Cost of Consultation	None	None	Programmatic consultation completed.	Add-4, 5, 6
Cost of Project Modifications & Environmental Studies	Minor	Minor	Substantial costs to address concerns of live-fire training (damage to cultural sites, fires and risk to listed species, contamination, etc.), but little or none of the cost would be attributable to the 'elepaio listing or its CH.	Add-6
<u>Schofield Barracks</u>				
Cost of Programmatic Consultation	\$ 8,000	\$ 12,000	Estimated share of cost for programmatic consultation.	Add-6
Annual Cost of Project Modification	\$ 24,000	\$ 75,000	Estimated share of cost for improved fire control related to live-fire training.	Add-7
Potential Annual Cost of Mitigation	None	\$ 51,000	Cost of rodent control if risk of fire can't be reduced sufficiently.	Add-7
<u>NAVMAG PH LLL</u>				
Cost of Programmatic Consultation	\$ 3,000	\$ 10,000	Estimated share of cost for programmatic consultation.	Add-7, 8
Annual Cost of Project Modification	Minor	Minor	Existing fire protection already at a high level to protect stored munitions. Also, no live-fire training.	Add-8
Potential Annual Cost of Mitigation	None	\$ 47,000	Cost of rodent control if risk of fire can't be reduced sufficiently.	Add-8

Add-14

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**Table Add-1. Summary of Costs and Benefits Attributable to the O'ahu 'Elepaio Listing and its Critical Habitat**

(10-year estimates)

(continued)

CH = critical habitat    C&PM = consultation and project modification    PCEs = primary constituent elements    n.e. = not estimated

Activity	Low Estimate	High Estimate	Explanation	Page(s)
<u>Kawailoa Training Area</u>				
Cost of Programmatic Consultation	\$ 5,000	\$ 5,000	Estimated share of cost for programmatic consultation.	Add-8, 9
Cost of Project Modification	None	None	No risk to 'elepaio or CH from helicopter training.	Add-9
<u>Fort Shafter</u>				
Cost of C&PM	None	None	No military activity in CH.	Add-9
<b>Residential Use:</b> Cost of C&PM (About 11 isolated cabins and homes.)	None	None	No consultation required on individual home loans if no Fed involvement; or, if there is Fed involvement, no practice of consultation. Also, residential use and home improvements amount to O&M of man-made features that lack the PCEs.	7-31 – 7-32
<b>Property Values and Costs to Property Owners</b>				
Decrease in Property Values	Minor	Minor	Over the long term, CH would result in little or no loss in land values because it would result in little or no loss of potential economic use.	7-32 – 7-33 & Add-9 – Add-11
Cost to Property Owners	\$ 40,000	\$ 60,000	About 10 to 15 private landowners could investigate the implications of CH at about \$4,000 per landowner.	Add-12
<b>Ecotourism</b>				
Cost of C&PM	None	None	No consultation required since no Fed involvement.	7-34
Increase in Tourism and Related Activity	n.e.	n.e.	An increase in the 'elepaio population and its range could stimulate tourism, adding \$340,000/yr or more in gross state product. But the contribution from the 'elepaio listing and CH is not determined.	7-34
<b>Small Businesses:</b> Cost of C&PM	See above	See above	The only small businesses likely to be affected by the CH are ecotourism operators.	7-35 – 7-36
<b>Recovery From Natural Disasters</b> Cost of C&PM	n.e.	n.e.	Fed involvement, but the cost of C&PM is too speculative to estimate.	7-35 – 7-37

Add-15

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**Table Add-1. Summary of Costs and Benefits Attributable to the O'ahu 'Elepaio Listing and its Critical Habitat**

(10-year estimates)

(continued)

CH = critical habitat    C&PM = consultation and project modification    PCEs = primary constituent elements    n.e. = not estimated

Activity	Low Estimate	High Estimate	Explanation	Page(s)
<b>Cost of Derivative Changes in Land Regulation and Land Management</b>	n.e.	n.e.	Derivative changes are (1) not anticipated, (2) small, or (3) speculative.	7-37 – 7-41
<b>Benefits of Preserving O'ahu 'Elepaio</b>	n.e.	n.e.	Benefits estimated at \$4.3 million/yr, with most of it attributable to rodent control and an undetermined portion attributable to the 'elepaio listing and its CH.	7-41 – 7-43
<b>Benefits of Preserving Other Species</b>	n.e.	n.e.	Recovery of 'elepaio will involve rodent control that will contribute to the survival and recovery of other native species (5 birds, 6 snails, 5+ plants, and insects), but information is inadequate to value the benefits.	7-43 – 7-44

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- [6] Gregg K. Kakesako. "Makua Live-Fire to Resume." *Honolulu Star-Bulletin*. Honolulu, Hawai'i. October 4, 2001.
- [7] Mike Gordon. "Army to Resume Training at Makua Valley." *The Honolulu Advertiser*. Honolulu, Hawai'i. October 5, 2001.
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- [12] Estate of Samuel Mills Damon, September 5, 2001.
- [13] City and County of Honolulu. Parcel data. October 2001.
- [14] Based on ownership data from the Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office.
- [15] Personal communication, U.S. Army, Schofield Barracks, August 7, 2001.