



ECONOMIC ANALYSIS OF
CRITICAL HABITAT
DESIGNATION FOR MAUI NUI

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prepared for:

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EXECUTIVE SUMMARY

1. The purpose of this report is to evaluate the potential economic impacts associated with the designation or revision of critical habitat for 135 species on the Hawaiian Islands of Kahoolawe, Lanai, Maui, and Molokai (hereafter “Maui Nui species”). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service). The information contained in this report is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.¹
2. This analysis describes protections provided by Federal, State and local statutes and regulations that may affect proposed critical habitat areas, including the listing of the species under the Act, that are not generated by or affected by critical habitat designation for Maui Nui species. These are “baseline” protections afforded the species regardless of the designation of critical habitat. Thus the analysis will not quantify the impacts associated with baseline protections, but will describe them qualitatively.
3. The discussion of the baseline protections for the Maui Nui species provides context for the evaluation of the economic impacts of critical habitat designation, which are the focus of this analysis. These “incremental” economic impacts are those that are not expected to occur absent the designation of critical habitat. This analysis considers the potential for both direct and indirect incremental impacts of the designation. Direct incremental costs are associated with additional effort for consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional conservation efforts that would not result from compliance with the section 7 prohibition on jeopardizing the species. Indirect costs are those that may result from the influence of critical habitat designation on the decisions of regulators and decision-makers other than the Service (e.g., State agencies and land managers) or the behavior of the public. We provide a qualitative evaluation of potential economic benefits in Chapter 6.

¹ 16 U.S.C. §1533(b)(2).

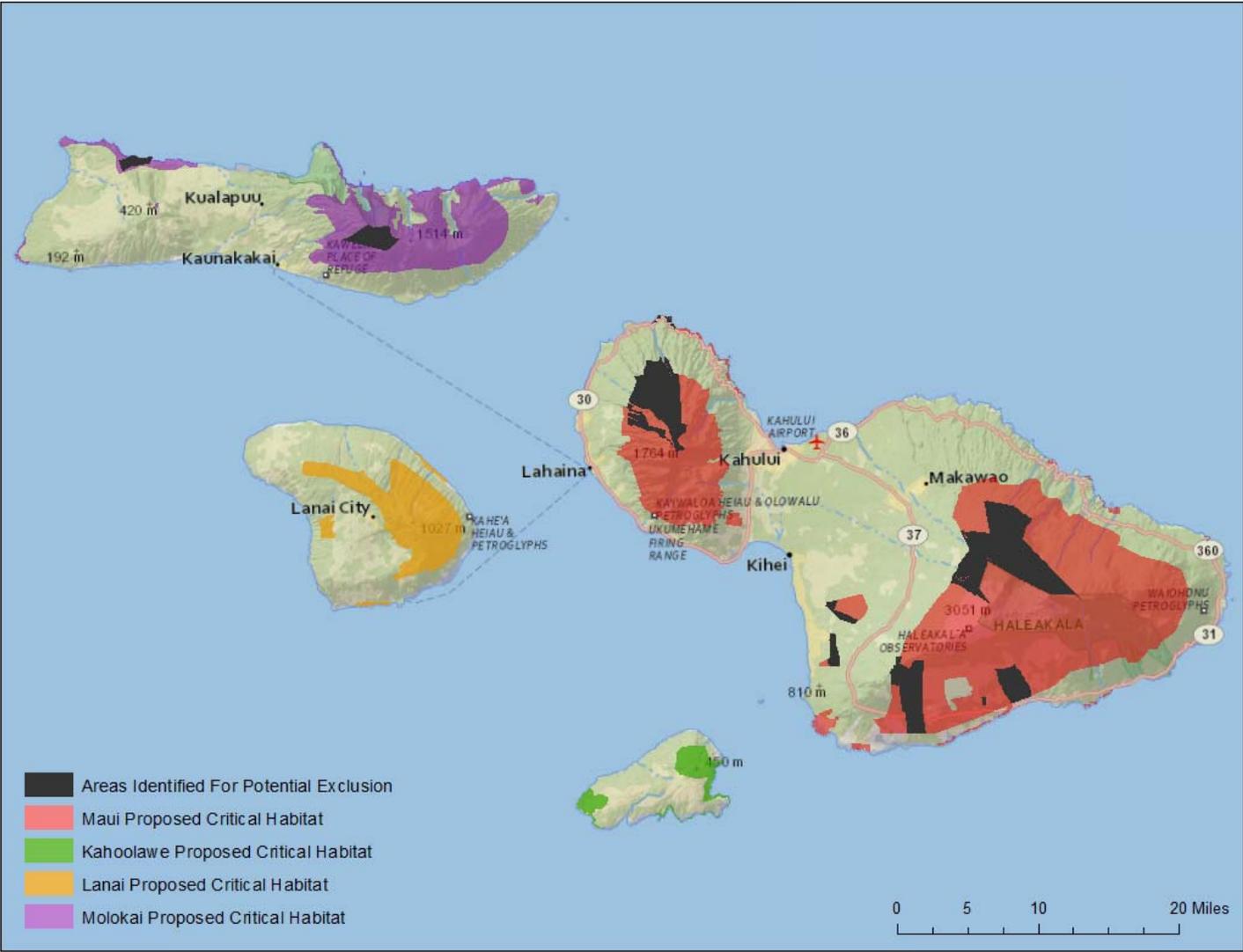
OVERVIEW OF THE PROPOSED CRITICAL HABITAT AND STUDY AREA

4. The Service proposes to designate approximately 271,062 acres (109,695 hectares) of land on the islands of Kahoolawe, Lanai, Maui, and Molokai (hereafter referred to as Maui Nui).² The proposed critical habitat comprises new critical habitat for 50 species (45 plant species; two bird species; and three tree snail species) and revised critical habitat for 85 plant species. Approximately 47 percent of the area proposed is currently critical habitat for 85 of the plant species included in this rule, or is already critical habitat for other listed species, including the Blackburn's sphinx moth. The proposed designation covers 135 species (130 plant species, two forest bird species, and three tree snail species) and includes 11 ecosystem types.
5. The proposed critical habitat area includes 100 units for the plant species; 44 units for the two forest bird species; and six units for the three tree snail species. However, 49 of the proposed critical habitat units are overlapping (e.g., some units described for plant species overlap units described for the bird species), as identified in the first column of the table presented in Appendix E. The proposed designation includes both occupied and unoccupied habitat.
6. In addition, the Proposed Rule identifies several areas as "under consideration for exclusion" from the final critical habitat designation under section 4(b)(2) of the Act. The proposed critical habitat and the areas being considered for exclusion are displayed in Exhibit ES-1. Our analysis separately presents impacts in the areas being considered for exclusion from final critical habitat designation from the remainder of the area proposed for designation.
7. Overall, approximately 35 percent of the proposed designation overlaps State lands, approximately ten percent overlaps Federal lands, approximately one percent occurs on county lands, and approximately 42 percent overlaps private lands.³

² 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.

³ *Ibid.*

EXHIBIT ES-1. OVERVIEW OF MAUI NUI PROPOSED CRITICAL HABITAT AND AREAS CONSIDERED FOR EXCLUSION



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

OVERVIEW OF ECONOMIC ACTIVITIES EVALUATED

8. This analysis focuses on the economic activities that, according to the Service, are of primary concern with respect to potential adverse modification of critical habitat.⁴ Such activities include commercial and residential development, and grazing and farming activities. We also evaluate potential impacts to renewable energy projects as these projects: a) have the potential to generate ground disturbance; and b) are important in terms of their contribution to the State of Hawaii's ability to meet its established renewable portfolio standards, which are mandated by the State.

SUMMARY OF KEY FINDINGS

9. Critical habitat may generate incremental economic impacts through implementation of additional conservation measures (beyond those implemented in conjunction with the prohibition on jeopardy to the species) and additional administrative effort in section 7 consultations to consider adverse modification. The presence of the Maui Nui species provides extensive baseline protection that includes offsetting habitat loss (i.e. acquiring and managing habitat to compensate for habitat disturbed as a result of a project or activity). However, critical habitat designation may generate the additional specification that offsets be located within the affected critical habitat unit, or within critical habitat of the same type.⁵

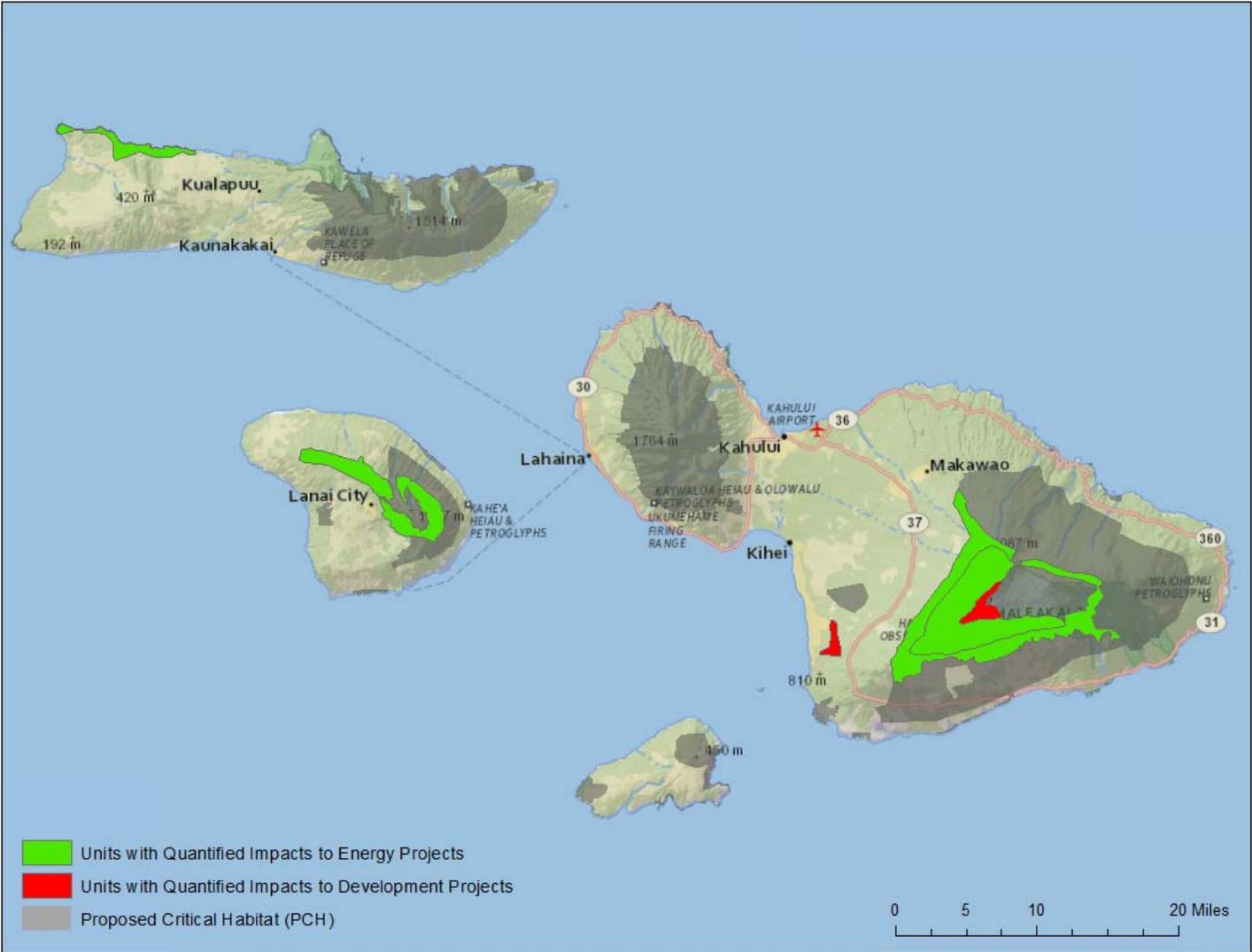
Quantified Impacts

10. For most of the ongoing and currently planned projects identified in this analysis, habitat offsets have been implemented or are currently being planned to occur within the critical unit even absent critical habitat designation and at a ratio that the Service believes will avoid adverse modification, although these projects will be evaluated on a case-by-case basis following the designation of critical habitat. Therefore, for these identified projects, incremental impacts of critical habitat designation are expected to be limited to the costs of additional administrative effort in section 7 consultations. However, for one development project – the Honua'ula project, described in detail in Chapter 3 – proposed critical habitat for the Maui Nui species has resulted in incremental impacts in the form of additional conservation measures. Specifically, following publication of the proposed rule for the Maui Nui species, the Service made additional recommendations including that additional habitat offsets be incorporated within lowland dry habitat (as the project is expected to disturb lowland dry habitat areas).
11. Exhibit ES-2 provides a map of the proposed critical habitat units in which we identified potential or ongoing projects, and Exhibit ES-3 provides a summary of the total estimated incremental impacts by unit corresponding with these projects.

⁴ Personal communication with the Service on August 21, 2012.

⁵ U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). See Appendix D.

EXHIBIT ES-2. UNITS WITH QUANTIFIED IMPACTS TO ONGOING AND CURRENTLY PLANNED PROJECTS



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

EXHIBIT ES-3. TOTAL QUANTIFIED INCREMENTAL IMPACTS FOR ONGOING AND CURRENTLY PROPOSED PROJECTS BY UNIT (\$2013, SEVEN PERCENT DISCOUNT RATE)

UNIT	PROJECT	PRESENT VALUE IMPACTS (2013-2022)	ANNUALIZED IMPACTS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Development Projects			
Maui Alpine Unit 1	Advanced Technology Solar Telescope Expansion	\$5,000	\$600
Maui Lowland Dry Unit 3	Honua'ula Development	\$100,000	\$20,000
Subtotal Development Projects		\$100,000	\$20,000
Energy Projects			
Molokai Coastal Unit 2	Molokai Renewables Wind Project	\$5,000	\$700
Lanai Lowland Mesic Unit 1	Lanai Wind Project	\$5,000	\$700
Subtotal Energy Projects		\$10,000	\$1,000
Total Proposed for Designation		\$100,000	\$20,000
AREAS CONSIDERED FOR EXCLUSION			
Energy Projects			
Maui Montane Mesic Unit 1	Ulupalakua Geothermal Project	\$2,000	\$300
Maui Subalpine Unit 1	Ulupalakua Geothermal Project	\$2,000	\$300
Total Identified for Potential Exclusion		\$5,000	\$700
<p>Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.</p>			

Unquantified Impacts

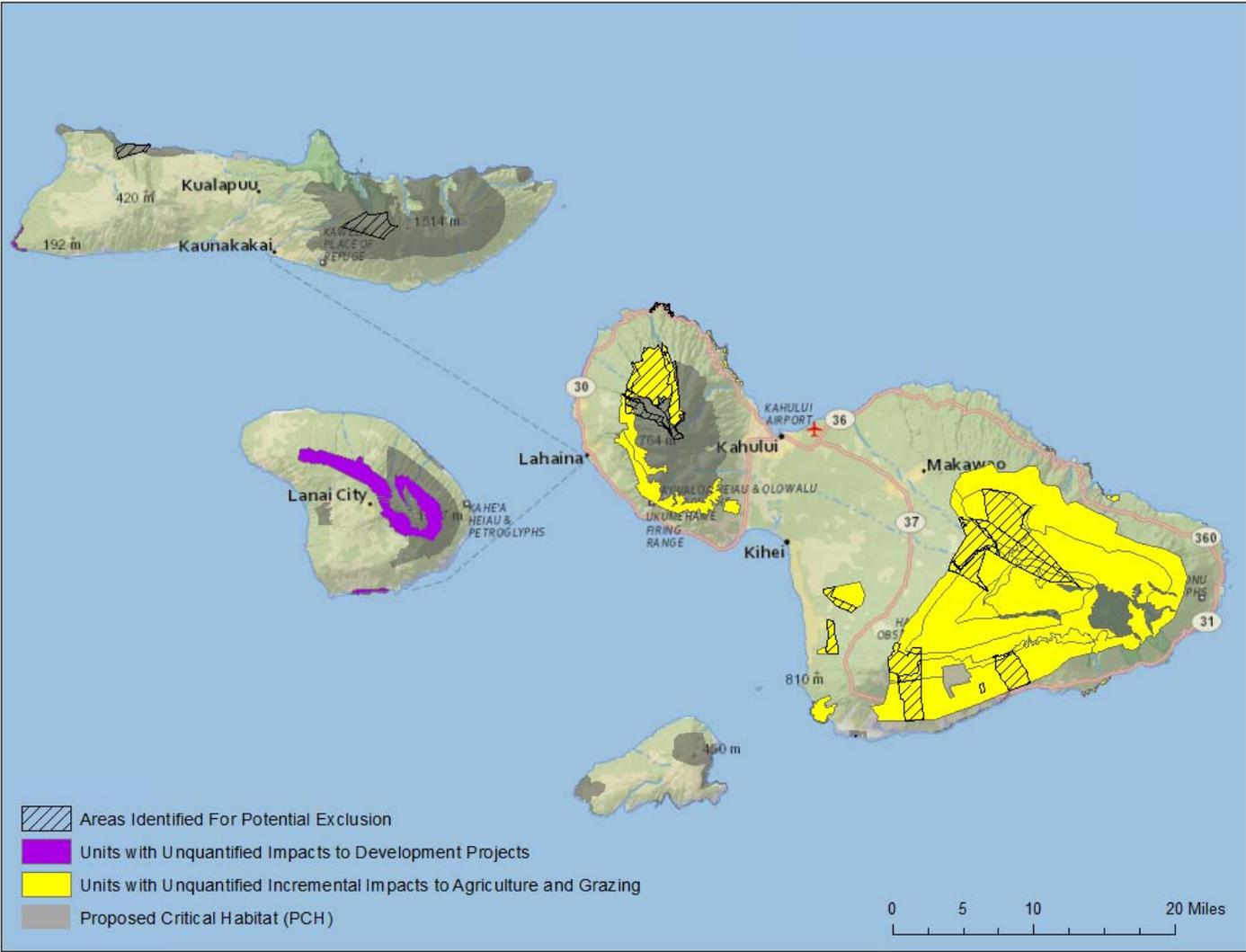
12. This analysis also highlights areas in which projects or activities may be affected by critical habitat designation but significant uncertainty and data limitations preclude quantification of impacts. We refer to these potential impacts as “unquantified impacts” throughout this report. Exhibit ES-4 provides a map highlighting the proposed critical habitat units in which we expect unquantified impacts may occur. The nature of potential incremental impacts in these areas is discussed qualitatively in this analysis. Specifically, we identify the following categories of unquantified impacts:

- **Future development projects:** We identified four proposed critical habitat units that may be subject to future development pressure based on communication with local planners and stakeholders. However, no specific plans exist for development in these units that would allow us to evaluate potential incremental impacts. To the extent that development is planned in these units, critical habitat designation may result in recommendations for additional conservation as

described in Chapter 3. Lacking data and information about the likelihood and characteristics of development, however, potential impacts are not quantified.

- **Grazing and Farming:** Twenty-three of the proposed critical habitat units overlap with parcels identified as supporting grazing; thirteen of these units include areas being considered for exclusion. Ten of the proposed critical habitat units overlap with parcels identified as supporting farming; five of these units include areas being considered for exclusion. While critical habitat is unlikely to directly affect these activities through section 7 consultation, stakeholders are concerned that the designation will result in: a) changes in the way that the State or county manage these lands; b) a reduction in land values due to the possible changes in land management; and c) perceptual effects on land values to the extent that potential buyers expect future economic opportunities on these lands may be restricted in some way. These potential indirect impacts are not quantified in this report due to substantial uncertainty regarding the potential magnitude (as discussed in Chapter 5). They are, however, provided for consideration regarding potential effects of critical habitat on farming and grazing activities in Chapter 5.

EXHIBIT ES-4. UNITS POTENTIALLY SUBJECT TO UNQUANTIFIED IMPACTS OF CRITICAL HABITAT DESIGNATION



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

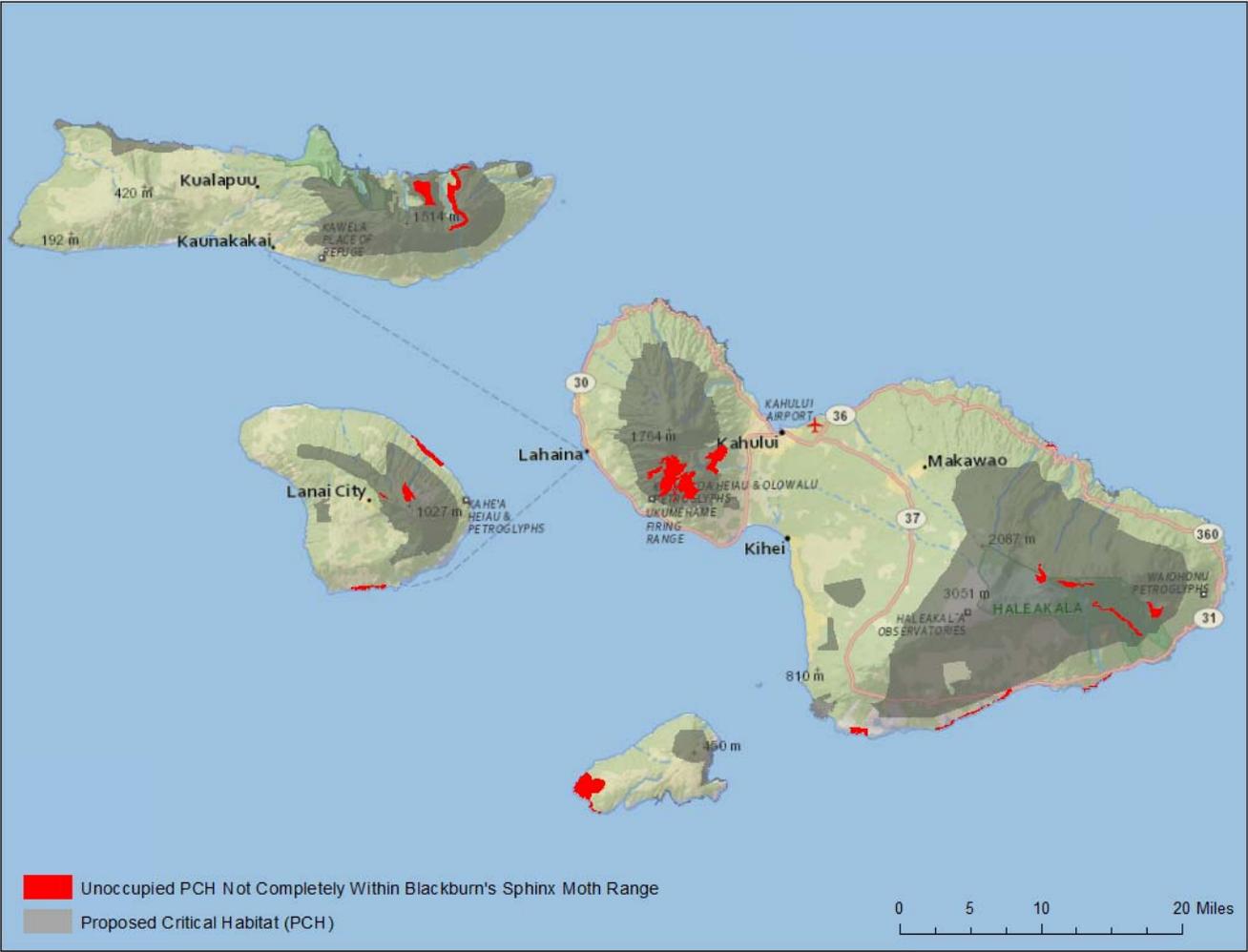
13. As described in Chapter 2 of this report, the presence of the Maui Nui species and Blackburn's sphinx moth, among other listed species, provide extensive baseline protection and limits the impact of critical habitat designation for the Maui Nui species. Where these species are present, the Service routinely recommends conservation measures, including offsetting disturbed or lost habitat, that will also benefit critical habitat for the Maui Nui species. As a result, where critical habitat is considered occupied by the Maui Nui species, critical habitat designation is expected to have a limited effect on economic activities, as described in Chapter 2. Furthermore, where proposed critical habitat overlaps with the probable range of the Blackburn's sphinx moth, economic activities are already subject to conservation measures that benefit the Maui Nui species and their critical habitat.⁶ Critical habitat designation is therefore also expected to have a limited effect on activities in these areas.⁷
14. Twenty-five proposed critical habitat units are considered to be unoccupied by the Maui Nui species but do not entirely overlap the probable range of the Blackburn's sphinx moth, as mapped by the Service.⁸ Economic activities in these units are the most likely to be subject to incremental conservation measures to avoid adverse modification of critical habitat for the Maui Nui species, and therefore experience incremental economic impacts. While our analysis did not identify any proposed projects within these units, we highlight these units for the Service as those areas in which future economic projects and activities may be subject to incremental economic impacts beyond just additional administrative costs of future section 7 consultation. Exhibit ES-5 provides a map indicating the locations of these units, which are listed in Exhibit ES-6.
15. In addition to the units that are entirely unoccupied by the Maui Nui species, some units contain both occupied and unoccupied areas. Should a future project or land use activity be proposed within a portion of the unit that is both unoccupied by a Maui Nui species and outside of the probable range of the Blackburn's sphinx moth, the project may be relatively more likely subject to incremental conservation measures generating economic impacts associated with the designation. We did not identify any ongoing or planned projects or activities located in these unoccupied areas. However, we highlight these units as those where future projects may experience a greater level of economic impact (due to the potential incremental conservation recommendations) than units that are occupied or within the probable range of the Blackburn's sphinx moth.

⁶ Personal communication with Service on August 21, 2012.

⁷ While the presence of other listed species may also provide baseline protection for the Maui Nui species' habitat, this analysis relied on information on the range of the Maui Nui species and the Blackburn's sphinx moth to identify where such baseline protection most likely exists. The sphinx moth is one of the most widespread species on Maui Nui and overlaps much of the proposed critical habitat area.

⁸ U.S. Fish and Wildlife Service. GIS data for Probable Moth Range provided to Industrial Economics, Inc. on August 23, 2012. According to the Service, the probable range of the Blackburn's sphinx moth identified those areas in which conservation measures are already likely to be recommended for the sphinx moth, even absent the presence of the Maui Nui species or their critical habitat.

EXHIBIT ES-5. UNOCCUPIED UNITS THAT DO NOT ENTIRELY OVERLAP WITH THE PROBABLE RANGE OF THE BLACKBURN'S SPHINX MOTH



Sources: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012; U.S. Fish and Wildlife Service. GIS data on probable range of Blackburn's sphinx moth provided to Industrial Economics, Inc. on August 23, 2012.

EXHIBIT ES-6. UNOCCUPIED PROPOSED CRITICAL HABITAT UNITS THAT DO NOT COMPLETELY OVERLAP WITH THE PROBABLE RANGE OF BLACKBURN'S SPHINX MOTH⁹

PROPOSED CRITICAL HABITAT UNITS
Maui Coastal Unit 2
Maui Coastal Unit 6
Maui Coastal Unit 7
Maui Coastal Unit 8
Maui Dry Cliff Unit 3/Bird Unit 27
Maui Dry Cliff Unit 4/Bird Unit 28
Maui Dry Cliff Unit 5/Bird Unit 29
Maui Dry Cliff Unit 6
Maui Dry Cliff Unit 7
Maui Lowland Mesic Unit 3/Bird Unit 1
Maui Lowland Wet Unit 7/Bird Unit 8
Maui Lowland Wet Unit 8/Bird Unit 9
Maui Montane Mesic Unit 6/Bird Unit 23
Maui Montane Wet Unit 5/Bird Unit 14
Maui Montane Wet Unit 8/Bird Unit 17
Maui Wet Cliff Unit 3/Bird Unit 32
Kahoolawe Lowland Dry Unit 1
Kahoolawe Coastal Unit 3
Lanai Coastal Unit 1
Lanai Coastal Unit 2
Lanai Coastal Unit 3
Lanai Dry Cliff Unit 1
Lanai Dry Cliff Unit 3
Molokai Montane Wet 2/Bird Unit 41
Molokai Wet Cliff 3

ORGANIZATION OF THE REPORT

16. This report is organized into five chapters. Chapter 1 provides background on the proposed critical habitat rule. Chapter 2 discusses the framework employed in the analysis. Chapters 3, 4 and 5 describe the level of activity and incremental impacts associated with development activity, energy projects, and grazing and farming activities, respectively. Chapter 6 provides a discussion of the potential economic benefits of the critical habitat designation. In addition, the report includes six appendices: Appendix A considers the distributional impacts of the rulemaking; Appendix B provides information on the sensitivity of the economic impact estimates to alternative discount rates; Appendix C provides undiscounted impacts by economic activity; Appendix D provides the Service's memorandum to IEC describing potential changes in conservation

⁹ U.S. Fish and Wildlife Service. GIS data for Probable Moth Range provided to Industrial Economics, Inc. on August 23, 2012.

recommendations for these species due to critical habitat designation, as well as follow-up communication between the Service and economic analysts; Appendix E provides a list of all of the proposed critical habitat units with information on the related species and occupancy status; and Appendix F provides a list of all parcels identified as supporting grazing that overlap with proposed critical habitat.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

17. This chapter provides an overview of the proposed critical habitat for 135 species on the islands of Kahoolawe, Lanai, Maui, and Molokai, including: a summary of past legal actions that relate to the current proposal; a description of the area proposed for designation; and a discussion of the major threats to the proposed critical habitat. This information provides context for the analysis contained in the remainder of this report. All official definitions and proposed critical habitat boundaries are provided in the Proposed Rule.¹⁰

1.1.1 PREVIOUS FEDERAL ACTIONS

18. The Service proposes to designate new critical habitat for 50 species (45 plant species; two bird species; and three tree snail species) and to revise critical habitat for 85 plant species under the Endangered Species Act (hereafter ESA or “Act”). The Proposed Rule provides detailed information on previous Federal actions pertaining to these species.¹¹

1.1.2 PROPOSED CRITICAL HABITAT DESIGNATION

19. The Service proposes to designate approximately 271,062 acres (109,695 hectares) of land on the islands of Kahoolawe, Lanai, Maui, and Molokai (hereafter referred to as Maui Nui).¹² Approximately 47 percent of the area being proposed as critical habitat is currently critical habitat for 85 of the plant species included in this rule, or is already critical habitat for other listed species. The proposed designation is for 135 species (130 plant species, two forest bird species, and three tree snail species) and includes 11 ecosystem types. The Proposed Rule provides descriptions of these species and habitats.¹³ The proposed critical habitat area comprises 100 units for the plant species; 44 units for the two forest bird species; and six units for the three tree snail species. However, 49 of the proposed critical habitat units are overlapping (e.g., some units described for plant species overlap units described for the bird species), as identified in the first column of the table presented in Appendix E.
20. The proposed designation includes both occupied and unoccupied habitat. Appendix E provides a table of the proposed critical habitat units with the following information: size of each unit in acres; ownership within each unit (acres of land in State, Federal, county,

¹⁰ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.

¹¹ *Ibid.*

¹² *Ibid.*

¹³ *Ibid.*

and private ownership); species type (i.e., plants, birds, or snails) relevant to each proposed unit; and whether the Service considers the unit occupied by those species. Overall, approximately 35 percent of the proposed designation is on State lands, approximately ten percent is on Federal lands, approximately one percent is on county lands, and approximately 42 percent is on private lands.¹⁴ The Service takes into consideration a variety of factors in identifying proposed critical habitat, including the ecosystem in which each species occurs.¹⁵ In the Proposed Rule, the Service states:

“As the conservation of each species is dependent upon a functioning ecosystem to provide its fundamental life requirements... we consider the physical or biological features present in the ecosystems described in this rule to provide the necessary [primary constituent elements] PCEs for each species in this proposal. The ecosystem’s features collectively provide the suite of environmental conditions within each ecosystem essential to meeting the requirements of each species...”¹⁶

21. Therefore, some portions of a given unit are considered occupied by a species while other areas of the unit are not.¹⁷
22. The Proposed Rule identifies several areas as being considered for exclusion from the final critical habitat designation under section 4(b)(2) of the Act. These areas include: four The Nature Conservancy preserves on Maui and Molokai; 8,931 acres associated with Maui Land and Pineapple Company on Maui; 6,537 acres associated with Ulupalakua Ranch on Maui; 8,746 acres associated with Haleakala Ranch Company on Maui; and 6,721 acres associated with East Maui Irrigation Company on Maui.¹⁸ The proposed critical habitat and the areas being considered for exclusion are displayed in Exhibit 1-1. Our analysis separately presents impacts in the areas being considered for exclusion from final critical habitat designation from the remainder of the area proposed for designation.

¹⁴ *Ibid.*

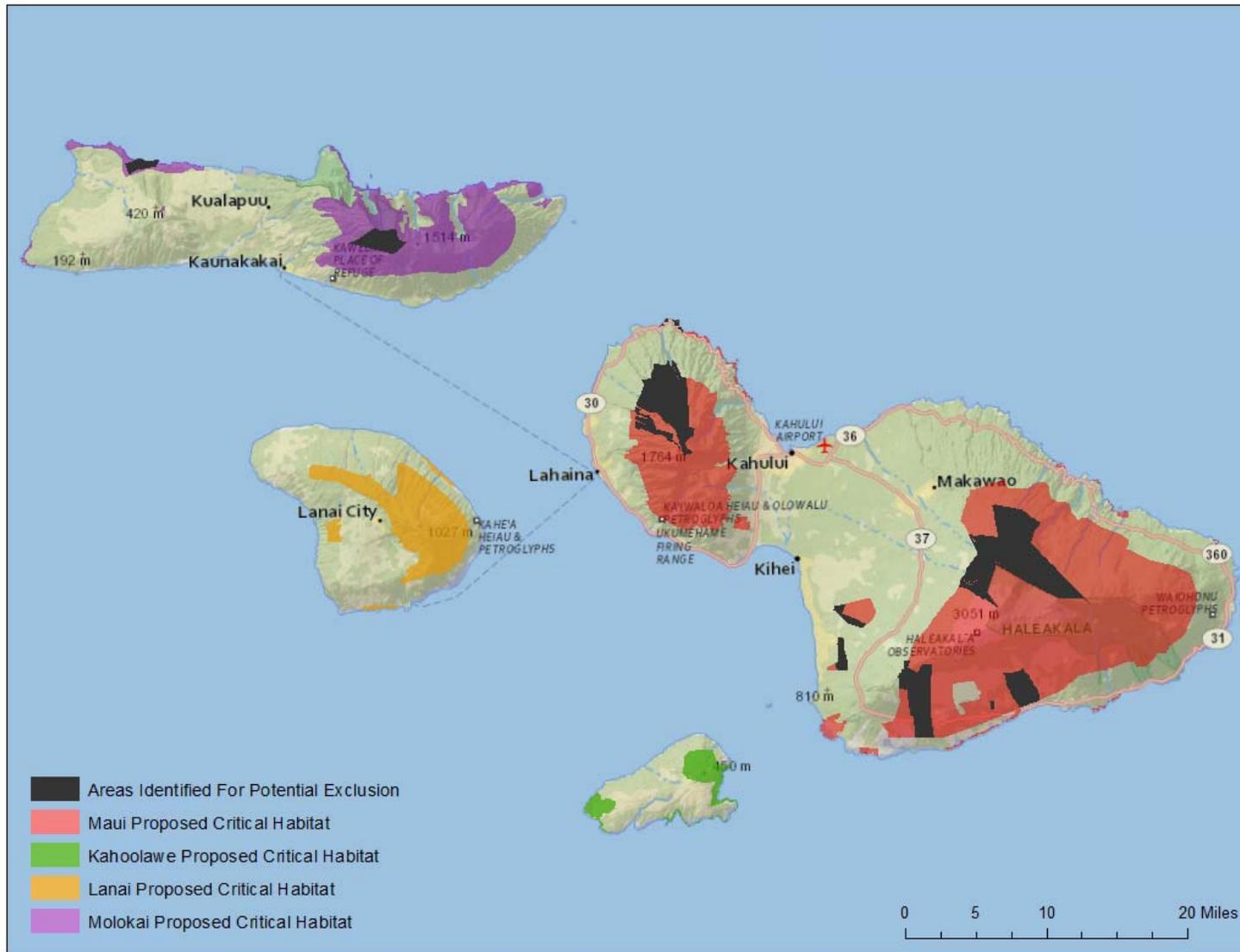
¹⁵ *Ibid.*

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ Areas being considered for exclusion do not include the proposed critical habitat unit for Newcomb’s tree snail (*Newcombia cumingi*), approximately 541 acres of which overlap with land owned by Maui Land & Pineapple Company.

EXHIBIT 1-1. OVERVIEW OF MAUI NUI PROPOSED CRITICAL HABITAT AND AREAS CONSIDERED FOR EXCLUSION



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

1.2 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

23. According to the Proposed Rule, threats to the species and their habitats include development and urbanization; trampling and grazing by ungulates; water diversion or impoundment; mining sand and other minerals; introducing or encouraging the spread of nonnative plants; fire; natural disasters; and other activities that degrade or destroy the physical or biological features of critical habitat for the species.
24. To focus the economic analysis, we discussed with the Service the activities of primary concern with respect to potential adverse modification of critical habitat. According to the Service, the key concern is the potential for activities to result in ground disturbance and/or habitat degradation within a critical habitat unit.¹⁹ Such activities include commercial and residential development, and farming and grazing. We also evaluate potential impacts to renewable energy projects, as these projects: a) have the potential to generate ground disturbance; and b) contribute to the State of Hawaii's ability to meet its established renewable portfolio standards, which are mandated by the State.
25. Other threats described in the Proposed Rule, such as natural disasters, fire, and spread of nonnative plants, are unpredictable by nature and are not addressed in this analysis. In addition, the consultation history for these species does not identify any consultations for mining activities apart from one geothermal energy project.²⁰ We include consideration of geothermal projects in our analysis of renewable energy projects. No future mine projects were identified within the proposed critical habitat area.
26. Our analysis therefore focuses on the following activities:
- Residential and commercial development;
 - Energy developments; and
 - Grazing and farming activities.
27. Within these activity categories, we focus our analysis on those projects and activities that are considered reasonably likely to occur within the proposed critical habitat area. This includes projects or activities that are currently planned or proposed, or that permitting agencies or land managers indicate are likely to occur.

1.3 SUMMARY OF CONCLUSIONS

28. When a species is federally-listed as threatened or endangered, it receives protection under the Act. For example, under section 7 of the Act, Federal agencies must consult with the Service to ensure that actions they fund, authorize, or carry out do not jeopardize the continued existence of the species. Economic impacts of conservation measures undertaken to avoid jeopardy to the species are considered baseline impacts in this analysis as they are not generated by the critical habitat designation. In other words, baseline conservation measures and associated economic impacts are not affected by decisions related to critical habitat designation for these species. Other baseline

¹⁹ Personal communication with the Service on August 21, 2012.

²⁰ Email communication from the Service on August 7, 2012.

protections accorded listed species under the Act and other Federal and State regulations and programs are described in Chapters 2 through 5 of this report.

29. The only Federal regulatory effect of a critical habitat designation is to invoke the section 7 provision of the Act prohibiting Federal actions from destroying or adversely modifying critical habitat after consultation with the Service. Critical habitat may generate incremental economic impacts through implementation of additional conservation measures recommended by the Service beyond those implemented in conjunction with baseline protections, and additional administrative effort for the section 7 consultation.²¹ For all of the ongoing and currently planned projects we have identified within the proposed critical habitat area, the Service does not expect to recommend additional or different conservation for the species due to critical habitat designation, as described in Chapters 3 and 4 of this report. For these projects, the incremental impacts of critical habitat designation are therefore limited to additional administrative effort in section 7 consultations to consider adverse modification. Exhibit 1-2 presents the units in which these projects occur and the estimated incremental impacts of critical habitat designation.

EXHIBIT 1-2. TOTAL ESTIMATED INCREMENTAL IMPACTS FOR ONGOING AND CURRENTLY PROPOSED PROJECTS BY UNIT (\$2013, SEVEN PERCENT DISCOUNT RATE)

UNIT	PROJECT	PRESENT VALUE IMPACTS (2013-2022)	ANNUALIZED IMPACTS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Development Projects			
Maui Alpine Unit 1	ATST Expansion	\$5,000	\$600
Maui Lowland Dry Unit 3	Honua'ula Development	\$100,000	\$20,000
Subtotal Development Projects		\$100,000	\$20,000
Energy Projects			
Molokai Coastal Unit 2	Molokai Renewables Wind	\$5,000	\$700
Lanai Lowland Mesic Unit 1	Lanai Wind	\$5,000	\$700
Subtotal Energy Projects		\$10,000	\$1,000
Total Proposed for Designation		\$100,000	\$20,000
AREAS CONSIDERED FOR EXCLUSION			
Energy Projects			
Maui Montane Mesic Unit 1	Ulupalakua Geothermal	\$2,000	\$300
Maui Subalpine Unit 1	Ulupalakua Geothermal	\$2,000	\$300
Total Identified for Potential Exclusion		\$5,000	\$700
Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.			

²¹ The Service may recommend conservation measures as part of section 7 consultation on a project or activity. Unless the Service has determined that, absent these conservation measures, the project or activity is likely to jeopardize the species or result in adverse modification of critical habitat, implementation of the conservation recommendations is at the discretion of the Federal Action Agency.

30. The analysis also identifies unquantified impacts for which significant uncertainty precludes quantification of impacts. Exhibit 1-3 identifies the units relatively more likely to be subject to unquantified impacts of critical habitat designation for the Maui Nui species; the nature of potential incremental impacts in these areas is discussed qualitatively in this analysis. Specifically, we identify the following categories of unquantified impacts:
- **Future development projects:** We identified four proposed critical habitat units that may be subject to future development pressure based on communication with local planners and stakeholders. No specific plans exist, however, for development in these units. To the extent that development is planned, critical habitat designation may result in recommendations for conservation as described in Chapter 3. Lacking data and information about the likelihood and characteristics of development, potential impacts are not quantified.
 - **Grazing and Farming:** Twenty-three of the proposed critical habitat units overlap with parcels identified as supporting grazing; thirteen of these units include areas being considered for exclusion. Ten of the proposed critical habitat units overlap with parcels identified as supporting agricultural activities; five of these units include areas being considered for exclusion. While critical habitat is unlikely to directly affect these activities through section 7 consultation, stakeholders are concerned that: a) the designation will result in changes in the way that the State or county manage these lands; and b) critical habitat will generate perceptual effects on land values to the extent that potential buyers expect future economic opportunities on these lands may be restricted in some way. These potential impacts are not quantified in this report due to substantial uncertainty regarding the potential magnitude (as discussed in Chapter 5). They are, however, provided for consideration regarding potential effects of critical habitat on farming and grazing in Chapter 5.
31. Where critical habitat is considered occupied by the Maui Nui species, critical habitat designation is expected to have a limited effect on economic activities, as described in Chapter 2. Furthermore, where proposed critical habitat overlaps with the probable range of the Blackburn's sphinx moth, economic activities are already subject to conservation measures that would benefit the Maui Nui species and their critical habitat.²² Critical habitat designation is therefore expected to have a limited effect on these areas, as well.

²² Personal communication with Service on August 21, 2012.

EXHIBIT 1-3. UNITS WITH UNQUANTIFIED POTENTIAL INCREMENTAL IMPACTS

UNIT	DEVELOPMENT	FARMING	GRAZING
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Lanai Coastal Unit 1	X		
Lanai Dry Cliff Unit 1	X		
Lanai Lowland Mesic Unit 1	X		
Maui Alpine Unit 1		X	X
Maui Coastal Unit 2			X
Maui Coastal Unit 3			X
Maui Coastal Unit 4			X
Maui Coastal Unit 7			X
Maui Coastal Unit 10			X
Maui Lowland Dry Unit 1			X
Maui Lowland Dry Unit 4			X
Maui Lowland Dry Unit 5		X	X
Maui Lowland Dry Unit 6		X	X
Maui Lowland Mesic Unit 1			X
Maui Lowland Mesic Unit 2		X	
Maui Lowland Wet Unit 1			X
Maui Lowland Wet Unit 2			
Maui Montane Dry Unit 1			X
Maui Montane Mesic Unit 1		X	X
Maui Montane Wet Unit 1			X
Maui Subalpine Unit 1		X	X
Maui Wet Cliff Unit 5		X	
Molokai Coastal Unit 1	X		
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION			
Maui Alpine Unit 1*			X
Maui Dry Cliff Unit 1*			X
Maui Dry Cliff Unit 3*			X
Maui Lowland Dry Unit 1*		X	X
Maui Lowland Dry Unit 2*		X	X
Maui Lowland Dry Unit 3*			X
Maui Lowland Mesic Unit 2*		X	
Maui Lowland Wet Unit 1*			
Maui Lowland Wet Unit 2*		X	
Maui Montane Dry Unit 1*			X
Maui Montane Mesic Unit 1*		X	X
Maui Montane Wet Unit 1*			X
Maui Montane Wet Unit 2*			X
Maui Subalpine Unit 1*			X
Maui Subalpine Unit 2*			X
Maui Wet Cliff Unit 1*			X
Maui Wet Cliff Unit 5*			
Notes:			
* Unit contains areas being considered for exclusion.			

32. Economic activities in proposed critical habitat areas that are not considered occupied by the Maui Nui species and do not completely overlap with the probable range of the Blackburn’s sphinx moth are therefore relatively more likely to be subject to additional conservation measures to avoid adverse modification of critical habitat for the Maui Nui species.²³ Exhibit 1-4 identifies these units. While our analysis did not identify any proposed projects within these units, we highlight these units for the Service as those areas in which future economic projects and activities would likely be subject to a greater level of economic impact (due to the potential incremental conservation measure recommendations) than occupied units or those units within the probable range of the Blackburn’s sphinx moth. In addition, note that some areas of a proposed critical habitat unit are considered occupied by a species while other areas of the same unit are not. Should a future development project take place in an area of such a unit that is both unoccupied by a Maui Nui species and outside of the probable range of the Blackburn’s sphinx moth, the project may be subject to additional conservation measures.

EXHIBIT 1-4. UNOCCUPIED PROPOSED CRITICAL HABITAT UNITS THAT DO NOT COMPLETELY OVERLAP WITH THE PROBABLE RANGE OF THE BLACKBURN’S SPHINX MOTH²⁴

PROPOSED CRITICAL HABITAT UNITS
Maui Coastal Unit 2
Maui Coastal Unit 6
Maui Coastal Unit 7
Maui Coastal Unit 8
Maui Dry Cliff Unit 3/Bird Unit 27
Maui Dry Cliff Unit 4/Bird Unit 28
Maui Dry Cliff Unit 5/Bird Unit 29
Maui Dry Cliff Unit 6
Maui Dry Cliff Unit 7
Maui Lowland Mesic Unit 3/Bird Unit 1
Maui Lowland Wet Unit 7/Bird Unit 8
Maui Lowland Wet Unit 8/Bird Unit 9
Maui Montane Mesic Unit 6/Bird Unit 23
Maui Montane Wet Unit 5/Bird Unit 14
Maui Montane Wet Unit 8/Bird Unit 17
Maui Wet Cliff Unit 3/Bird Unit 32
Kahoolawe Lowland Dry Unit 1
Kahoolawe Coastal Unit 3

²³ While the presence of other listed species may also provide baseline protection for the Maui Nui species’ habitat, this analysis relied on information on the range of the Maui Nui species and the Blackburn’s sphinx moth to identify where such baseline protection most likely exists. The sphinx moth is one of the most widespread species on Maui Nui and overlaps much of the proposed critical habitat area.

²⁴ U.S. Fish and Wildlife Service. GIS data for Probable Moth Range provided to Industrial Economics, Inc. on August 23, 2012.

PROPOSED CRITICAL HABITAT UNITS
Lanai Coastal Unit 1
Lanai Coastal Unit 2
Lanai Coastal Unit 3
Lanai Dry Cliff Unit 1
Lanai Dry Cliff Unit 3
Molokai Montane Wet 2/Bird Unit 41
Molokai Wet Cliff 3

1.4 ORGANIZATION OF THE REPORT

33. The remainder of this report proceeds through five additional chapters. Chapter 2 discusses the framework employed in the analysis. Chapters 3, 4 and 5 describe the level of activity and incremental impacts associated with development, energy and grazing and farming activities, respectively. Chapter 6 provides a discussion of the potential economic benefits of the critical habitat designation.
34. In addition, the report includes six appendices: Appendix A considers potential distributional impacts of the rulemaking, allowing the Service to address the requirements of Executive Orders (E.O.) 12866 (as amended by 13563), 13211, and 12630, the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), and the Unfunded Mandates Reform Act (UMRA).²⁵ Appendix B provides information on the sensitivity of the economic impact estimates to alternative discount rates; Appendix C provides undiscounted impacts by economic activity; Appendix D provides the Service’s memorandum to IEC describing potential changes in conservation recommendations for these species due to critical habitat designation, as well as follow-up communication between the Service and economic analysts; Appendix E provides a list of all of the proposed critical habitat units with information on the related species and occupancy status; and Appendix F provides a list of all parcels identified as supporting grazing that overlap with proposed critical habitat.

²⁵ Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13563 (2011)); Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights, March 15, 1988; Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. § 601 et seq; Pub Law No. 104-121; and 2 U.S.C. 1501, et seq.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

35. The purpose of this report is to evaluate the economic impact of actions taken to protect the Maui Nui species and their critical habitat as currently proposed, and specifically those impacts attributable to the designation of critical habitat. This analysis examines the potential impacts of restricting or modifying specific land uses or activities as a result of designating critical habitat. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections afforded the species absent critical habitat designation, including listing under the Act and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those that are expected to occur solely due to the designation of Maui Nui critical habitat.
36. According to section 4(b)(2) of the Act, the Service must consider the economic impacts, impacts to national security, and other relevant impacts of designating any particular area as critical habitat. An area may be excluded from designation as critical habitat if the benefits of exclusion (i.e., the impacts that would be avoided if an area were excluded from the designation) outweigh the benefits of designation, so long as exclusion of the area will not result in extinction of the species. **The purpose of the economic analysis is to provide information to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.**²⁶ In addition, this information allows the Service to address the requirements of E.O.s 12866 (as amended by 13563), 13211, and 12630, the RFA, as amended by SBREFA.²⁷
37. This chapter describes the framework for this analysis. The chapter first provides a background of case law that led to the selection of the framework applied in this report. We then describe in economic terms the general categories of economic effects that are the focus of the impact analysis, including a discussion of both efficiency and distributional effects. This chapter then defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a description of the information sources relied upon in the analysis.

²⁶ 16 U.S.C. §1533(b)(2).

²⁷ Executive Order 12866, *Regulatory Planning and Review*, September 30, 1993; Executive Order 13563, *Improving Regulation and Regulatory Review*, January 18, 2011; Executive Order 13211, *Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*, May 18, 2001; 5. U.S.C. §5601 *et seq*; and Pub Law No. 104-121.

2.1 BACKGROUND

38. This analysis examines the potential impacts of restricting or modifying specific land uses or activities due to the designation of critical habitat. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."²⁸ In other words, the baseline includes the existing restrictions or other constraints on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
39. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.²⁹ Specifically, the court stated,
- “The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation. . . . Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act].”³⁰
40. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.³¹ For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-

²⁸ OMB, “Circular A-4,” September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

²⁹ *New Mexico Cattle Growers Assn. v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

³⁰ *Ibid.*

³¹ *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. ‘To find the true cost of a designation, the world with the designation must be compared to the world without it.’”³²

41. More recently, in 2010, the U.S. Ninth Circuit Court of Appeals came to similar conclusions during its review of critical habitat designations for the Mexican spotted owl and 15 vernal pool species.³³ Plaintiffs in both cases requested review by the Supreme Court, which declined to hear the cases in 2011.
42. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis will employ “without critical habitat” and “with critical habitat” scenarios:
 - The "**without critical habitat**" scenario represents the **baseline** for the analysis, considering protections already afforded the Maui Nui species. The baseline for this analysis is the state of regulation, absent designation of critical habitat that provides protection to the species under the Act, as well as under other Federal, State and local laws and conservation plans. The baseline includes sections 7, 9, and 10 of the Act to the extent that they are expected to apply absent the designation of critical habitat for the species. The analysis will qualitatively describe how baseline conservation for the Maui Nui species is currently implemented across the proposed designation in order to provide context for the incremental analysis (Chapters 3, 4 and 5). Although critical habitat is currently designated for 85 of these species, the existing designations are not considered part of the baseline in order to ensure a complete assessment of the potential economic consequences of the proposed designation.
 - The "**with critical habitat**" scenario describes and monetizes the **incremental** impacts due specifically to the designation of critical habitat for the species. The incremental Maui Nui conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat. This report focuses on the incremental analysis (Chapters 3, 4 and 5).

³² *Center for Biological Diversity v. United States Bureau of Land Management* 422 F. Supp.2d 1115 (N.D. Cal. 2006).

³³ *Home Builders Association of Northern California v. United States Fish and Wildlife Service*, 616 F.3d 983 (9th Cir. 2010), cert. denied, 179 L. Ed 2d 301, 2011 U.S. Lexis 1392, 79 U.S.L.W. 3475 (2011); *Arizona Cattle Growers v. Salazar*, 606 F. 3d 1160 (9th Cir. 2010), cert. denied, 179 L. Ed. 2d 300, 2011 U.S. Lexis 1362, 79 U.S.L.W. 3475 (2011).

43. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.³⁴ Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.³⁵ Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species.
44. A detailed description of the methods used to define baseline and incremental impacts is provided in Section 2.3.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

45. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the Maui Nui species and their habitat (hereinafter referred to collectively as "Maui Nui conservation efforts"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal Action Agency to consult with the Service under section 7 represent opportunity costs of Maui Nui conservation efforts.
46. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether species conservation efforts are likely to affect a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

³⁴ Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

³⁵ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, 378 F.3d 1059 (9th Circuit 2004).

2.2.1 EFFICIENCY EFFECTS

47. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect Maui Nui habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.³⁶
48. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.
49. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.
50. This analysis begins by measuring impacts associated with efforts undertaken to protect the Maui Nui species and their habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets. As described in Chapters 3, 4 and 5, in the case of the Maui Nui species, conservation efforts are not anticipated to significantly affect markets; therefore, this report focuses on compliance costs.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

51. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects

³⁶ For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

separately from efficiency effects.³⁷ This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities, Governments and Energy Supply, Distribution, and Use

52. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.³⁸ It also assesses the potential for impacts to State, local, and Tribal governments and the private sector as required by Title II of UMRA.³⁹ Finally, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.⁴⁰

Regional Economic Effects

53. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
54. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

³⁷ OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

³⁸ 5 U.S.C. §5601 *et seq.*

³⁹ 2 U.S.C. 1531 *et seq.*

⁴⁰ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

55. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.
56. Impacts associated with Maui Nui conservation efforts reflect increased administrative effort to participate in section 7 consultations. As described in the remainder of this report, critical habitat designation is not expected to affect the levels of economic activity occurring within the region. Therefore, measurable impacts of the type typically assessed with input-output models are not anticipated.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

57. This analysis: 1) identifies those economic activities most likely to pose a threat to the Maui Nui species and their habitat; 2) describes the baseline regulation protection for the species; and 3) monetizes the incremental economic impacts to avoid adverse modification of the proposed critical habitat area. This section provides a description of the methods used to separately identify baseline protections from the incremental impacts stemming from the proposed designation of critical habitat for the Maui Nui species. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

58. The baseline for this analysis is the existing state of regulation, absent the designation of critical habitat, including the listing of the species under the Act, as well as protection under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.
59. Baseline protections include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species. This analysis describes these baseline regulations and, where possible, provides examples of the potential magnitude of the costs of these baseline protections. The primary focus, however, is not on baseline costs, since these will not be affected by the proposed regulation. Instead, the focus of this analysis is on monetizing the incremental impacts forecast to result from the proposed critical habitat designation.

- Section 7 of Act, even absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. Consultations under the jeopardy standard result in administrative costs, as well as impacts of conservation efforts resulting from consideration of this standard.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."⁴¹ The economic impacts associated with this section manifest themselves in sections 7 and 10.
- Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with a land or water use activity or project.⁴² The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

60. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act (CWA) or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

61. This analysis quantifies the potential incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts resulting from

⁴¹ 16 U.S.C. 1532.

⁴² U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.

62. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing conservation efforts (i.e., reasonable and prudent alternatives) resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.
63. Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional consultation efforts that would not have been requested under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from designation of critical habitat, triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.

Approach to Identifying Incremental Impacts

64. To inform the economic analysis, the Service provided a memorandum describing its expected approach to conservation for the Maui Nui species following critical habitat designation (Appendix D).⁴³ According to the memorandum, the types of project modifications currently recommended by the Service to avoid jeopardy to listed plant, forest bird, and tree snail species (“baseline” project modifications) include the following:
- Actions to avoid destruction of individual listed plants, snails, birds, active nests, and eggs.
 - Actions to control feral pigs (*Sus scrofa*), feral goats (*Capra hircus*), feral cattle (*Bos taurus*), wild deer (*Axis axis*), and mouflon sheep (*Ovis gmelini musimon*).
 - Actions to control nonnative plants.
 - Actions to control seed predators such as rats.
 - Actions to control nonnative invertebrates (e.g., slugs).
 - Actions to control wildfire.
 - Actions to avoid destruction of habitat for listed plants, forest birds, and snails.

⁴³ U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui).

- Actions to offset destruction of listed plants including propagating, outplanting and conserving the plants elsewhere such that no net reduction to the species' range or numbers results from the project.
- Actions to offset destruction of forest bird habitat, including conservation and restoration (e.g., fencing, removal of feral ungulates, control of nonnative plants, control of rats, planting of native species) of habitat elsewhere within the range of the species.
- Egg collection, hatching, rearing, and introduction of juveniles into protected, good-quality native habitat.
- Captive rearing and reintroduction into protected, good-quality native habitat.
- Actions to offset adverse impacts to individual snails or their habitat including conserving listed snails or restoring and conserving, in perpetuity, snail habitat. Snail conservation actions could include propagating the listed snails and native plants and managing snail populations and snail habitat in areas that are restored to good-quality native habitat and protected from snail predators (including mongoose, rats, and predatory snails), ungulate browsing, wildfire, competition from invasive species, and other disturbances.

65. In addition to the above baseline project modifications, where a project disturbs habitat for the species, the Service may also recommend that habitat impacts be offset by restoring and conserving, in perpetuity, two or more acres of comparable habitat for every acre of habitat that is permanently removed.⁴⁴ The exact habitat offset ratio would depend on the severity of the impact, and the condition and rarity of the affected habitat.⁴⁵ According to the Service, this conservation recommendation would be made to avoid potential jeopardy to the Maui Nui species regardless of the critical habitat designation.^{46,47} We accordingly consider recommendations to offset disturbed habitat to be baseline recommendations. Critical habitat may, however, generate the additional recommendation that habitat offsets be located within the affected critical habitat unit or, where that is not possible, within another critical habitat unit of the same type (e.g., if a project results in adverse impacts to a lowland dry critical habitat unit, the Service would recommend that offsets occur in that unit or, if that is not possible, in another lowland dry critical habitat unit).^{48,49} Specifically, the Service states:

⁴⁴ U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). See Appendix D.

⁴⁵ *Ibid.*

⁴⁶ *Ibid.*

⁴⁷ Personal communication with the Service on December 18, 2012.

⁴⁸ U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). See Appendix D.

⁴⁹ The Service may recommend conservation measures as part of section 7 consultation on a project or activity. Unless the Service has determined that, absent these conservation measures, the project or activity is likely to jeopardize the species

“The Service’s recommendations for offsetting adverse project impacts to habitat that is occupied by a listed bird, invertebrate, or plant species under the jeopardy standard are often the same as recommendations we would make to offset adverse impacts to critical habitat with the exception of the conservation project’s location.”⁵⁰

66. Therefore, we conclude that, in occupied critical habitat, section 7 consultations considering critical habitat may generate the following categories of incremental impacts:
- The potential incremental cost of siting habitat offsets within the critical habitat unit that is affected or within another critical habitat unit of the same type; and
 - The additional administrative costs of considering adverse modification in section 7 consultation.
67. As previously described, however, a number of the proposed critical habitat units are not considered to be occupied by the species. In addition, within the occupied units for the plant species, the plants are not necessarily identified throughout the unit but may occur intermittently throughout the unit. Where the species are not present at a project or activity site, section 7 consultations may not focus on effects to the species but will consider the potential for adverse modification of critical habitat.
68. In much of the unoccupied critical habitat area, the presence of other listed species, and in particular the Blackburn’s sphinx moth, provides extensive baseline protection that includes offsetting disturbed habitat.⁵¹ With respect to this baseline protection, the Service states,

“This is because the habitat requirements of the species (such as Blackburn’s sphinx moth) are often very similar (e.g., native vegetation) to the physical and biological features identified in critical habitat... These plants are often are identical to, or coexist with the physical or biological features that are essential to the conservation of species for which critical habitat is designated. Thus, actions to promote native habitats that would contain plants supporting Blackburn’s sphinx moth will also be beneficial in establishing and providing ecosystems that support species identified as physical or biological features for critical habitat, such as *Myoporum*, *Pleomele*, *Chamaesyce*, *Dodonaea*, *Bidens*, *Chenopodium* and other genera found in lowland dry ecosystem.”⁵²

or result in adverse modification of critical habitat, implementation of the conservation recommendations is at the discretion of the Federal Action Agency.

⁵⁰ *ibid.*

⁵¹ Personal communication with Service on August 21, 2012.

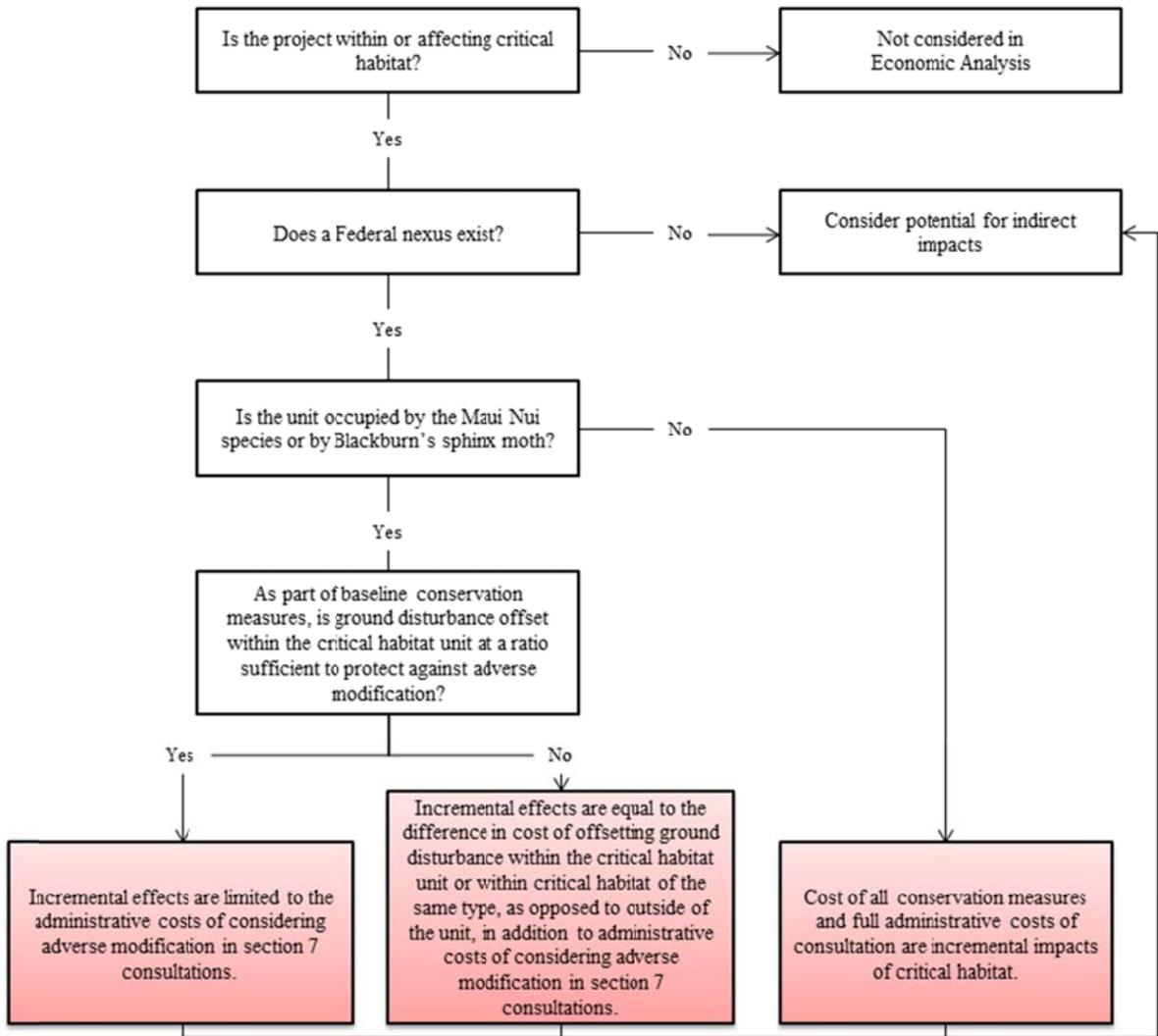
⁵² U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). See Appendix D.

69. Approximately 42 percent of the proposed critical habitat for the Maui Nui species overlaps with the probable range of Blackburn's sphinx moth.⁵³ Within this area, projects and activities have been subject to section 7 consultation considering the potential effects on Blackburn's sphinx moth over the last 12 years. The Service has regularly recommended habitat offsets to ensure projects and activities avoid jeopardy to the sphinx moth. A number of the projects identified as occurring within the proposed critical habitat area for the Maui Nui species have already been subject to recommendations to incorporate habitat offsets to avoid adversely affecting the sphinx moth and its habitat.
70. Where critical habitat is both unoccupied by the Maui Nui species and outside of the probably range of the Blackburn's sphinx moth, the incremental impact of critical habitat designation would be greater than in units occupied by the Maui Nui species or the sphinx moth.⁵⁴ This is because impacts of critical habitat in these units would include all administrative costs of consultation and all costs associated with implementing conservation measures for the Maui Nui species, as described in the following section.
71. Based on the findings of this memorandum, Exhibit 2-1 presents our decision framework for determining the extent of incremental impacts.

⁵³ Email communication from the Service on August 21, 2012.

⁵⁴ While the presence of other listed species may also provide baseline protection for the Maui Nui species' habitat, this analysis relied on information on the range of the Maui Nui species and the Blackburn's sphinx moth to identify where such baseline protection most likely exists. The sphinx moth is one of the most widespread species on Maui Nui and overlaps much of the proposed critical habitat area.

EXHIBIT 2-1. FRAMEWORK FOR DETERMINING INCREMENTAL IMPACTS



Direct Impacts

72. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any conservation efforts that might be taken by the Action Agency in conjunction with section 7 consultation to avoid potential destruction or adverse modification of critical habitat.
73. Section 7(a)(2) of the Act requires Federal agencies to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers (Corps). Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a CWA section 404 permit.
74. During a consultation, the Service, the Action Agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
75. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the Action Agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process to avoid adverse impacts to listed species and critical habitat. The informal consultation process is completed when the Service either concurs with the Action Agency's determination that the project is not likely to adversely affect the listed resource or the Action Agency requests formal consultation to address the adverse effect. By contrast, a *formal consultation* is required if the Action Agency determines that its proposed action is likely to adversely affect the listed species or designated critical habitat in ways that cannot be avoided. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require administrative effort on the part of all participants.

Administrative Section 7 Consultation Costs

76. Parties involved in section 7 consultations include the Service, a Federal "Action Agency," and in some cases, a private entity involved in the project or land use activity. The Action Agency (i.e., the Federal nexus necessitating the consultation) serves as the

liaison with the Service. While consultations are required for activities that involve a Federal nexus and may affect a species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

77. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
 2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
 3. **Incremental consultation resulting entirely from critical habitat designation** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.
78. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation.
79. Exhibit 2-2 provides the incremental administrative consultation costs applied in this analysis. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions are applied.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule to designate critical habitat.
 - Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and

therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly 25 percent of the cost of the entire consultation.⁵⁵ The remaining 75 percent of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.

- Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

EXHIBIT 2-2. INCREMENTAL ADMINISTRATIVE CONSULTATION COSTS (2013 DOLLARS)

INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	\$600	n/a	\$1,000	n/a	\$2,000
Informal	\$2,000	\$3,000	\$2,000	\$2,000	\$10,000
Formal	\$6,000	\$6,000	\$3,000	\$5,000	\$20,000
Programmatic	\$20,000	\$10,000	n/a	\$6,000	\$40,000
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$300	n/a	\$500	n/a	\$800
Informal	\$1,000	\$2,000	\$1,000	\$1,000	\$5,000
Formal	\$3,000	\$3,000	\$2,000	\$2,000	\$10,000
Programmatic	\$8,000	\$7,000	n/a	\$3,000	\$20,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION					
Technical Assistance	\$100	n/a	\$300	n/a	\$400
Informal	\$600	\$800	\$500	\$500	\$2,000
Formal	\$1,000	\$1,000	\$900	\$1,000	\$5,000
Programmatic	\$4,000	\$3,000	n/a	\$1,000	\$9,000
Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2011, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes: 1. The level of effort per consultation represents approximate averages based on the best available information. The estimates in this table are accordingly rounded to one significant digit to reflect this imprecision.					
2. Estimates reflect average hourly time required by staff.					

⁵⁵ *Ibid.*

80. To determine appropriate costs per consultation, we consulted Service biologists who participate in section 7 consultation.⁵⁶ Other relevant stakeholders could not comment on the level of administrative effort involved in section 7 consultation.

Section 7 Conservation Effort Impacts

81. Section 7 consultation considering critical habitat may also result in additional conservation effort recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of conservation efforts undertaken to avoid adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated conservation efforts are assumed to be incremental impacts of the designation. This is summarized below.

1. **Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested in informal consultation to minimize effects to the species or required in formal consultation to avoid jeopardy are considered incremental.
2. **Re-initiation of consultation to address adverse modification** - Only project modifications above and beyond what was requested to minimize effects to the species or avoid jeopardy are considered incremental.
3. **Incremental consultation resulting entirely from critical habitat designation** - Impacts of all project modifications are considered incremental.

Indirect Impacts

82. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

83. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP that meets statutory requirements, including minimizing and mitigating the potential harmful effects of the incidental take to the maximum extent practicable. As such, the purpose of the habitat conservation planning process is to ensure that the effects

⁵⁶ Personal communication with the Service on August 21, 2012.

of incidental take are adequately minimized or mitigated. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.

84. Application for an incidental take permit and completion of an HCP are not required by a critical habitat designation. However, in certain situations the new information provided by the critical habitat rule may prompt a landowner to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation actions are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified.

Other State and Local Laws

85. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.
86. Chapter 3 of this report discusses the potential for critical habitat to result in changes in the State's land management practices.

Additional Indirect Impacts

87. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:
- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
 - **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation.

- **Stigma** - In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not adjacent to a stream designated as critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation.

Indirect impacts may also result from critical habitat providing new information regarding where project proponents should consult regarding potential impacts on the species or habitat. Because for some of the species at issue here the listing of the species and the critical habitat designation are being proposed coincidentally, it is difficult to determine whether the critical habitat designation specifically generates the understanding of the areas in which the species are present. In other words, it is unclear whether the critical habitat designation will generate improved understanding above and beyond that provided by the listing of where project proponents should consult with the Service.

2.3.3 BENEFITS

88. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.⁵⁷ OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.⁵⁸
89. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.⁵⁹ *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

⁵⁷ Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

⁵⁸ OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4.

⁵⁹ *Ibid.*

90. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the PCEs on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

91. As described in Chapter 1, this analysis evaluates impacts of critical habitat designation on activities within or affecting the proposed critical habitat area. We evaluate impacts separately by unit for each unit. We also separately describe impacts within areas proposed for critical habitat designation from those areas being considered for exclusion from critical habitat designation.

2.3.5 ANALYTIC TIME FRAME

92. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). Recent guidance from OMB indicates that "if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future."⁶⁰ The "foreseeable future" for this analysis includes, but is not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. Forecasted impacts will be based on the planning periods for potentially affected projects. Specifically, we focus our analysis on those projects that are reasonably likely to occur based as indicated by existing plans or by landowners and land managers. As a result, this analysis considers economic impacts to activities over a ten-year period from 2013 (expected year of final critical habitat designation) through 2022.

2.4 INFORMATION SOURCES

93. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, State and local government agencies, and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation record for the areas of proposed critical habitat. A complete list of references is provided at the end of the main text of this document.

⁶⁰ U.S. Office of Management and Budget, February 7, 2011. "Regulatory Impact Analysis: Frequently Asked Questions (FAQs)." Accessed on October 10, 2012 at http://www.whitehouse.gov/omb/circulars_a004_a-4.

2.5 PRESENTATION OF RESULTS

94. Impacts are described in present value and annualized terms applying discount rates of seven percent throughout the body of the report. Additionally, Appendix B provides the present and annualized value of impacts in each unit applying a three percent discount rate for comparison with values calculated at seven percent.⁶¹ Appendix C presents undiscounted annual impact values by activity and subunit. Present value and annualized impacts are calculated according to the methods described in Exhibit 2-3 below.
95. The level of effort per consultation and the potential costs of conservation measures in this analysis represent approximate averages based on the best available cost information. The economic impacts presented throughout this report are accordingly rounded to one significant digit to reflect this imprecision.

⁶¹ The U.S. Office of Management and Budget (OMB) directs Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A-4, 2003).

EXHIBIT 2-3. CALCULATING PRESENT VALUE AND ANNUALIZED IMPACTS

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) from year t to T is measured in 2013 dollars according to the following standard formula:^a

$$PV_c = \sum_t^T \frac{C_t}{(1+r)^{t-2013}}$$

C_t = cost of Maui Nui critical habitat conservation efforts in year t

r = discount rate^b

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, development activities employ a forecast period of ten years, 2013 through 2022. Annualized future impacts (APV_c) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1 - (1+r)^{-N}} \right]$$

N = number of years in the forecast period (in this analysis, ten years)

^a To derive the present value of future impacts, t is 2013 and T is 2022.

^b To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

CHAPTER 3 | DEVELOPMENT PROJECTS

96. This chapter assesses the potential impacts of proposed critical habitat designation on identified residential, commercial, and industrial development projects. Development activities occurring in or near proposed critical habitat may result in adverse effects to the Maui Nui species or their critical habitat. The Proposed Rule states that past land use practices such as agriculture or urban development have resulted in limited native vegetation occurring below 2,000 feet throughout the Hawaiian Islands, and that this has negatively affected many of the ecosystems included in the proposed critical habitat designation.⁶² In addition, the Proposed Rule states that large tracts of former agricultural lands are being converted into residential areas or left fallow.⁶³
97. This evaluation of the potential impacts of critical habitat designation applies the following method:
- Identify currently planned development activities across the proposed critical habitat area;
 - Identify baseline conservation measures relevant to the identified projects due to the presence of the Maui Nui species or other listed species, such as the Blackburn's sphinx moth;
 - Determine whether critical habitat is likely to generate additional conservation recommendations or otherwise change the scope or scale of the proposed projects;
 - Quantify:
 - i. Incremental administrative costs of consultation on the identified projects; and
 - ii. Any incremental conservation efforts;
 - Highlight particular areas in which no specific plans for projects exist but for which future development is reasonably likely to occur.

⁶² 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.

⁶³ *Ibid.*

KEY ISSUES AND CONCLUSIONS OF THE DEVELOPMENT PROJECTS ANALYSIS

Quantified Impacts:

We estimate that the critical habitat designation will result in a total present value impact of approximately \$100,000 (seven percent discount rate) to development activities in two units (a total annualized impact of approximately \$20,000 over ten years). All impacts are expected to occur in 2013. These impacts are associated with two development projects identified as likely to occur within the proposed critical habitat area:

1. Advanced Technology Solar Telescope Expansion at Haleakala Observatories (Maui Alpine Unit 1); and
2. Honua'ula development project in Kihei, Maui (Maui Lowland Dry Unit 3).

These impacts reflect additional administrative effort as part of future section 7 consultation on both projects, as well as additional habitat conservation measures for the Honua'ula project as a result of proposed critical habitat designation.

Unquantified Impacts:

In addition, four other proposed critical habitat units have been identified as overlapping with lands that may be subject to future development pressure. These units are Lanai Coastal Unit 1, Lanai Dry Cliff Unit 1, Lanai Lowland Mesic Unit 1, and Molokai Coastal Unit 1. We identified these areas as potentially subject to future development through information from Maui County's Department of Planning and from public comments submitted on the Proposed Rule. For these units, the level of uncertainty regarding the nature of future development, as well as how the designation of critical habitat may result in project modifications, precludes quantification of impacts of critical habitat on future development in these areas. However, incremental impacts to potential future development activities in these units would likely be limited as the areas overlap with the Blackburn's sphinx moth's range and would therefore be subject to consultation and conservation measures, including recommendations to offset habitat disturbance, even absent critical habitat designation. Incremental impacts of critical habitat are therefore likely limited to the incremental cost of offsetting habitat disturbance within the critical habitat unit and additional administrative costs of considering adverse modification in section 7 consultation.

Key Uncertainties:

A key uncertainty in this analysis is the potential change in conservation measures associated with future development projects. While the Service may recommend conservation measures as part of section 7 consultation on a project or activity, unless the Service has determined that, absent these conservation measures, the project or activity is likely to result in jeopardy to the species or adverse modification of critical habitat, implementation of the conservation recommendations is at the discretion of the Federal Action Agency. As a result, whether these conservation recommendations will be implemented is uncertain. Furthermore, whether conservation measures implemented as part of the baseline (absent critical habitat designation) will be sufficient to avoid adverse effects on critical habitat, as was the case with one of the two identified projects, is uncertain.

With respect specifically to the Honua'ula development project, the Service has indicated that the conservation measures being planned do not meet the "full extent of mitigation" recommended. The nature of potential additional future conservation recommendations is uncertain; however, to the extent that the Service makes additional recommendations that are implemented due to concerns with respect to potential adverse effects on critical habitat, the incremental impact of critical habitat on this project quantified in this analysis is a low end estimate.

In addition, this analysis relies on information from Maui County's Department of Planning regarding currently proposed projects and areas that may be subject to development in the future. To the extent that more projects may occur within the ten year timeframe of this analysis, or a greater area than identified may be subject to development pressure, the analysis may underestimate potential impacts to development activities.

3.1 INTRODUCTION AND REGULATORY OVERVIEW

98. Development in many areas of Hawaii remains controversial due to the competing demands of Hawaii's growing population on scarce land and water resources. Although lands designated for agricultural use are no longer used for crop production at the same levels as in the past, development on these former agricultural lands is limited due to the fact that water systems have deteriorated and developed water sources are limited.^{64,65}
99. Concern exists on the part of private landowners that if private lands are designated as critical habitat for the Maui Nui species, the State and county entities that regulate land use on Maui Nui will redistrict or rezone the lands for conservation uses, thereby preventing or restricting future development on these lands.⁶⁶
100. To determine whether or not the critical habitat designation is likely to impact land use regulation on Maui Nui, we spoke with representatives of both State and county regulatory authorities. This research identified that the State and county do not expect critical habitat designation will result in re-districting or re-zoning, as follows:
- When the State redistricts lands, the presence of critical habitat does not require that an area will be redistricted to the Conservation District and this hasn't been a past practice of the State.⁶⁷
 - The county does not know of any instance in which critical habitat designation specifically lead to rezoning land.⁶⁸ The presence of critical habitat would be one of many factors under consideration in considering potential zoning changes, but the county could not recall an instance in which a land area was rezoned to limit development specifically because of the presence of critical habitat.⁶⁹
101. While the State and county indicate that critical habitat designation does not require, and has not historically generated, changes in land use zoning or districting, we recognize that third party lawsuits have the potential to affect this practice. It is expected that the State will, in the future, undertake a statewide review of the land use districts. At this time, third party lawsuits may assert that the State should incorporate critical habitat areas into the Conservation District. Similarly, third parties may petition Maui County to rezone critical habitat areas to preclude activities such as development. The likelihood, timing, and outcome of such potential legal challenges are significantly uncertain. We do not quantify impacts of land value losses associated with re-districting or re-zoning land due

⁶⁴ Personal communication with Dr. Bruce Plasch on September 24, 2012.

⁶⁵ U.S. Department of Agriculture. 2010. Statistics of Hawaii Agriculture. Available at http://www.nass.usda.gov/Statistics_by_State/Hawaii/Publications/Annual_Statistical_Bulletin/index.asp, accessed on September 26, 2012.

⁶⁶ Email communication from the Service on December 6, 2012.

⁶⁷ Personal communication with the State Office of Planning on November 9, 2012.

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

to this rulemaking as the assumption that this would occur and would result in limiting development is speculative.

102. The remainder of this section provides a regulatory overview for land use regulation practices on Maui Nui, as well as a more detailed discussion of the results of our conversations with State and county regulatory authorities.

State Land Use Regulation

103. The following State government entities play central roles in regulating land use on Maui Nui:

- **The Department of Business, Economic Development & Tourism’s (DBEDT) State Office of Planning:** This office provides information to the Governor to assist in the overall analysis and formulation of State policies and strategies, and works closely with local, State, and Federal government entities; the University of Hawaii; and various community stakeholders to achieve these objectives.⁷⁰ The Office is guided by two statewide planning documents: (1) the Hawaii State Planning Act, which is a broad policy document that guides the decisions made by local and State agencies; and (2) the New Day Comprehensive Plan, which outlines the administration’s priorities.
- **DBEDT’s Land Use Commission:** The State Land Use Commission administers a statewide zoning law, the Land Use Law, which establishes an overall framework of land use management whereby all lands in the State of Hawaii are classified into one of four districts: urban, rural, agricultural, and conservation.⁷¹ This process is directed by the State Land Use Law (Chapter 205, Hawaii Revised Statutes), which was originally adopted by the State Legislature in 1961 in order to better manage development in the State.
- **The Department of Land and Natural Resources’ (DLNR) Office of Conservation and Coastal Lands (OCCL):** The OCCL is responsible for reviewing and permitting land use within the State Land Use Conservation District.⁷²

104. Exhibit 3-1 provides information on the amount of proposed critical habitat that occurs within the four State Land Use Districts and Exhibit 3-2 presents a map of the proposed designation within each district. As shown in the exhibits, the majority of lands proposed for critical habitat designation fall within the State Land Use Conservation District, and most of the remaining lands fall within the State Land Use Agricultural District; less than one percent of the lands overlap with the Urban and Rural Districts.

⁷⁰ State of Hawaii, Office of Planning. 2012. Office of Planning Website. Available at <http://hawaii.gov/dbedt/op/>, accessed on November 26, 2012.

⁷¹ State of Hawaii, Land Use Commission. 2012. Land Use Commission Website. Available at <http://luc.state.hi.us/about.htm>, accessed on November 26, 2012.

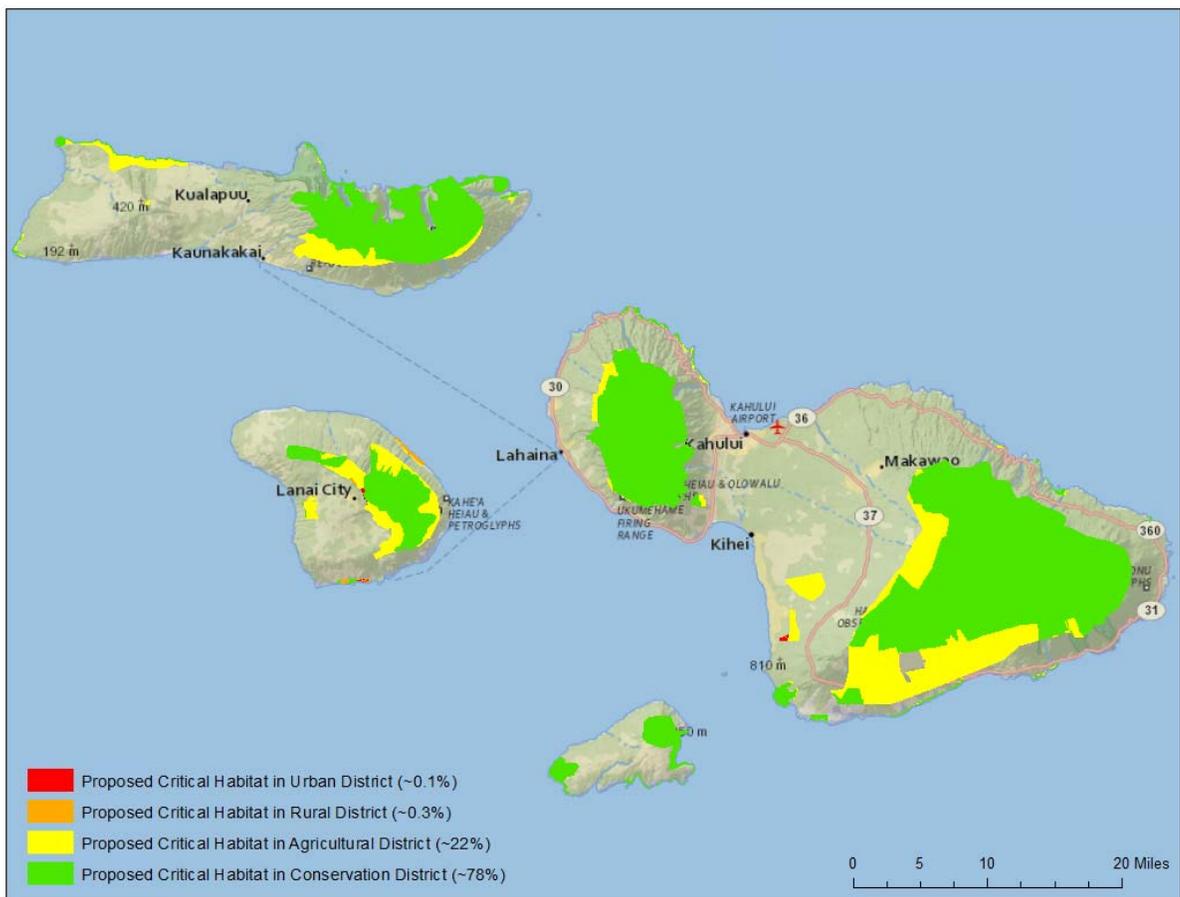
⁷² State of Hawaii, Department of Land and Natural Resources. 2012. Office of Conservation and Coastal Lands Website. Available at <http://hawaii.gov/dlnr/occl>, accessed on November 26, 2012.

EXHIBIT 3-1. PROPOSED CRITICAL HABITAT BY STATE LAND USE DISTRICT

STATE LAND USE DISTRICT	ACRES IN PROPOSED CRITICAL HABITAT	PERCENTAGE OF OVERALL CRITICAL HABITAT DESIGNATION
Urban	316	0.1
Rural	683	0.3
Agricultural	59,915	22
Conservation	210,142	78

Note: Totals may not sum due to rounding.
 Source: State of Hawaii, Office of Planning, GIS Program. State Land Use Districts, updated November 2011. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012.

EXHIBIT 3-2. PROPOSED CRITICAL HABITAT BY STATE LAND USE DISTRICT



Sources: State of Hawaii, Office of Planning, GIS Program. 2012. State Land Use Districts, updated November 2011. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on November 26, 2012; and U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

105. According to the Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL), which is responsible for overseeing lands that lie within the State Land Use Conservation District, the State does not change how it designates land to the Conservation District as a result of critical habitat designation.⁷³ According to the State Office of Planning, critical habitat is taken into consideration during the redistricting process (both during 5-year boundary reviews and when landowners, counties, or the State petition for boundary amendments); however, the presence of critical habitat does not necessarily mean that an area will be redistricted to the Conservation District.⁷⁴ For example, during the last 5-year boundary review in 1992, the Office of Planning proposed that certain streams that were identified as outstanding aquatic resources and waterbird recovery habitat be reclassified to the Conservation District. However, the Land Use Commission only reclassified one stream to the Conservation District.⁷⁵ The State representatives were not able to identify an instance in which lands were petitioned to be, or were, re-districted specifically because of the presence of critical habitat.
106. The State Department of Hawaiian Homelands (DHHL) owns land within proposed critical habitat on Maui Nui that is potentially subject to development. DHHL lands are exempt from city and State zoning, but have their own proposed land use districts, which include a conservation district and special district. According to DHHL, most of their lands that overlap with proposed critical habitat fall within the DHHL conservation district and so management is consistent with the needs of critical habitat.⁷⁶ However, some lands that overlap with proposed critical habitat fall into the special use district, and these lands may be subject to future energy development, including wind and geothermal projects. No specific plans for these projects exist, however, and DHHL stated that they are trying to avoid developing in critical habitat.⁷⁷

County Land Use Regulation

107. In addition to the State entities discussed above, the County of Maui's Department of Planning plays a key role in regulating land use in Maui County. The Department of Planning serves an advisory role to the Mayor, County Council and commissions; proposes zoning legislation; and drafts updates to the General Plan, Maui Island Plan (MIP), and Community Plans, among other roles.⁷⁸
108. While the county does not have the authority to redistrict lands that are currently assigned to one of the State Land Use Districts (only the State Land Use Commission has that power), the county does have the authority, granted in Section 46-4 of the Hawaii

⁷³ Personal communication with Office of Conservation and Coastal Lands on September 19, 2012.

⁷⁴ Personal communication with the State Office of Planning on November 9, 2012.

⁷⁵ Email communication with the State Office of Planning on November 20, 2012.

⁷⁶ Personal communication with Department of Hawaiian Homelands on October 16, 2012.

⁷⁷ *Ibid.*

⁷⁸ Maui County. 2012. Planning Department Website. Available at <http://www.co.maui.hi.us/index.aspx?nid=121>, accessed on November 26, 2012.

Revised Statutes, to regulate land use in accordance with the land use directives of the Hawaii Revised Statutes, the revised charter of the county, and the general plan and community plans of the county.⁷⁹

109. With the exception of the State Land Use Conservation District, where all uses are governed by DLNR, the county governs zoning and permits uses across Maui County. Within the State Land Use Agricultural District, for example, the county permits land uses, assuring that they are compatible with the State districting of the land. Other uses may be permitted through the county's special or conditional use permit process. Maui County Code (MCC) Title 19, Section 19.510.070 states that for a special use permit to be issued, "the proposed development must not adversely impact the social, cultural, economic, environmental, and ecological character and quality of the area."⁸⁰
110. The county is divided into the following use zone districts: residential districts; multiple-family districts; hotel districts; business districts; industrial districts; airport district; agricultural district; off-street parking and loading; planned development; civic improvement district; park districts; rural districts; and open space districts.⁸¹ According to the Maui County Code of Ordinances, the purposes of the open space zoning district include to "protect and preserve areas with important environmental, scenic, and cultural resources" and to "direct development away from fragile ecosystems and agricultural areas."⁸²
111. As described above, private landowners are concerned that critical habitat designation may cause Maui Nui to re-zone lands to preclude potential development activities or may deny petitions to re-zone areas to allow for a proposed development project or activity. According to the Department of Planning's Zoning Administration and Enforcement Division, there are typically two ways that the county implements zoning changes: (1) through the development of a comprehensive zoning ordinance, and (2) through changes implemented on a case-by-case basis when landowners apply for a variance from the zoning ordinances of the county.⁸³ The last comprehensive zoning process took place in 1998; since then, zoning changes have typically occurred as a result of applications for variances.
112. According to the Division, there has never been an instance when an area of land was rezoned due to the presence of critical habitat.⁸⁴ According to the Division, if a

⁷⁹ Maui County, Hawaii, Code of Ordinances, Title 19 Zoning, Article II. Comprehensive Zoning Provisions. Chapter 19.04 General Provisions and Definitions.

⁸⁰ Maui County Code, Title 19, Section 19.510.070 - Special use permits. Available at http://library.municode.com/HTML/16289/level3/TIT19ZO_ARTVADEN_CH19.510APPR.html#TIT19ZO_ARTVADEN_CH19.510A_PPR_19.510.070SPUSPE Accessed on September 19, 2012.

⁸¹ Maui County, Hawaii, Code of Ordinances, Title 19 Zoning, Article II. Comprehensive Zoning Provisions. Chapter 19.06 Districts and Boundaries.

⁸² Maui County, Hawaii, Code of Ordinances, Title 19 Zoning, Article II. Comprehensive Zoning Provisions. Chapter 19.07 Open Space Districts.

⁸³ Personal communication with Maui County Department of Planning's Zoning Administration and Enforcement Division on December 7, 2012.

⁸⁴ *Ibid.*

landowner wanted to rezone land that had become critical habitat to support a particular development or land use plan, theoretically it may be harder to achieve due to the presence of critical habitat; however, critical habitat would be one of many factors under consideration during the rezoning process. The Division could not recall any examples of this occurring, however.⁸⁵

113. In addition, the county has initiated several planning policies to guide land use on Maui Nui, including the Countywide Policy Plan (CPP) and the Maui Island Plan (MIP). The CPP, adopted on March 24, 2010, provides broad goals, objectives, policies, and implementing actions for future development on Maui Nui. The CPP states that one of the countywide goals is to preserve, manage, and care for Maui County's natural environment, and that countywide policies include "protecting critical habitat areas" and "expand[ing] coordination with the State and nonprofit agencies and their volunteers to... identify critical habitat."⁸⁶
114. The MIP, currently under development, is a long range planning document that will be used by the County Council, Maui Planning Commission, county staff and the community as a policy foundation for land use decision making on Maui.⁸⁷ One of the key elements of the MIP is a Directed Growth Strategy that "prescribes and outlines how Maui will grow over the next two decades, including the location and general character of new development."⁸⁸ The Directed Growth Strategy is the first time that Maui County will establish and adopt these urban and rural growth areas, as required MCC 2.80B.
115. According to the Draft MIP, the urban growth boundaries (UGBs) will be used to evaluate proposals involving community plan amendments, changes in zoning, development proposals or utility extensions. In addition, the UGBs and rural growth boundaries (RGBs) will be used to protect farms and natural areas from sprawl and to "ensure that future development patterns do not compromise Maui's unique and fragile natural resources."⁸⁹ Draft UGBs were developed by the Department of Planning, Maui Planning Commission, and General Plan Advisory Committee in July 1, 2009, but have not yet been finalized.⁹⁰ While the Plan intends to focus the development within these areas, it does not preclude development from occurring outside of the UGBs and RGBs.

⁸⁵ *ibid.*

⁸⁶ Maui County. 2010. 2030 General Plan, Countywide Policy Plan. Available at <http://www.co.maui.hi.us/documents/17/69/241/PublishedWholeCWPPredo121510.PDF>. Accessed on September 19, 2012.

⁸⁷ Maui County. 2012. Draft Maui Island Plan. Available at <http://www.co.maui.hi.us/index.aspx?NID=1120>. Accessed on September 19, 2012.

⁸⁸ Maui County. 2009. Maui Island Plan, General Plan 2030, DRAFT. Planning Department, Long Range Division. Available at <http://www.co.maui.hi.us/documents/17/69/71/599/605/combinedcover.PDF>. Accessed on September 19, 2012.

⁸⁹ Maui County Planning Department, Long Range Planning Division, General Plan 2030: Draft Maui Island Plan. Available at <http://www.co.maui.hi.us/index.aspx?NID=1120>, accessed on January 2, 2013.

⁹⁰ Maui County Planning Department, Long Range Planning Division, GIS Section. Maui Island Plan Map Layers. Effective Date July 1, 2009.

3.2 SCOPE AND SCALE OF FUTURE DEVELOPMENT WITHIN THE PROPOSED CRITICAL HABITAT

116. In order to identify development projects that are reasonably likely to occur over the next ten years on the islands of Maui, Molokai, Lanai, and Kahoolawe, we contacted Maui County's Department of Planning and reviewed public comments that were submitted in response to the Proposed Rule.
117. Maui County's Department of Planning provided the following information on the overall status of development activity on Maui Nui:
- Development on Maui Island is currently largely on hold due to the fact that the MIP is still under development and the UGBs have not yet been finalized.⁹¹
 - On Molokai Island, there are no large development projects occurring and plans for future development are unclear.^{92,93}
 - Future development on Lanai Island is also very uncertain due to the recent sale of the island to Oracle Corporation CEO Larry Ellison. According to the county, the new owner has not revealed his plans for the island, so while future development is possible, no specific information is available at this time.^{94,95}
 - The entire island of Kahoolawe Island is designated Conservation District under the State Land Use Code and no development is forecast to occur on the island in the foreseeable future.^{96,97}
118. Overall, the level of development activity is low across all of the islands of Maui Nui for the reasons described above. However, Maui County's Department of Planning provided us with GIS data that identifies potential development projects as of February 15, 2011.⁹⁸ We mapped these data along with proposed critical habitat to determine which of the development projects may affect the proposed critical habitat area.
119. The remainder of this section describes our findings with respect to the scope and scale of future development activities within proposed critical habitat. First, we present a summary of those projects identified as overlapping with proposed critical habitat but unlikely to be subject to incremental impacts of critical habitat designation. Next, we

⁹¹ Personal communication with Current Planning Division, Maui County, on September 13, 2012.

⁹² Personal communication with Current Planning Division, Maui County, on September 28, 2012.

⁹³ Personal communication with Long Range Planning Division, Maui County, on September 7, 2012.

⁹⁴ Personal communication with Current Planning Division, Maui County, on September 28, 2012.

⁹⁵ Personal communication with Long Range Planning Division, Maui County, on September 7, 2012.

⁹⁶ Hawaii Department of Land and Natural Resources. 2005. Hawaii's Comprehensive Wildlife Conservation Strategy. Available at <http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Full%20document%20Hawaii%20CWCS.pdf>. Accessed on September 19, 2012.

⁹⁷ Personal communication with Dr. Bruce Plasch on August 6, 2012.

⁹⁸ Maui County. February 15, 2011. GIS Data: Development Projects Layer Files. Planning Department, Division of Long Range Planning, GIS Section. Available at <http://www.co.maui.hi.us/index.aspx?NID=1061>. Accessed on September 19, 2012.

provide information about areas within proposed critical habitat that may experience development pressure, but where the lack of information on specific projects precludes quantification of incremental impacts of critical habitat designation. Lastly, we describe those projects identified within proposed critical habitat that are occurring or likely to occur within the timeframe of the analysis, and for which incremental impacts of critical habitat are quantified.

Projects for which Incremental Impacts are Not Expected

120. The GIS data from Maui County’s Department of Planning indicated that the three development projects identified in Exhibit 3-3 overlap with proposed critical habitat.⁹⁹ However, these projects are either no longer expected to occur or have recently been completed. We therefore do not expect critical habitat designation to result in incremental impacts to these projects.

EXHIBIT 3-3. DEVELOPMENT PROJECTS FOR WHICH INCREMENTAL IMPACTS ARE NOT EXPECTED

PROPOSED CRITICAL HABITAT UNIT(S)	PROJECT NAME AND DESCRIPTION	PROJECT STATUS
Maui Coastal Unit 10	Winn 4-lot residential subdivision	According to the Department of Planning, the application was “closed” in 2005. ¹
Maui Lowland Dry Unit 2	DHHL Keokea Homestead	Project has been completed. ²
Maui Lowland Dry Unit 5, Maui Lowland Mesic Unit 2	Kahoma Lots	No final subdivision permit has been issued and market conditions have limited this development thus far. ¹
Sources:		
1. Email communication from Maui County Department of Planning, Long Range Planning Division, on September 12, 2012.		
2. Personal communication with Department of Hawaiian Homelands on October 16, 2012.		

Areas Subject to Future Development Activity

121. The following proposed critical habitat units have been identified as areas where development pressure exists, but specific future development activities are highly uncertain. Due to the fact that we were unable to establish if and when development projects may occur in these units, and whether project proponents would implement habitat offsets in critical habitat as part of the baseline conservation efforts, we present unquantified potential incremental impacts in section 3.3.2 of this chapter.

Lanai Coastal Unit 1

122. Proposed critical habitat unit Lanai Coastal Unit 1 overlaps with an area known as the Manele Project District. Specifically, a portion of the unit overlaps with part of the Challenge at Manele golf course and with the Palms at Manele luxury condominiums.

⁹⁹ In addition, the Maui County development data indicated that a project known as the Waikapu Mauka Rural Lots overlaps a small portion of Maui Lowland Dry Unit 6. However, there is a high level of uncertainty surrounding the current status of the project. According to Maui County’s Department of Planning, the project has not been included in the MIP and lacks appropriate State Land Use designations

According to the Service, areas within the proposed critical habitat unit that overlap with the Challenge at Manele golf course and the Palms at Manele luxury condominiums will likely be removed from proposed critical habitat because they do not meet the criteria for critical habitat, although the final decision will be made as part of the final rulemaking.¹⁰⁰

123. While much of the Manele Project District is already developed, there are several undeveloped parcels for which projects have been proposed in recent years.¹⁰¹ Due to market conditions, however, and to the recent change in ownership on Lanai, the current status of these projects is unclear.^{102, 103} Exhibit 3-4 shows the area within proposed critical habitat unit Lanai Coastal Unit 1 that overlaps with the current Manele Project District.

EXHIBIT 3-4. MANELE BAY AREA



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

¹⁰⁰ U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). Table 4. Preliminary Analysis of Economic Activity Threats by Unit. See Appendix D.

¹⁰¹ Maui County Board of Variances and Appeals. Meeting Minutes for March 10, 2011. Available at <http://www.co.maui.hi.us/archives/42/031011min.pdf>, accessed on September 24, 2012.

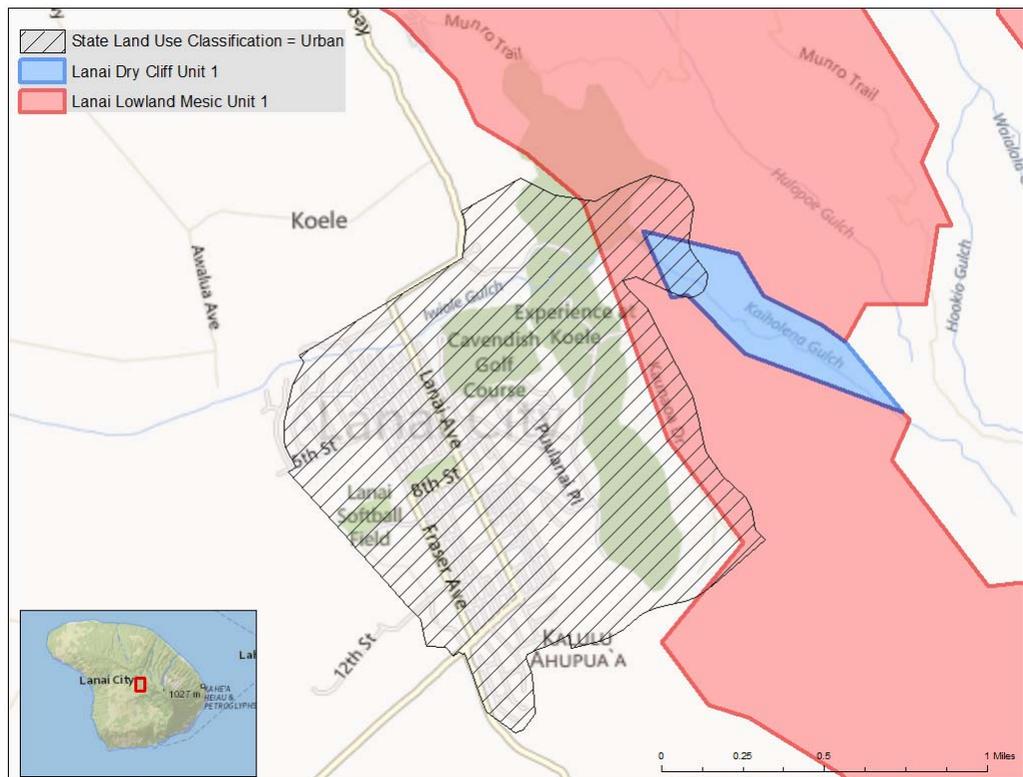
¹⁰² Personal communication with Castle and Cooke on November 8, 2012.

¹⁰³ Personal communication with Maui County Department of Planning, Long Range Planning Division, on September 12, 2012.

Lanai Dry Cliff Unit 1, Lanai Lowland Mesic Unit 1

124. A public comment submitted in response to the Proposed Rule on behalf of Castle & Cooke Properties Inc. and Castle & Cooke Resorts LLC states that proposed critical habitat units Lanai Dry Cliff Unit 1 and Lanai Lowland Mesic Unit 1 overlap “areas of existing and planned development in the Koele Project District.”¹⁰⁴ According to the comment, the proposed critical habitat units overlap portions of the existing golf course (The Experience at Koele) and subdivision units K-3, K-6, K-7, K-8(A), K-8(B), and K-10. Again, future development on Lanai is highly uncertain due to market conditions and to the recent change in ownership on Lanai.^{105,106} The timing and nature of future development in the Koele Project District are unclear.¹⁰⁷ Exhibit 3-5 shows the area within proposed critical habitat units Lanai Dry Cliff Unit 1 and Lanai Lowland Mesic Unit 1 that overlap with the current Koele Project District.

EXHIBIT 3-5. KOELE PROJECT DISTRICT



Sources: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012; and State of Hawaii, Office of Planning, GIS Program. 2012. State Land Use Districts, updated November 2011. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on November 26, 2012.

¹⁰⁴ Public comment submitted by Goodwill Anderson Quinn & Steifel LLP on behalf of Castle and Cooke Properties Inc. and Castle & Cooke Resorts. Attn: FWS-R1-ES-2011-0098.

¹⁰⁵ Personal communication with Maui County Department of Planning, Long Range Planning Division, on September 12, 2012.

¹⁰⁶ Personal communication with Castle and Cooke on November 8, 2012.

¹⁰⁷ Ibid.

Molokai Coastal Unit 1

125. Molokai Properties Limited (MPL) has, in the past, wanted to develop La’au Point to build a luxury subdivision. There was a great deal of controversy (significant support and opposition) to the plan between 2005 and 2007, and in 2008 MPL shut down all of its operations on Molokai. According to Maui County’s Department of Planning, the proposal for this project was withdrawn in 2009 due to community opposition to the project.¹⁰⁸ However, MPL still owns the majority of the land surrounding La’au Point, so it is unclear if the company intends to develop the area in the future.¹⁰⁹ Exhibit 3-6 shows the area within proposed critical habitat unit Molokai Coastal Unit 1.

EXHIBIT 3-6 LA’AU POINT



Source: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012.

¹⁰⁸ Personal communication with Maui County Department of Planning, Long Range Planning Division, on September 12, 2012.

¹⁰⁹ State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated May 8, 2012. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012.

Projects for which Incremental Impacts are Likely

126. We identified two projects that are expected to occur within proposed critical habitat: the Advanced Technology Solar Telescope (ATST) expansion at Haleakala Observatories, which overlaps with proposed critical habitat unit Maui Alpine Unit 1, and the Honua'ula development project, which overlaps with proposed critical habitat unit Maui Lowland Dry 3. Potential incremental impacts to these projects are presented in the following section.

3.3 ECONOMIC IMPACTS OF CRITICAL HABITAT ON DEVELOPMENT ACTIVITIES

127. Critical habitat may generate incremental economic impacts through implementation of additional conservation measures (beyond those recommended to avoid jeopardy to the species) and additional administrative effort in section 7 consultations to consider adverse modification. As described in Chapter 2, while the Service may recommend habitat conservation measures absent critical habitat designation, critical habitat designation may generate the additional specification that the measures be located within the affected critical habitat unit or, where this is not possible, within critical habitat of the same type.¹¹⁰
128. Incremental impacts of critical habitat designation on the two development projects expected to occur within proposed critical habitat are described in detail in section 3.3.1 below. In section 3.3.2, we provide a qualitative discussion of potential economic impacts for the four proposed critical habitat units in which future development is possible but highly uncertain.

3.3.1 QUANTIFIED IMPACTS

129. This section addresses the potential impacts of critical habitat designation on the two identified development projects overlapping proposed critical habitat.
- Advanced Technology Solar Telescope Expansion at Haleakala Observatories
130. The National Science Foundation (NSF) is currently funding construction of the ATST within the University of Hawaii Institute for Astronomy (IfA) Haleakala High Altitude Observatory (HO) site at the summit of Haleakala, Maui, Hawaii. The proposed project site falls within proposed critical habitat unit Maui Alpine Unit 1, which has been proposed as critical habitat for the Haleakala silversword (*Argyroxiphium sandwicense* ssp. *macrocephalum*). The construction of the ATST facilities is likely to result in land disturbance of less than one acre.¹¹¹
131. The HCP for the project, finalized on October 29, 2010, addresses anticipated impacts to State and Federal threatened, endangered, and listed species from the construction of the

¹¹⁰ Personal communication with the Service on October 16, 2012.

¹¹¹ U.S. Fish and Wildlife Service. June 15, 2011. Biological Opinion of the U.S. Fish and Wildlife Service for Construction and Operation of the Advanced Technology Solar Telescope (ATST) at the Haleakala High Altitude Observatory Site, Maui, Hawaii. 1-2-2011-F-0085. Available at http://atst.nso.edu/files/docs/NHPA/FINAL_ATST_BO%20Signed.pdf.

ATST.¹¹² The Service conducted a formal consultation on the proposed ATST construction and issued a biological opinion (BO) on June 15, 2011.¹¹³ According to the BO, one of the measures adopted to avoid, minimize, and offset impacts to the Haleakala silversword is that 300 plants will be propagated and outplanted on State lands on Haleakala.¹¹⁴ Additionally, an area of approximately 328 acres surrounding the ATST construction site will be established as a conservation/mitigation area in perpetuity. The proposed mitigation area will be fenced and managed for the Hawaiian petrel, but will also serve as habitat for the Haleakala silversword.¹¹⁵ Exhibit 3-7 illustrates the project location within proposed critical habitat unit Maui Alpine Unit 1, as well as the proposed mitigation area.¹¹⁶

132. The Service expects that critical habitat designation will likely result in one informal section 7 consultation on this project.¹¹⁷ The Service stated that they would likely not recommend further project modifications beyond the mitigation already planned and described in the BO; however, the project will be evaluated formally during a section 7 consultation following critical habitat designation.¹¹⁸ We expect that incremental costs for this project will likely be limited to the additional administrative costs of considering critical habitat in a reinstituted informal section 7 consultation to consider adverse modification to Maui Nui critical habitat following critical habitat designation in 2013. Total incremental costs associated with this project are estimated to be \$5,000. These costs are expected to be borne by the Service, Federal Action Agency, and the project proponent (NSF), as described in Exhibit 2-3. It is important to note that, while the Service does not expect that it will recommend additional conservation measures as a result of critical habitat, the final decision will be made during the section 7 consultation following critical habitat.

¹¹² Habitat Conservation Plan for Construction of the Advanced Technology Solar Telescope at the Haleakala High Altitude Observatory Site, Maui, Hawaii. October 29, 2010. Available at <http://hawaii.gov/dlnr/chair/meeting/submittals/110527/C-FW-Submittals-C2.pdf>.

¹¹³ U.S. Fish and Wildlife Service. June 15, 2011. Biological Opinion of the U.S. Fish and Wildlife Service for Construction and Operation of the Advanced Technology Solar Telescope (ATST) at the Haleakala High Altitude Observatory Site, Maui, Hawaii. 1-2-2011-F-0085. Available at http://atst.nso.edu/files/docs/NHPA/FINAL_ATST_BO%20Signed.pdf.

¹¹⁴ *Ibid.*

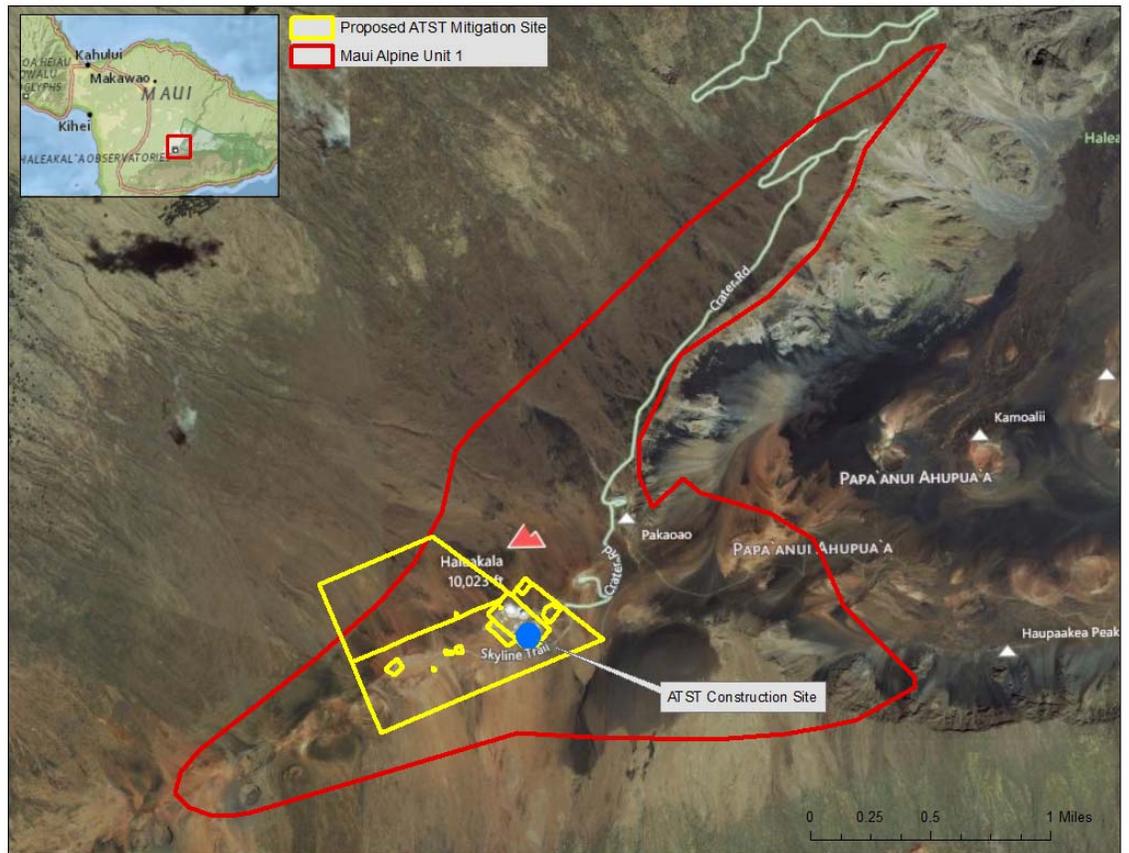
¹¹⁵ *Ibid.*

¹¹⁶ The locations for the construction site and proposed mitigation site are approximated based on maps provided in the Service's biological opinion, cited above.

¹¹⁷ Personal communication with the Service on October 17, 2012.

¹¹⁸ Personal communication with the Service on August 21, 2012.

EXHIBIT 3-7. ATST PROJECT AREA AND PROPOSED MITIGATION SITE



Sources: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012; and State of Hawaii, Office of Planning, GIS Program. 2012. Tax Map Key (TMK) Parcels, updated May 8, 2012. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012.

Honua’ula Development Project

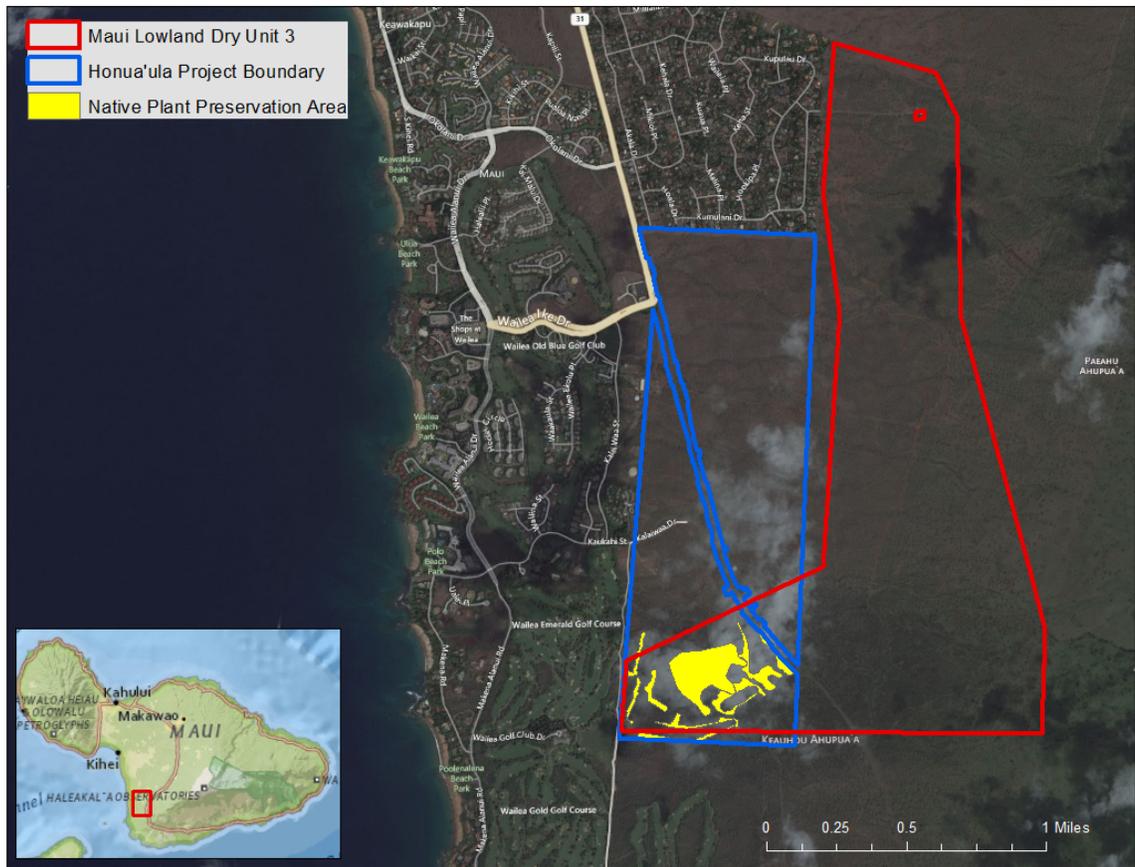
- 133. The Honua’ula development project is a proposed master-planned community in Kihei, Maui, that includes residential, commercial, and retail uses; on-site recreational amenities and parks; open space; and an 18-hole homeowners’ golf course and related facilities.^{119,120} The proposed project site consists of 670 acres of land, 170 of which overlap with proposed critical habitat Maui Lowland Dry Unit 3.

¹¹⁹ SWCA Environmental Consultants. December 2012. Draft Habitat Conservation Plan for Honua’ula (Wailea 670) Kihei, Maui. Prepared for U.S. Fish and Wildlife Service and Hawai’i Department of Land and Natural Resources on behalf of Honua’ula Partners, LLC.

¹²⁰ According to a public comment submitted by Honua’ula Partners LLC on the proposed rule, the project is expected to infuse more than one billion dollars of direct capital investment into the Maui economy and create thousands of jobs during the 13-year construction and build-out period. According to the comment, after construction is complete, the project is expected to provide hundreds of permanent jobs and contribute over one and a half million dollars in annual property tax revenue to Maui County.

134. The project’s developer, Honua’ula Partners, LLC, has drafted an HCP as part of its application for an incidental take permit for the project.¹²¹ The draft HCP states that, as part of its mitigation measures to compensate for the potential incidental take of the Blackburn’s sphinx moth and the nēnē or Hawaiian goose, as well as to meet permit issuance criteria, Honua’ula Partners, LLC will establish a perpetual on-site conservation easement, referred to as the Native Plant Preservation Area, over an area of approximately 40 acres. According to the developer, the costs associated with the easement and with the associated conservation activities are estimated to be \$16.8 million and \$1.3 million, respectively.¹²² Exhibit 3-8 shows the proposed project site and the proposed conservation easement, along with Maui Lowland Unit 3.

EXHIBIT 3-8. HONUULA PROPOSED PROJECT SITE AND CONSERVATION EASEMENT



Sources: U.S. Fish and Wildlife Service. GIS data on proposed critical habitat provided to Industrial Economics, Inc. on July 20, 2012; and U.S. Fish and Wildlife Service. GIS data on Honua’ula Draft HCP provided to Industrial Economics, Inc. on August 1, 2012.

¹²¹ SWCA Environmental Consultants. December 2012. Draft Habitat Conservation Plan for Honua’ula (Wailea 670) Kihei, Maui. Prepared for U.S. Fish and Wildlife Service and Hawai’i Department of Land and Natural Resources on behalf of Honua’ula Partners, LLC.

¹²² Personal communication with Honua’ula Partners LLC on November 6, 2012.

135. In addition to the Native Plant Preservation Area, other Plant Conservation Areas will be located throughout the property, adding an additional conservation area of 36 acres in which existing native plants will be protected. In addition, Honua'ula Partners, LLC intends to establish several offsite conservation easements on a total of 354 acres on privately owned lands at Ulupalakua Ranch.
136. Following publication of the proposed critical habitat rule for the Maui Nui species, the Service reviewed the draft HCP for the project and provided additional recommendations for conservation measures.¹²³ According to the Service and Honua'ula Partners, LLC, several conservation efforts have been incorporated into the draft HCP as a result of the proposed critical habitat designation for the Maui Nui species.^{124,125} These conservation measures are summarized in the text box on the following page. It is important to note that, until section 7 consultation on this draft HCP occurs following the critical habitat designation, the Service cannot determine definitively whether or not further conservation measures will be recommended to avoid adverse effects on critical habitat.
137. We estimate a total present value impact of critical habitat designation on the Honua'ula project of \$100,000, or \$20,000 on an annualized basis over the next ten years (seven percent discount rate). We expect this consultation and associated costs will occur in 2013.

¹²³ Personal communication with the Service on December 19, 2012.

¹²⁴ Personal communication with the Service on December 19, 2012.

¹²⁵ Personal communication with Honua'ula Partners LLC on December 27, 2012.

INCREMENTAL EFFECTS OF CRITICAL HABITAT ON HONUUA'ULA PROJECT

Proposed critical habitat in Maui Lowland Dry Unit 3 overlaps the proposed Honua'ula development: a master-planned community with residential, commercial, and recreational uses. The project planning has been underway for over ten years and has involved State and Federal agencies and community groups. The developer, Honua'ula Partners, LLC, has been working with the Service to develop an HCP as part of its application for an incidental take permit. The draft HCP considers impacts of the project on Blackburn's sphinx moth and the nēnē (Hawaiian goose), as well as the Maui Nui species. The draft HCP includes a variety of conservation measures, including a 40-acre on-site conservation easement ("the Native Plant Preservation Area") and 354 acres of offsite conservation easements.

Additional Conservation Measures Due to Proposed Critical Habitat Designation

Following publication of the proposed critical habitat rule for the Maui Nui species, the Service reviewed the draft HCP with respect to potential adverse effects on critical habitat. Specifically, because the project is expected to result in the loss of 119.5 acres of lowland dry critical habitat, the Service recommended that Honua'ula Partners:

1. Increase habitat offsets by 35 acres within lowland dry critical habitat. Prior to the proposed rule, the Service had recommended offsetting habitat loss at a 2:1 ratio. As a result of proposed critical habitat, the Service recommended that the offsets occur within lowland dry critical habitat (although it did not recommend an increase in the 2:1 ratio). While the 394 acres of conservation easements exceeded the Service's suggested offset ratio, a portion of the planned offset area falls outside of lowland dry critical habitat, generating a recommendation from the Service to increase the area that is being conserved in lowland dry habitat by 35 acres.
2. Increase outplanting efforts for ten of the species for which Maui Lowland Dry Unit 3 is proposed to conserve.

In response to these recommendations, Honua'ula Partners is undertaking the following additional measures. The costs of these measures are incremental impacts of the critical habitat designation, as they were not planned prior to the proposed designation:

1. Honua'ula Partners will provide an additional \$125,000 to contribute to a fencing project on 35 acres of land within lowland dry critical habitat, and perform fence maintenance through the permit period.
2. Honua'ula Partners will include in their outplanting efforts nine plant species for which Maui Lowland Dry 03 is proposed to conserve (in addition to the āwikiwiki, which was already included in the outplanting effort prior to the proposed critical habitat designation). According to Honua'ula Partners, this measure will not result in any additional cost.

In addition, Honua'ula Partners noted that the Service made additional recommendations regarding fire break measures, invasive plant species removal, and the extent of non-native species cover.

Additional Administrative Impacts of Section 7 Consultation:

We expect that there will be a reinitiated informal section 7 consultation in 2013 (following critical habitat designation) to consider adverse modification of critical habitat. Total incremental administrative costs associated with this section 7 consultation are estimated to be \$5,000.

Potential Unquantified Impacts

In addition to the incremental cost of the additional conservation measures and administrative effort, the project has been subject to schedule delays resulting from the need to allow for revision of the HCP following the proposed critical habitat designation. These delays generate carrying costs on project-related debt. Furthermore, as the project has been ongoing for more than a decade, Honua'ula Partners is concerned that delays will reduce lenders' confidence in the company's ability to work with regulatory agencies. The lenders may then ask for more assurances from the company to demonstrate confidence that the project will be completed.

According to the Service, the project does not meet the "full extent of mitigation" recommended by the Service, and therefore the Service may recommend additional conservation measures in the future as part of section 7 consultation on this project. The nature of potential future recommendations to avoid adverse effects on critical habitat is, however, uncertain. In light of this, we expect the \$130,000 cost of additional conservation measures and administrative effort is a low end estimate of the incremental impacts of critical habitat designation on this project.

Sources:

3. Personal communication with the Service on December 19, 2012.
4. Personal communication with Honua'ula Partners, LLC on December 27, 2012.
5. SWCA Environmental Consultants. December 2012. Draft Habitat Conservation Plan for Honua'ula (Wailea 670) Kihei, Maui. Prepared for U.S. Fish and Wildlife Service and Hawai'i Department of Land and Natural Resources on behalf of Honua'ula Partners, LLC.

3.3.2 UNQUANTIFIED IMPACTS

138. Four proposed critical habitat units were identified as overlapping with areas where there is development pressure but where specific development activities are highly uncertain. As presented in Exhibit 3-9, two of these units are occupied by the Maui Nui species, and all of the units are within the probable range of the Blackburn’s sphinx moth.

EXHIBIT 3-9. UNITS WITH UNQUANTIFIED IMPACTS

PROPOSED CRITICAL HABITAT UNIT	DEVELOPMENT ACTIVITY	OCCUPIED BY MAUI NUI SPECIES? ¹ (YES/NO)	WITHIN BLACKBURN’S SPHINX MOTH PROBABLE RANGE? ² (YES/NO)	HABITAT CONSERVATION RATIO RECOMMENDED BY THE SERVICE IN THE BASELINE ³
Lanai Coastal Unit 1	Manele Project District	No	Yes	1:1
Lanai Dry Cliff Unit 1	Koele Project District	No	Yes	n/a*
Lanai Lowland Mesic Unit 1	Koele Project District	Yes	Yes	1:1 - 2:1
Molokai Coastal Unit 1	La’au Point	Yes	Yes	1:1 - 2:1
<p>Sources:</p> <p>1. 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.</p> <p>2. U.S. Fish and Wildlife Service. GIS data for Probable Moth Range provided to Industrial Economics, Inc. on August 23, 2012.</p> <p>3. U.S. Fish and Wildlife Service to Industrial Economics, Inc. October 15, 2012. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui). Table 4. Preliminary Analysis of Economic Activity Threats by Unit. See Appendix D.</p> <p>*This unit was identified as subject to potential future development after the Service submitted the Incremental Effects Memorandum with its recommended offset ratios. Therefore, we do not have information about the offset ratio that may be recommended for this unit.</p>				

139. While two of the units (Lanai Coastal Unit 1 and Lanai Dry Cliff Unit 1) are not known to be occupied by the Maui Nui species, all four units fall within the probable range of the Blackburn’s sphinx moth. The Service is likely to recommend offsetting habitat disturbance to protect against jeopardy to the moth, although the offsets would not necessarily be recommended to occur within the proposed critical habitat units identified above, or within critical habitat of the same type.¹²⁶ The Service does not expect the critical habitat designation to affect the habitat offset ratios recommend. These ratios are determined during project development after an assessment of project impacts, quality of

¹²⁶ Personal communication with Service on August 21, 2012.

habitat, and other factors.¹²⁷ Therefore, incremental impacts to future development projects within these units are most likely to include the following:

- The incremental cost of siting habitat offsets (acquiring and managing habitat to offset disturbance in critical habitat) within the critical habitat unit or within critical habitat of the same type; and
- The additional administrative costs of considering adverse modification in section 7 consultation.

140. Factors affecting the magnitude of such potential incremental impacts include the following:

- Extent of project impacts (ground disturbance, etc.);
- Habitat offset ratio recommended;
- Relative value of land within the critical habitat unit as opposed to potential conservation sites outside of the unit; and
- Extent of baseline conservation measures.

141. Acquiring and managing land for the conservation of the species in order to address habitat disturbance increases the cost to developers of developing a parcel of land. Depending on the proposed project, these impacts may take a variety of forms. First, the landowner may purchase a conservation easement, precluding future development within a land area in order to address impacts of the development on the species and habitat. In this case, the size of the development project is not affected but the cost of this easement is a direct cost to the project. The cost of the conservation easement reflects the fraction of the value of the easement land associated with its potential for future development and of other activities that may be precluded once the easement area is established. The developer may also need to ensure active management of the easement area in perpetuity such that it addresses the permanent habitat disturbance effects of the development project. This may be an additional cost to the project. For example, the developer of the Honua'ula project provided us with estimates of the costs associated with the project's conservation efforts. According to the developer, the cost of the conservation easements and the associated conservation activities are estimated to be \$16.8 million and \$1.3 million, respectively.¹²⁸

142. Where developable land is in limited supply, however, recommendations to offset habitat disturbance may restrict the extent of development possible. This is particularly relevant where the Service recommends that habitat offsets be situated within the same critical habitat unit as the disturbed area, or within a critical habitat unit of the same type. In the case that the land area of the unit is not sufficient to support both the full extent of the proposed development and the area required for the offset, the landowner may need to adjust the size of the development project to accommodate the habitat offset. In this case,

¹²⁷ *Ibid.*

¹²⁸ Personal communication with Honua'ula Partners LLC on November 6, 2012.

not only are there impacts associated with purchasing and managing the offset area, but also of the reduced development in the area, which may manifest in terms of reduced regional economic activity. Where development is no longer viable in an area due to the need to offset disturbance, there may be a reduction in the value of the land associated with the foregone opportunity for future development.

143. Consequently, quantifying the economic impacts of addressing habitat disturbance requires information on:
- The projected acreage of habitat disturbance associated with a development; and
 - The difference in the cost of conservation easements, if any, between the location of the easement in the baseline (potentially outside of the unit) and with critical habitat designation (within the unit).
144. As noted above, however, development projects within the proposed critical habitat area may incorporate habitat offsets within critical habitat units at ratios sufficient to avoid adverse modification of critical habitat even absent the designation. Of the two development projects identified in this chapter, one incorporated offsetting habitat disturbance at a level the Service anticipates will avoid adverse effects on critical habitat absent the designation (i.e., in the baseline). The other – the Honua’ula development – was subject to review by the Service following the proposed rule for Maui Nui species critical habitat, and subsequently incorporated additional habitat offsets within the lowland dry critical habitat. The extent to which future developments will incorporate sufficient habitat offsets to avoid adverse effects on critical habitat in the baseline, or whether this conservation will be driven by the critical habitat designation, is uncertain.

3.4 ASSUMPTIONS AND LIMITATIONS

145. Exhibit 3-10 describes the key assumptions relied upon in the development projects analysis and the influence of those assumptions on the results of the analysis.

EXHIBIT 3-10. KEY ASSUMPTIONS ASSOCIATED WITH THE ESTIMATED INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION TO DEVELOPMENT ACTIVITIES

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS OF QUANTIFIED IMPACTS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
<p>The effect of critical habitat designation on recommendations to offset permanent habitat disturbance will be the additional specification that offsets occur within the disturbed critical habitat unit, or a critical habitat unit of the same habitat type. Critical habitat designation is unlikely to change the habitat offset ration recommended by the Service or generate other conservation recommendations.</p>	<p>May result in an underestimate of costs.</p>	<p>Potentially major. While the Service anticipates that the most likely change in conservation recommendations will be the additional specification that habitat offsets occur within the affected critical habitat unit, or within critical habitat of the same type, final recommendations to avoid adverse effects on critical habitat will depend upon the specific nature of the proposed project and will be made as part of future consultation on the project. Whether this additional specification generates additional costs of critical habitat designation is uncertain, as: 1) projects may already plan to offset habitat disturbance within the affected unit even absent critical habitat designation; or 2) the difference in cost between offsetting habitat disturbance outside versus inside of the unit may be negligible. For the two projects identified in this analysis, critical habitat designation changed the location of habitat conservation measures for one.</p>
<p>The extent to which critical habitat designation changes the way the State or county manage the land in the future (e.g., through districting, zoning, or permitting) is uncertain.</p>	<p>May result in an underestimate of costs.</p>	<p>Potentially major. Conversations with State and county regulatory and planning agencies indicate that critical habitat is unlikely to change the way the land area is managed (e.g., to preclude or restrict development activities). We recognize, however, the potential for third party lawsuits or other actions that may assert that these areas should be incorporated into conservation areas due to the presence of critical habitat for the Maui Nui species. To the extent that critical habitat results in limitations on land use activities due to changes in State and county management of the land, this analysis underestimates potential economic impacts.</p>

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS OF QUANTIFIED IMPACTS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
<p>This analysis relies on information from Maui County’s Department of Planning regarding currently proposed projects.</p>	<p>May result in an underestimate of costs.</p>	<p>Potentially major. To the extent that more projects may occur within the ten year timeframe of this analysis, the analysis may underestimate potential impacts to development activities. In addition, we highlight areas that may be subject to development in the future although, currently, project plans do not exist. These areas were identified by speaking with Maui County’s Department of Planning and through public comments submitted on the Proposed Rule. To the extent that additional areas within the proposed critical habitat area may support future development, our analysis may underestimate the area over which critical habitat may affect development activities.</p>

CHAPTER 4 | ENERGY PROJECTS

146. This chapter assesses the potential impacts of designating critical habitat for the Maui Nui species on the development of renewable energy projects. Existing renewable energy facilities in Maui Nui include wind, ocean thermal, wave, geothermal, biofuel, and waste-to-energy projects. As Hawaii focuses on gaining more energy independence, the number of energy projects, particularly renewable energy developments, is expected to increase over time. Similar to development projects described in Chapter 3, energy projects have the potential to impact critical habitat through direct ground disturbance associated with construction.
147. This evaluation of the potential impacts of critical habitat designation on energy projects applies the following method:
- Identify currently planned energy projects across the proposed critical habitat area;
 - Identify baseline regulations of energy developments that provide conservation protection to the Maui Nui species within the proposed critical habitat area;
 - Determine whether critical habitat is likely to generate additional conservation recommendations or otherwise change the scope or scale of the proposed projects;
 - Quantify:
 - i. Incremental administrative costs of consultation on the identified projects; and
 - ii. Any incremental conservation efforts.

KEY ISSUES AND CONCLUSIONS OF THE ENERGY PROJECTS ANALYSIS

Quantified Impacts:

For areas proposed for critical habitat designation, we estimate a total present value impact of \$10,000 over the next ten years across two units (an annualized impact of \$1,000, seven percent discount rate) for consultations regarding energy projects. Impacts on energy projects in areas being considered for exclusion are expected to be \$5,000 across two units (an annualized impact of \$700, seven percent discount rate). These costs reflect additional administrative effort to consider critical habitat designation as part of formal consultation on three proposed energy developments in Maui Nui.

Unquantified Impacts:

Uncertainty exists regarding whether the energy projects identified in this section will adversely modify critical habitat. Conservation measures undertaken for these projects even absent critical habitat designation most likely result in the project avoiding adverse effects on Maui Nui critical habitat. Consequently, it is unlikely the identified projects will be affected by the designation beyond the quantified administrative impacts.

Geographic Distribution of Impacts:

Impacts are expected for future energy projects planned on Maui, Molokai, and Lanai. Energy developments are not expected to occur on Kahoolawe.

Key Uncertainties:

This analysis relies on information from the Hawaii State Energy Office regarding currently proposed projects. These include projects that are just beginning the scoping phase, to projects that have begun initial development and are expected online in the next few years. Because of the length of time required to develop an energy project, from initial due diligence to coming online, we anticipate this list of projects is reflective of the energy projects that may be subject to consultation regarding Maui Nui critical habitat over the next ten years. We note, however, that some of these projects may not come to fruition and others may be proposed over the timeframe of this analysis. To the extent that more projects may be subject to consultation in this timeframe, our analysis underestimates potential administrative impacts of consultation on energy projects.

We conclude that compliance with existing regulations and permits most likely avoids potential impacts of future energy projects on Maui Nui critical habitat, and therefore that it is unlikely that additional conservation measures will be recommended due to critical habitat designation. To the extent that future projects do not incorporate conservation measures sufficient to avoid potential adverse effects on critical habitat, and the Service recommends additional conservation be implemented, this analysis underestimates impacts of the designation on energy projects. Even in the case that incremental conservation is recommended, the Service anticipates the recommended project modifications would be limited to ensuring habitat offsets for permanently disturbed habitat occur within the proposed critical habitat unit (as described in Chapter 3). It is not likely that critical habitat designation would preclude an energy project from being developed.

4.1 INTRODUCTION AND REGULATORY OVERVIEW

148. Hawaii has a long history of renewable energy use from the sugar cane industry as bagasse was burned to generate electricity. However, all but one of the plantations have closed, and the State is now highly dependent on imported oil for generating electricity. Hawaii has placed increased focus on renewable energy developments in recent years.¹²⁹ In 2008, the Hawaii Clean Energy Initiative (HCEI) was founded based on a Memorandum of Understanding between the State of Hawaii and the U.S. Department of Energy (DOE). HCEI comprises a variety of working groups with representation from Federal, State, and local government, not-for-profit organizations, private companies, and

¹²⁹ State of Hawaii Department of Business, Economic Development and Tourism, Research and Economic Analysis Division. Economic Report 2011: Renewable Energy in Hawaii. June 2011.

trade associations. The primary objective of HCEI is to chart a strategy for Hawaii to reach a stated goal of 70 percent clean energy by 2030. With respect to electricity development, the HCEI plans for 40 percent of electricity demand to be met through renewable sources of energy by 2030.¹³⁰

149. In addition to the HCEI objectives, the State of Hawaii is subject to regulated Renewable Portfolio Standards (RPS). The State's RPS goals were codified into enforceable law in 2004 via the passage of Act 95.¹³¹ In 2009, following the inception of HCEI, Act 155, expanded the State's enforceable RPS, specifically codifying the HCEI goals with respect to net electricity sales by renewable sources.¹³²
150. Since the establishment of HCEI and Act 155, renewable energy projects have been proposed or developed across the islands of Hawaii. While the contribution of renewables is growing, meeting the HCEI goals and enforceable RPS will require development of more renewable energy sources over time.
151. Multiple Federal and State regulations and programs affect the development and operation of energy projects and provide protection to the Maui Nui species and their habitat. This section describes current regulation of renewable energy developments.
152. The National Environmental Policy Act (NEPA) requires that all Federal agencies conduct a detailed environmental impact statement (EIS) in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. Through its requirement to consider alternatives, the NEPA process may provide protection to listed species and their habitats through evaluation of appropriate conservation actions associated with planned energy developments.
153. To guide the development of renewable projects and transmission of the energy produced, the State of Hawaii and the DOE developed the Hawaii Interisland Renewable Energy Program (HIREP) in 2010. The focus of the HIREP was on identifying locations on Maui, Lanai, and Molokai for renewable energy generation, and the transmission of this energy to Oahu.¹³³ The program was subject to environmental review under the Hawaii Environmental Protection Act (Hawaii Administrative Rule, Title 11, Department of Health, Chapter 200; and HRS Chapter 343); NEPA (42 U.S.C. 4321-4370h); and the White House Council of Environmental Quality regulations (40 C.F.R. Parts 1500-1508), which implement the requirements of NEPA.¹³⁴
154. Based on comments received during the scoping phase of the HIREP NEPA process, the DOE and State of Hawaii decided to broaden the focus of the action, and develop a

¹³⁰ Hawaii Clean Energy Initiative. 2011. HCEI Road Map.

¹³¹ Act 95, Session Laws of Hawaii, 2004.

¹³² Act 155, Session Laws of Hawaii, 2009.

¹³³ AECOM. April 2012. Hawaii Interisland Renewable Energy Program (HIREP): Background Information. Prepared for: State of Hawaii, Department of Business, Economic Development and Tourism, Strategic Industries Division.

¹³⁴ AECOM. April 2012. Hawaii Interisland Renewable Energy Program (HIREP): Reference Information. Prepared for: State of Hawaii, Department of Business, Economic Development and Tourism, Strategic Industries Division.

program focused on all renewable energy projects across Hawaii. In August 2012, the DOE published an Amended Notice of Intent to prepare the Hawaii Clean Energy Programmatic Environmental Impact Statement (PEIS) under NEPA. The DOE is the lead Agency and the State of Hawaii and Federal Bureau of Oceans and Energy Management (BOEM) are cooperating agencies in the PEIS. The PEIS will not evaluate specific projects or eliminate the need for project-specific environmental review. The PEIS does, however, propose to develop guidance, including potential mitigation measures, which DOE can use in making decisions about future funding or other actions to support Hawaii in achieving renewable energy objectives. The PEIS is currently in the scoping phase and a draft is expected to be made available to the public for comment in 2013.¹³⁵

155. The PEIS will specifically address mitigating potential effects of the developments on biological resources. The PEIS will rely in part on analysis undertaken in the development of the HIREP, as described in a report developed by AECOM (“AECOM Report”), to identify potential effects on biological resources, and recommendations for conservation and construction measures. Relevant to Maui Nui conservation the AECOM Report specifies:

“Prior to any vegetation impacts and/or soil disturbance activities, the construction footprint (i.e., all permanently and temporarily disturbed areas as a result of the construction) and immediately adjacent areas should be surveyed to determine if threatened and endangered plants or vegetation or habitats used by protected fauna are within or adjacent to the site. If present, construction plans should be evaluated to minimize impacts to the vegetation.”¹³⁶

156. The AECOM Report makes the following additional recommendations that would likely provide protection to the essential features of Maui Nui critical habitat with respect to construction of the undersea cable transmission system.

Conservation measures for terrestrial/coastal biological resources, species, and habitat:

- Alternative landing site areas should be investigated for presence of threatened and endangered species and their habitat. Impacts to habitats for threatened or endangered species should be avoided;
- Control sediment erosion and turbidity discharges;
- Investigate alternative landing site areas for presence of wetlands or threatened and endangered species and their habitat;
- Avoid dredging, the placement of fill in open waters, or altering drainage courses;

¹³⁵ 77 FR 47828-47831.

¹³⁶ AECOM. April 2012. Hawaii Interisland Renewable Energy Program (HIREP): Reference Information. Prepared for: State of Hawaii, Department of Business, Economic Development and Tourism, Strategic Industries Division. Section 3.14.

- Give preference to landing site areas in developed areas or locations where vegetation has been disturbed.¹³⁷

157. While the AECOM Report currently provides these conservation measures as recommendations, it is likely the recommendations will be incorporated into design of future projects under the current Hawaii Clean Energy PEIS.

158. In addition, multiple Federal and State permits and approvals are likely to be required for the development of energy projects. The following is a partial list of Federal and State laws and regulations that are likely required of the renewable energy projects. In addition to those described above, these laws and regulations, in particular, are likely to require consideration of effects on Maui Nui species and their habitat.

Federal Laws and Regulations

- Clean Water Act
- Fish and Wildlife Conservation Act
- Solid Waste Disposal Act
- Watershed Protection and Flood Prevention Act, as amended

Hawaii State Statutes and Administrative Rules

- Coastal Zone Management, HRS Chapter 205A
- Conservation District, HRS Chapter 183C
- Environmental Response Law, HRS Chapter 128D
- Hawaii's Endangered Species Act, HRS Chapter 195D
- Natural Area Reserve Systems, HRS Chapter 195
- Solid Waste Disposal, HRS Chapters 342G, 342H, 342I, 349
- State Land Use Law, HRS Chapter 205

4.2 SCOPE AND SCALE OF RENEWABLE ENERGY PROJECTS WITHIN PROPOSED CRITICAL HABITAT

159. To keep pace, not only with the HCEI goals for renewable energy production, but also with the concurrent increased demand for energy in Hawaii, multiple types of renewable projects are currently in the early planning and scoping stages across the islands of Hawaii. To inform this analysis, the Hawaii State Energy Office provided information on planned and ongoing renewable energy projects that may affect critical habitat designation for the Maui Nui species. Overall, the State Energy Office identified eight projects that are in the planning or early development stages (i.e., from conducting initial due diligence to planning to commence development) that are proposed on Maui Nui.

¹³⁷ AECOM. April 2012. Hawaii Interisland Renewable Energy Program (HIREP): Reference Information. Prepared for: State of Hawaii, Department of Business, Economic Development and Tourism, Strategic Industries Division. Section 3.14.

Based on the location, status, and specific circumstances of the projects, this analysis identifies three of these eight projects that may overlap the proposed critical habitat area and therefore be subject to consultation considering potential effects on Maui Nui critical habitat. Exhibit 4-1 summarizes the status of these proposed projects. Of note, this list is current as of August 2012; however, the new projects are being proposed regularly and, thus, this list is subject to change, even in the short term. This list, however, represents the best available information regarding potential energy projects overlapping the proposed critical habitat area.

EXHIBIT 4-1. PROPOSED ENERGY PROJECTS IN MAUI NUI

PROJECT NAME (DEVELOPER)	OVERLAPPING CRITICAL HABITAT UNIT(S)	PROJECT DESCRIPTION	EXPECTED PRODUCTION LEVEL (MW)	EXPECTED YEAR OF COMPLETION (PROJECT STATUS)
PROPOSED PROJECTS ON MAUI				
Ulupalakua Geothermal (ORMAT)	Maui Montane Mesic 1, Maui Subalpine 1	GEOTHERMAL ENERGY: ORMAT has obtained DOE funding, filed an EISPN, and is conducting initial due diligence on a geothermal energy production facility occurring on Ulupalakua Ranch and adjacent State lands. Overlaps Maui Montane Mesic Unit 1 and Maui Subalpine Unit 1.	24 MW	Unknown (initial due diligence)
PROPOSED PROJECTS ON MOLOKAI				
Molokai Renewables Wind Project (Pattern Energy/Group LP/Bio- Logical Capital LLC)	Molokai Coastal 2	WIND ENERGY: Proposed wind farm in early planning stages on Molokai, located on Molokai Ranch, near Molokai Lowland Dry Unit 1 and Molokai Coastal Unit 1. Energy would be transmitted to Oahu via an undersea transmission cable that may potentially run through Molokai Coastal Unit 2.	200 MW	Unknown (initial due diligence)
PROPOSED PROJECTS ON LANA'I				
Lanai Wind Project (Castle and Cooke)	Lanai Lowland Mesic Unit 1	WIND ENERGY: Despite the sale of Lanai in 2012, Castle and Cooke retained the rights to a proposed wind farm on the northwest side of Lanai. Overlaps portions of Lanai Lowland Mesic Unit 1. Power would be transmitted to Oahu via an undersea transmission cable.	200 MW	Unknown (initial environmental reporting has been undertaken)
Source: Information on proposed energy developments in Maui Nui provided by the Hawaii State Energy Office on August 24, 2012.				

4.3 ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION ON ENERGY PROJECTS

160. This analysis focuses on the potential economic impacts of critical habitat designation on the reasonably foreseeable energy projects identified in Exhibit 4-1. Additional projects proposed within the coming years would not be likely to begin development and operation for several years, due to the NEPA compliance requiring due diligence and scoping.

4.3.1 POTENTIAL FOR CRITICAL HABITAT TO GENERATE INCREMENTAL CONSERVATION MEASURES

161. The Service describes the likely baseline conservation measure recommendations for renewable energy projects in Maui Nui, as described in Exhibit 4-2. The Service expects to recommend these conservation measures regardless of the critical habitat designation for the Maui Nui species.

EXHIBIT 4-2. BASELINE CONSERVATION MEASURES ASSOCIATED WITH ENERGY PROJECTS

BASELINE CONSERVATION MEASURES
PROJECT MODIFICATIONS CURRENTLY RECOMMENDED TO AVOID JEOPARDY TO LISTED PLANTS
Avoidance of destruction of individual listed plants.
Avoidance of destruction of habitat for listed plants.
Controlling feral ungulates, seed predators, non-native species, and wildfire.
Offsetting destruction of listed plants, including propagating, outplanting and conserving the plants elsewhere such that no net reduction to the species' range or numbers results from the project.
PROJECT MODIFICATIONS CURRENTLY RECOMMENDED TO AVOID JEOPARDY TO LISTED FOREST BIRDS
Avoidance of destruction of individual birds, active nests, and eggs.
Avoidance of destruction of habitat for listed forest birds.
Controlling feral ungulates and non-native plant species.
Offsetting destruction of forest bird habitat, including conservation and restoration (e.g., fencing, removal of feral ungulates, control of nonnative plants, control of rats, planting of native species) of habitat elsewhere within the range of the species.
Egg collection, hatching, rearing, and introduction of juveniles into protected, good-quality native habitat.
Captive rearing and reintroduction into protected, good-quality native habitat.
PROJECT MODIFICATIONS CURRENTLY RECOMMENDED TO AVOID JEOPARDY TO LISTED TREE SNAILS
Avoidance of destruction of individual snails and their habitat.
Offsetting adverse impacts to individual snails or their habitat including conserving listed snails or restoring and conserving, in perpetuity, snail habitat. Snail conservation actions could include propagating the listed snails and native plants and managing snail populations and snail habitat in areas that are restored to good-quality native habitat and protected from snail predators (including mongoose, rats, and predatory snails), ungulate browsing, wildfire, competition from invasive species, and other disturbances.
Source: U.S. Fish and Wildlife Service to Industrial Economics, Inc. January 4, 2013. Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui).

162. As described in Chapter 2, where the listed Maui Nui species or Blackburn's sphinx moth are present, the incremental effects of critical habitat are likely limited to the difference in cost of siting habitat offsets within the critical habitat unit affected, or within critical habitat of the same type, as opposed to elsewhere in the region. Where the units are not occupied by the Maui Nui species or other listed species, such as the Blackburn's sphinx moth, the cost of the incremental conservation associated with the designation would be the total cost associated with acquiring and managing the habitat offsets.
163. As described in Section 4.1, however, energy projects would likely be managed to avoid adversely affecting the Maui Nui critical habitat regardless of critical habitat designation. The Hawaii Clean Energy PEIS specifies surveying project areas for threatened and endangered plants and avoiding impacts to endangered species and the habitats that support them. The recommendation to avoid impacts on listed species and their habitats would likely be sufficient to avoid the need for conservation recommendations as a result of section 7 consultation. In other words, if managed according to the Hawaii Clean Energy PEIS recommendations, energy projects are not likely to cause potential adverse modification of critical habitat for the Maui Nui species. It is likely that energy projects will be managed to avoid adverse modification of critical habitat for the Maui Nui species even absent the designation.
164. According to the Service, the three energy projects identified in Exhibit 4-1 will result in consultation. However, we do not expect critical habitat designation will generate recommendations for additional conservation measures associated with these projects.

Molokai Renewables Wind Project (MRWP)

165. The MRWP is a wind energy project in the early planning stages, located on the island of Molokai. Construction for the project is not expected to begin until 2018.¹³⁸ The developer, Pattern Energy, LLC, is proposing to construct wind turbines, access roads, a high voltage DC converter station, and transmission cables on lands owned by Molokai Ranch.¹³⁹ While the exact location and extent of ground disturbance related to the project is uncertain at this time, it is expected that turbines, access roads, and the converter station will be located north of Molokai Lowland Dry Unit 1 and inland from Molokai Coastal Unit 1 but will not occur within the units themselves.¹⁴⁰ Several potential alternative locations are being considered for the transmission cable, which will transmit electricity produced on Molokai to Oahu, including areas in Molokai Coastal Unit 2.¹⁴¹
166. Although there are no current plans for the MRWP to overlap Maui Nui proposed critical habitat, siting of the MRWP is in the early planning stages and is highly uncertain, and

¹³⁸ Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

¹³⁹ Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

¹⁴⁰ Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

¹⁴¹ Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

the potential for overlap exists. However, in conversations with Pattern Energy regarding potential economic impacts to the MRWP, representatives from the company indicated that they expect minimal effects of the proposed critical habitat on the siting of their project, including cabling operations.¹⁴² According to the firm, any potential MRWP facilities located in proposed critical habitat would be relocated to avoid impacts to critical habitat with no increase in the price or production cost of energy (i.e. no quantifiable economic impacts).¹⁴³

167. In addition, as described above, even absent critical habitat designation, the Hawaii Clean Energy PEIS provide strong baseline regulatory protections, requiring that energy projects avoid effects on listed species and their habitats. Accordingly, we do not anticipate incremental project modifications related to the MRWP. As discussed above, this project will likely result in a section 7 consultation regarding potential impacts to Molokai Coastal Unit 2. Due to the significant level of planning and review required for energy projects, and their potential effects on Maui Nui species and their critical habitat, we anticipate this consultation will most likely be formal. Potential incremental administrative costs are described in Section 4.3.2.

Lanai Wind Project (LWP)

168. Castle & Cooke is proposing to install approximately 67 wind turbines on lands on the northwest portion of Lanai. The LWP would generate 200 MW to 400 MW of wind energy to be transmitted to Oahu by undersea cable.¹⁴⁴ The wind turbines would span a total area of approximately 7,000 acres, including five turbines and access roads on a small portion of Lanai Lowland Mesic Unit 1.¹⁴⁵
169. As the LWP is currently in early planning stages, the exact locations of structures and access roads generating ground disturbance remains uncertain. It is unlikely, however, that the project will be subject to additional conservation due to the critical habitat designation for the following reasons:
- Castle & Cooke have indicated that the project will have a very limited physical footprint and only affect poor quality habitat. Castle & Cooke suggest the area that they are planning for construction of this project is unlikely to contain the physical and biological features of critical habitat for the Maui Nui species due to the existing level of degradation.
 - The level of ground disturbance associated with the project will be limited as all access roads associated with the LWP will be located on existing roadways.¹⁴⁶ Additionally, according to the Service, impacts from the installation of wind

¹⁴² Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

¹⁴³ Personal communication with Christian Hackett, Pattern Energy, Manager of the Molokai Renewables Wind Project, on September 17, 2012.

¹⁴⁴ Written communication with Richard Mirikitani, legal counsel for Castle & Cooke, on October 4, 2012.

¹⁴⁵ Written communication with Richard Mirikitani, legal counsel for Castle & Cooke, on October 4, 2012.

¹⁴⁶ Written communication with Richard Mirikitani, legal counsel for Castle & Cooke, on October 4, 2012.

turbines are, in general, minor, due to the limited project footprint of a wind turbine tower.¹⁴⁷

- Even in the case that the level of ground disturbance constitutes adverse modification, the project would already be subject to considerable conservation measures as identified by the Hawaii Clean Energy PEIS. It is therefore likely the project would avoid adverse modification of Maui Nui critical habitat even absent the designation.

170. This analysis therefore expects that the effects of critical habitat will be limited to incremental administrative effort as part of a future formal section 7 consultation on this project, as described in Section 4.3.2.

Ulupalakua Geothermal Project (UGP)

171. ORMAT Technologies, Inc., based in Nevada, is a geothermal power plant developer. ORMAT has filed an EIS Preparation Notice (EISPN) related to the UGP, located on Ulupalakua Ranch and State-owned lands adjacent to Ulupalakua Ranch on the southern tip of Maui.¹⁴⁸ The UGP received DOE funding for this project.¹⁴⁹ According to the action area described in the EISPN for Ulupalakua Geothermal Mining Lease, it is likely that only portions of the currently operational “Geothermal Resource Subzone” (GRS) overlap proposed critical habitat.¹⁵⁰ The extent to which the project may affect critical habitat is therefore uncertain. Furthermore, as described in the Proposed Rule, Ulupalakua Ranch lands are being considered for exclusion from critical habitat due to the existing management of the land.
172. For the reasons discussed above for the LWP, it is most likely that the UGP will avoid adverse modification of critical habitat for the Maui Nui species, even absent the designation. This is due to the limited overlap of the project with the proposed critical habitat area, and the expected management of these projects as described by the PEIS. According to the PEIS, the DOE intends to avoid impacts of renewable energy projects on listed species and habitats even absent critical habitat designation.
173. We anticipate a formal consultation will occur considering potential effects of this project on listed species and habitats, including Maui Nui critical habitat, as described in Section 4.3.2.

4.3.2 ADMINISTRATIVE COSTS

174. Exhibit 4-3 summarizes the expected number of consultations on energy projects by unit based on the projects described in in this section. Due to the significant level of planning and review required for these projects, and their potential effects on Maui Nui species and

¹⁴⁷ Personal communication with the Service on August 21, 2012.

¹⁴⁸ Environmental Impact Statement Preparation Notice for Ulupalakua Geothermal Mining Lease and Geothermal Resource Subzone Modification Application, Island of Maui. TMMs: 2-1-009:001; 2-1-004:006, 016-029. 032-035, 049, 071, 106-107.

¹⁴⁹ Personal communication with the Hawaii State Energy Office on August 24, 2012.

¹⁵⁰ Environmental Impact Statement Preparation Notice for Ulupalakua Geothermal Mining Lease and Geothermal Resource Subzone Modification Application, Island of Maui. TMMs: 2-1-009:001; 2-1-004:006, 016-029. 032-035, 049, 071, 106-107.

their critical habitat, we anticipate these consultations will most likely be formal. The administrative costs of consultation on the UGP are divided between two units as the project has the potential to overlap these two units. Of note, the Ulupalakua Ranch lands that will support this project are being considered for exclusion from critical habitat.

EXHIBIT 4-3. PROJECTED ENERGY CONSULTATION ACTIONS (2013-2022)

UNIT	FORMAL CONSULTATIONS
AREAS PROPOSED FOR DESIGNATION	
Molokai Coastal Unit 2	1
Lanai Lowland Mesic Unit 1	1
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION	
Maui Montane Mesic Unit 1	0.5
Maui Subalpine Unit 1	0.5
Source: Information on proposed energy developments in Maui Nui provided by the Hawaii State Energy Office on August 24, 2012.	

175. To calculate administrative costs, we multiply the expected number of consultations in each unit by estimated per-consultation administrative costs presented in Exhibit 2-2. Exhibit 4-4 summarizes the total present value impacts of Maui Nui critical habitat designation on future energy projects. As all three energy projects have entered the permitting process, the analysis assumes that each project will be required to consult the Service when critical habitat is finalized in 2013. Overall, this analysis finds that total present value impacts to energy projects in areas proposed for critical habitat designation amount to \$10,000 over the next ten years (or \$1,000 on an annualized basis). Impacts on energy projects in areas being considered for exclusion are expected to be \$5,000 (present value). The relatively low level of impact on energy projects reflects two factors: 1) the limited number of future projects identified within or affecting the proposed critical habitat area; and 2) the likely substantial level of conservation incorporated into future energy projects even absent Maui Nui critical habitat designation.

EXHIBIT 4-4. PRESENT VALUE ADMINISTRATIVE IMPACTS TO ENERGY PROJECTS, 2013-2022
(\$2013)

UNIT	TOTAL PRESENT VALUE (7% DISCOUNT RATE)	ANNUALIZED (7% DISCOUNT RATE)
PROPOSED FOR DESIGNATION		
Molokai Coastal Unit 2	\$5,000	\$700
Lanai Lowland Mesic Unit 1	\$5,000	\$700
Total Proposed for Designation	\$10,000	\$1,000
IDENTIFIED FOR POTENTIAL EXCLUSION		
Maui Montane Mesic Unit 1	\$2,000	\$300
Maui Subalpine Unit 1	\$2,000	\$300
Total Identified for Potential Exclusion	\$5,000	\$700
<p>Note: Forecast costs are based on information on proposed energy developments in Maui Nui provided by the Hawaii State Energy Office on August 24, 2012. The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.</p>		

4.4 ASSUMPTIONS AND LIMITATIONS

176. Exhibit 4-5 describes the key assumptions relied upon in the energy projects analysis and the influence of those assumptions on the results of the analysis.

EXHIBIT 4-5. ASSUMPTIONS AND LIMITATIONS

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
The currently planned projects described in Exhibit 4.1 are reflective of the level of activity for energy development in the proposed critical habitat in the foreseeable future.	May result in an underestimate of costs.	Likely minor. While it is possible that renewable energy project demand will increase in the future, the only costs of critical habitat on these activities are expected to be administrative in nature. To the extent that additional projects are proposed that are subject to consultation, this analysis underestimates the administrative effort of considering effects of the projects on critical habitat.
Existing regulation and management of renewable energy projects most likely avoids the potential for the projects to adversely modify Maui Nui critical habitat.	May result in an underestimate of costs.	Likely minor. While we recognize this as a key assumption of the analysis, the substantial regulatory baseline for renewable energy projects in Hawaii make it unlikely that critical habitat designation will generate the need for additional conservation measures for the Maui Nui species.

CHAPTER 5 | GRAZING AND FARMING ACTIVITIES

177. Over the past several decades as Hawaii's economy has grown, plantation agriculture (pineapple and sugarcane) has declined throughout the Hawaiian Islands. Large tracts of former agricultural lands have been converted into grazing land, residential or commercial development, or left fallow. Historical agricultural land use has resulted in limited native vegetation occurring below 2,000 feet throughout the main Hawaiian Islands, negatively affecting the ecosystems in these areas.¹⁵¹
178. In general, most of the proposed critical habitat area for the Maui Nui species is likely to be unsuitable for grazing or farming due to the rugged mountain terrain and limited access. In addition, much of the existing pasture and cropland does not support the physical and biological features of critical habitat for the Maui Nui species and is therefore not included in the proposed designation. Some portions of the proposed critical habitat, however, do overlap existing ranches and farms, primarily on the Island of Maui. This chapter addresses the potential impacts of critical habitat designation for the Maui Nui species on grazing and farming activities in the study area.
179. Cattle consume vegetation and trample roots and seedlings, which may cause erosion and create disturbed areas that attract nonnative vegetation. Forest habitat that is grazed by cattle degrades to grassland pasture that does not support diverse, native species. These activities may negatively affect five of the ecosystems on which the Maui Nui species depend: the lowland dry, lowland mesic, lowland wet, montane mesic, and montane wet ecosystems.¹⁵² Cattle grazing also provides a benefit by reducing dry summer vegetation, limiting spread of wildfire.
180. Farming is more limited activity and has been declining in recent years. Past farming activities have negatively affected the coastal, lowland dry, lowland mesic, and lowland wet ecosystems.¹⁵³
181. This chapter discusses the scope and scale of grazing and farming activities across the proposed critical habitat area to identify for the Service where these land use activities are occurring and by extension, where existing economic activity may be affected by the designation. This chapter then evaluates how these activities may be affected by critical habitat designation for the Maui Nui species, assessing whether the designation may: a) directly generate additional regulatory requirements on these activities; and b) more indirectly affect these activities, for example in the case that the designation is viewed as

¹⁵¹ 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.

¹⁵² 77 FR 34487.

¹⁵³ 77 FR 34485.

a risk to future economic opportunities on these lands. This discussion relies on our communication with key stakeholders, including the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the Hawaii Cattlemen's Council, Inc. (HCC), the Hawaii Farm Bureau, the State of Hawaii Office of Planning, and the DLNR.

KEY ISSUES AND CONCLUSIONS OF THE GRAZING AND FARMING ANALYSIS

Unquantified Impacts:

Direct impacts of critical habitat designation (i.e., impacts generated by section 7 consultation and associated conservation recommendations) are expected to be minor. The only section 7 consultations that occur on farming and grazing activities are associated with Federal assistance programs that generally support ecologically beneficial projects. While the future locations and frequency of these consultations is uncertain, the consultations are expected to be informal and result in minimal incremental effort to consider critical habitat.

The focus of this analysis is therefore on evaluating the potential indirect effects of the designation (i.e., not generated by section 7 consultation) on farming and grazing, including:

- A change in the way the State or county manages and permits activities;
- Perceptual effects on land values;
- Limitations on the ability of ranch owners to diversify land use; and
- Increased vulnerability to lawsuits regarding the management of the land.

Significant uncertainty regarding the potential for these types of effects, as well as data regarding the magnitude of the effects, precludes our ability to reliably monetize the indirect impacts. We present a qualitative discussion of the potential indirect impacts, however, and identify those land parcels that may be vulnerable to the potential incremental impacts.

Geographic Distribution of Potential Impacts:

Cattle grazing is a commercial activity on the island of Maui; however, limited grazing and farming occurs on Molokai and, to a lesser extent, Lanai.

Grazing activity overlaps 23 of the proposed critical habitat units on Maui, 13 of which are being considered for exclusion (Exhibit 5-5).

Farming activities overlap ten of the proposed critical habitat units on Maui, five of which are being considered for exclusion (Exhibit 5-7).

While uncertainty precludes quantification of the indirect impacts of critical habitat designation, these exhibits identify those areas that may be vulnerable to the categories of the unquantified impacts described above.

Key Uncertainties:

The most significant uncertainties in this analysis are the likelihood that critical habitat designation will generate indirect economic impacts, such as restrictions on land use by the State or county, and reduced property values. Exhibit 5-8 describes the nature of these uncertainties.

5.1 INTRODUCTION AND REGULATORY OVERVIEW

182. While plantation agriculture has declined in terms of total land area in the County of Maui, agricultural activities have been increasing in value in recent years. Total net income for all farms more than doubled between 2002 and 2007, from \$12.3 million to \$25.0 million. Within this same time frame, however, the total land area classified as cropland and grazing land decreased slightly; acres of cropland decreased by approximately ten percent and acres of grazing land by approximately three percent. Furthermore, employment in the agriculture sector dropped approximately 27 percent (from 2,804 hired workers in 2002 to 2,051 in 2007). Despite the increase in total net income for farms in Maui, many agricultural operations continued to struggle over this timeframe. In 2002, approximately 42 percent of operations reported a net loss in income. In 2007, more than half (54 percent) of operations reported a net loss.¹⁵⁴
183. A number of Federal assistance programs support agricultural activities in the County of Maui. The NRCS and the Farm Services Agency (FSA), for example, manage various programs and services offering technical and financial assistance to farm and ranch operators. The NRCS manages a number of voluntary programs to maintain, enhance, and conserve natural resources for farmers, whereas the FSA administers voluntary farm loans, conservation programs, commodity programs, disaster payments, and outreach programs.
184. Data identifying the specific farms participating in these programs are not readily available; however, the 2007 U.S. Census of Agriculture presents data describing the number of farms in Maui Nui that received Federal assistance in 2007. Of the 1,156 total farms reported in Maui Nui, approximately 44 (or 3.8 percent) received some form of Federal assistance in 2007. Government payments to these operations totaled \$688,000 in 2007, an average of \$15,626 per farm.¹⁵⁵
185. These programs are voluntary and constitute a Federal nexus that would compel section 7 consultation in the case that the Federal agency determined the project or activity may affect listed species or critical habitat. Over the past nine years, the Service has participated in approximately 16 consultations considering ranch and farm participation in Federal government programs (one-third of 49 informal consultations that were not internal Service consultations, as described in the Proposed Rule). A fraction of these considered potential effects on existing critical habitat in Maui County.
186. These farming and grazing consultations considered projects and activities supported by NRCS Programs, including the Wetland Reserve Program, Wildlife Habitat Incentives Program (WHIP), and Environmental Quality Incentives Program (EQIP), as well as the FSA's Emergency Conservation Program.¹⁵⁶ Projects included herbicide control of

¹⁵⁴ Industry data cited is from: U.S. Department of Agriculture, National Agricultural Statistics Service, Data and Statistics: County Level Information for 2002 and 2007, accessed at http://www.nass.usda.gov/Data_and_Statistics/ on November 19, 2012.

¹⁵⁵ USDA, 2007 Census of Agriculture, Hawaii State and County Data, Table 5, Page236, accessed at http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Hawaii/ on November 20, 2012.

¹⁵⁶ 77 FR 34588.

invasive species, construction of enclosure fencing to protect native species from domesticated and feral ungulates, and wetland habitat restoration projects. All of the consultations considering farming and grazing activities in Maui Nui were informal consultations and the Service determined all projects and activities were not likely to adversely affect the species or critical habitats involved.

187. As described in Chapter 3, the Hawaii State Land Use Law (Chapter 205, Hawaii Revised Statutes) provides a framework whereby all lands in the State are classified into one of four “districts”: Urban, Rural, Conservation, or Agricultural. Administered by the Land Use Commission, this law focuses on preserving and protecting Hawaii’s lands and encouraging those uses to which lands are best suited. Toward this end, the Agricultural District identifies lands with significant potential for agricultural use, including crop cultivation and raising livestock. These lands are not, however, strictly limited to agricultural use. The law specifies other uses of these lands, including wind energy developments and golf courses in certain Agricultural District areas. In addition, the permitting process for activities on Agricultural District lands allows for “unusual and reasonable” uses to the extent that these uses comply with the objectives of the Land Use Law. Applications for permits for an area of fewer than 15 acres are approved by the county; for larger areas, approval is also required from the Land Use Commission.¹⁵⁷
188. In addition, farming and grazing activities may occur on Conservation District lands. The Conservation District is broken into five subzones: protective, limited, resource, general, and special. These subzones identify varying levels of environmental sensitivity. Landowners can apply for a Conservation District Use Permit (CDUP) to determine if a particular land use, such as grazing or farming, is consistent with the subzone. The State’s “Hawaii Administrative Rules” identify that agricultural use is allowed (with accompanying management plan if more than one acre) in all Conservation District subzones with the exception of “protective.”¹⁵⁸ DLNR approval is required of CDUPs for activities on Conservation District land. The majority of the grazing and farming activities on Maui occur in the Agricultural District. Some grazing land and cropland parcels (identified using Tax Map Keys (TMKs) data) do, however, overlap Conservation District lands as described in Exhibit 5-1 and identified in Exhibits 5-2 and 5-3.¹⁵⁹ Very limited agricultural land use occur in the Urban and Rural District lands. In fact, the acreages of agricultural parcels that overlap the Urban and Rural Districts may host agriculture-related structures that support agricultural activities.

¹⁵⁷ Hawaii Revised Statutes, Chapter 205.

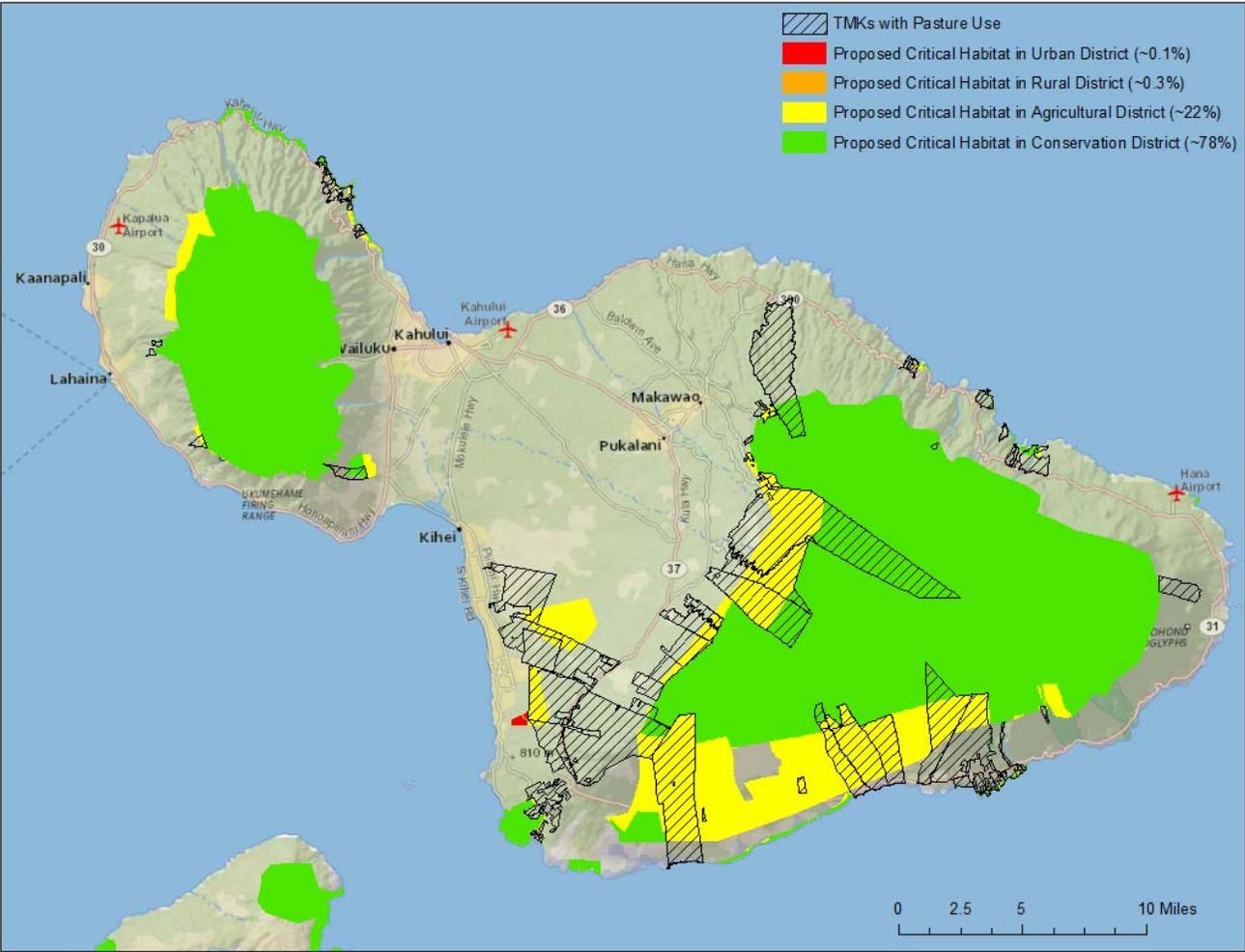
¹⁵⁸ Hawaii Administrative Rules, § 13-5-22 through 13-5-26.

¹⁵⁹ Land parcels are identified on Maui by Tax Map Key number, or “TMK” number.

EXHIBIT 5-1. GRAZING AND FARMING LAND USE BY STATE LAND USE DISTRICT WITHIN PROPOSED CRITICAL HABITAT, MAUI NUI COUNTY

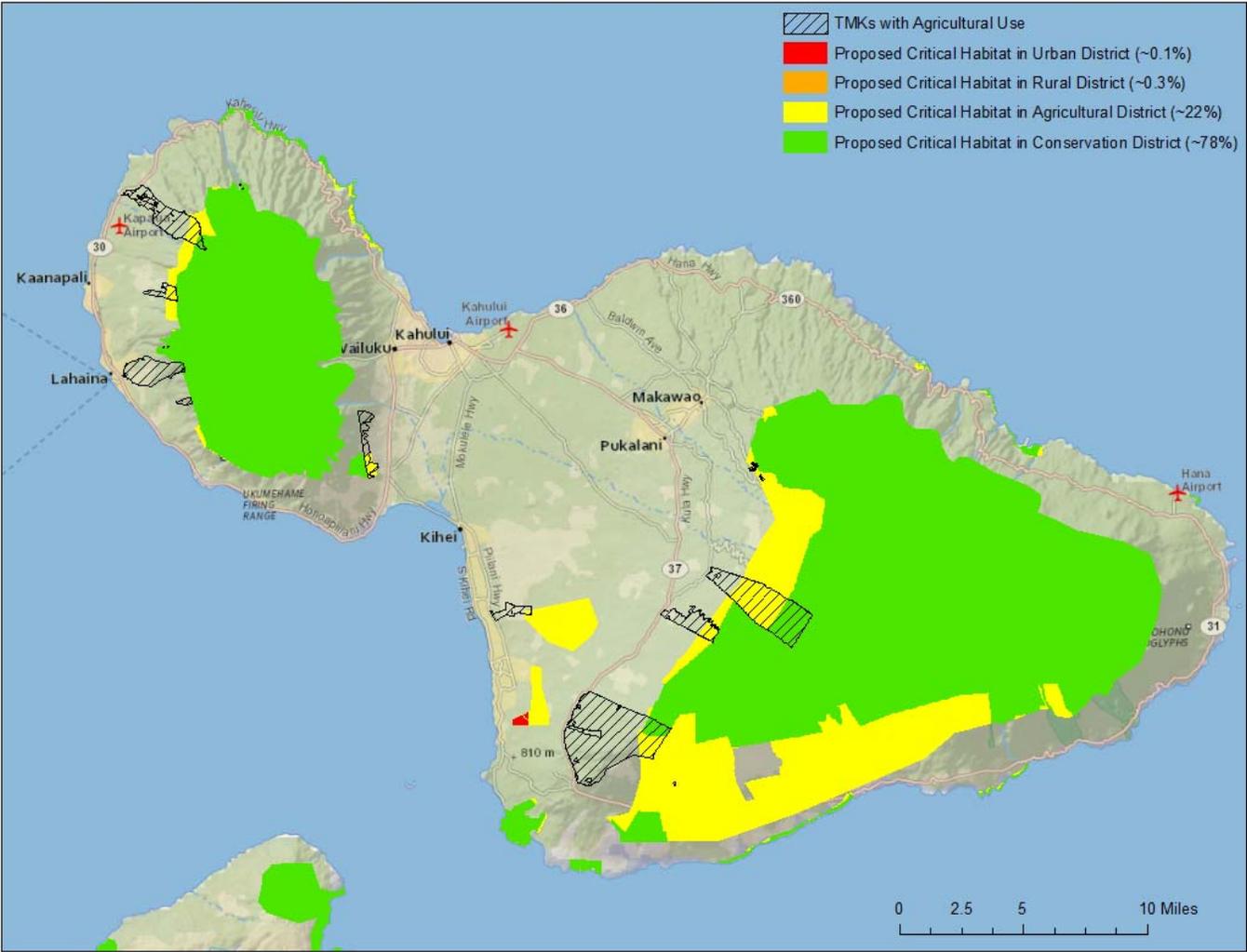
LAND USE IN PROPOSED CRITICAL HABITAT	ACRES WITHIN STATE LAND USE DISTRICTS				TOTAL ACRES
	AGRICULTURAL	CONSERVATION	RURAL	URBAN	
Grazing land	48,292 (79%)	13,058 (21%)	1 (<1%)	6 (<1%)	61,359
Cropland	12,426 (88%)	1,692 (12%)	0 (0%)	0 (0%)	14,117

EXHIBIT 5-2. PARCELS SUPPORTING GRAZING LAND WITHIN PROPOSED CRITICAL HABITAT BY STATE LAND USE DISTRICT



Sources: State of Hawaii, Office of Planning, GIS Program. 2012. State Land Use Districts, updated November 2011. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on November 26, 2012; State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated May 8, 2012. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012; and Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at <http://www.co.maui.hi.us/DocumentCenter/Index/231>.

EXHIBIT 5-3. PARCELS SUPPORTING CROPLAND WITHIN PROPOSED CRITICAL HABITAT BY STATE LAND USE DISTRICT



Sources: State of Hawaii, Office of Planning, GIS Program. 2012. State Land Use Districts, updated November 2011. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on November 26, 2012; State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated May 8, 2012. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012; and Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at <http://www.co.maui.hi.us/DocumentCenter/Index/231>.

5.2 SCOPE AND SCALE OF GRAZING AND FARMING ACTIVITIES WITHIN THE PROPOSED CRITICAL HABITAT AREA

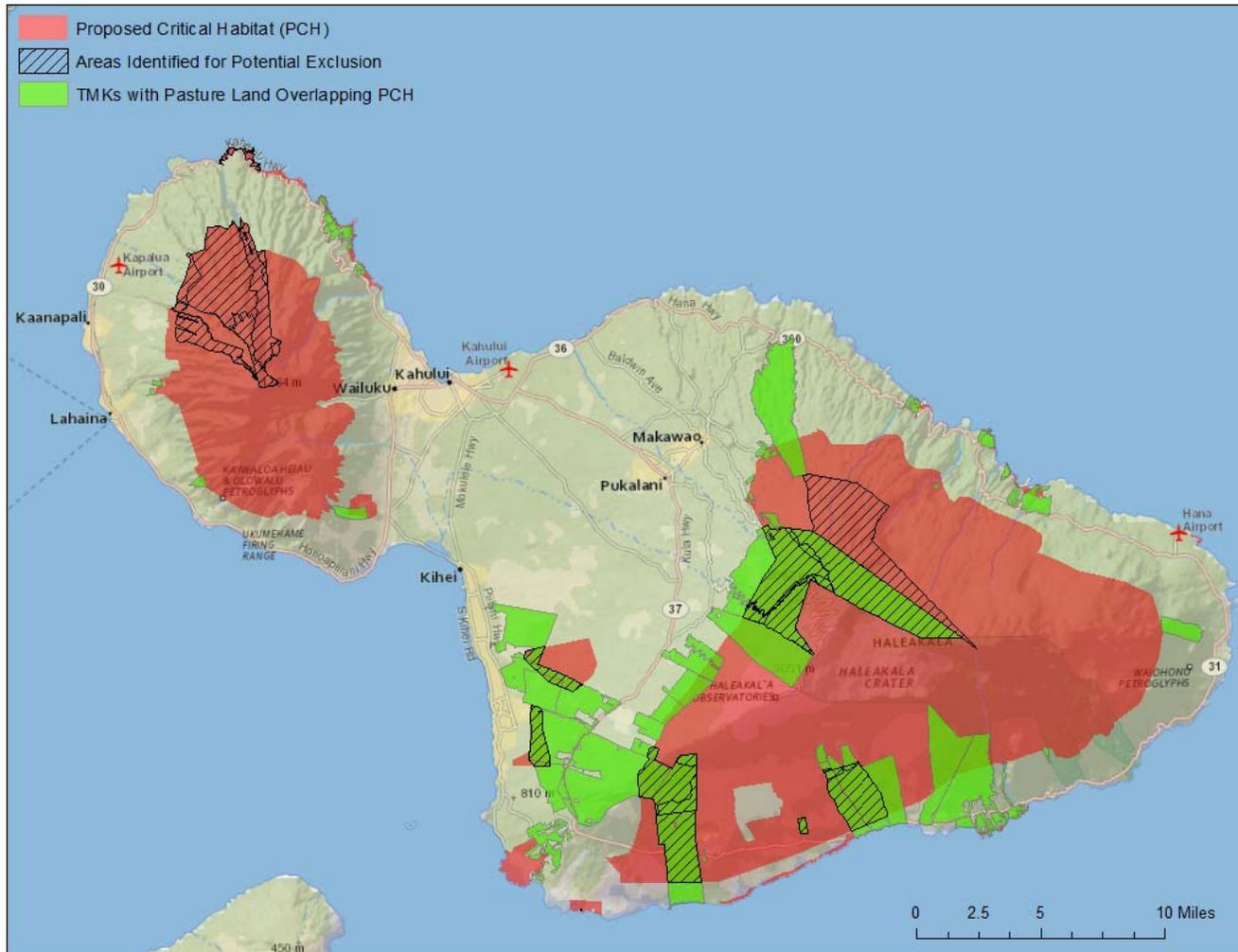
189. As described in the Proposed Rule, the majority of the proposed critical habitat area is most likely unsuitable for development, farming, cattle grazing, or other economic activities due to the rugged mountain terrain and remote location. As a result, there is likely limited overlap between agricultural land uses and proposed critical habitat. This section relies on the best available information to describe the current geographic distribution of grazing and farming activities, and discusses the potential for future expansion of these activities within the proposed critical habitat area.
190. Information is not available to map the locations of current farming and grazing activities except on the Island of Maui. Within the islands of Maui Nui, however, the larger-scale cattle ranches and farms are concentrated on Maui. The remaining islands support limited farming and smaller cattle ranches, and, while some expansion of grazing is possible, significant expansion of these activities is not likely:
- **Molokai:** Considerable irrigated farming occurs on the western part of the island. The landowners of mountain land turned their water rights over to The Nature Conservancy and therefore major expansion of farming into new areas is unlikely. Expansion of cattle grazing is possible, however. In 1986, about 7,000 cattle island-wide grazed on about 57,000 acres on large and small ranches from West Molokai to East Molokai. In 1987, the Molokai cattle the State Department of Agriculture (DOA) mandated eradication of all the cattle on the island due to a threat of bovine tuberculosis. To help revitalize the cattle industry on Molokai, a variety of Federal, State and county agencies funded a state-of-the-art slaughterhouse which began operations in January 2006.¹⁶⁰ Currently, about 35,000 acres on Molokai are used for cattle grazing.
 - **Lanai:** Lanai supports limited farming, including some crop farming. Water resources are scarce on the island and, consequently, major expansion of farming is not expected.
 - **Kahoolawe:** Kahoolawe is managed entirely for conservation land use and does not support farming or grazing developments.
191. Exhibit 5-4 highlights the overlap between (1) parcels that are entirely or partially taxed as “pastureland”; and (2) the proposed critical habitat on Maui. Exhibit 5-5 then summarizes the extent of the overlap of 93 parcels that support grazing across 23 proposed critical habitat units (13 of which are being considered for exclusion). Importantly, the parcels identified as pastureland are not necessarily grazed in their entirety. These parcels are identified by the county as including some grazing land; the extent and location of the grazing activities within the parcels are not mapped. We are therefore unable to discern whether the grazing activities associated with these parcels occur within the proposed critical habitat area and, if so, to what extent. Assuming grazing activity may occur over the entire parcel most likely leads to an overstatement of

¹⁶⁰ Han, L. et al. Sustainable Molokai: Agriculture Needs Assessment . May 2012. Prepared for the Sacharuna Foundation and Hawaii People’s Fund.

the portion of the proposed critical habitat area that supports grazing activities. We highlight these areas, however, as the areas most likely to support grazing activities within the proposed critical habitat.

192. Exhibit 5-6 maps the overlap between existing cropland (“diversified agriculture”) parcels and the proposed critical habitat on Maui; Exhibit 5-7 summarizes the extent of this overlap of 26 parcels that support cropland across ten units. As evidenced by this exhibit, crop farming is a less prevalent activity on Maui than cattle grazing. As noted above for pastureland, the cropland parcels are identified as those parcels supporting some diversified crop cultivation activity. The extent and locations of the crops within the parcels are, however, not mapped.

EXHIBIT 5-4. OVERVIEW OF MAUI NUI PROPOSED CRITICAL HABITAT WITH PARCELS THAT CONTAIN GRAZING LAND AND AREAS BEING CONSIDERED FOR EXCLUSION

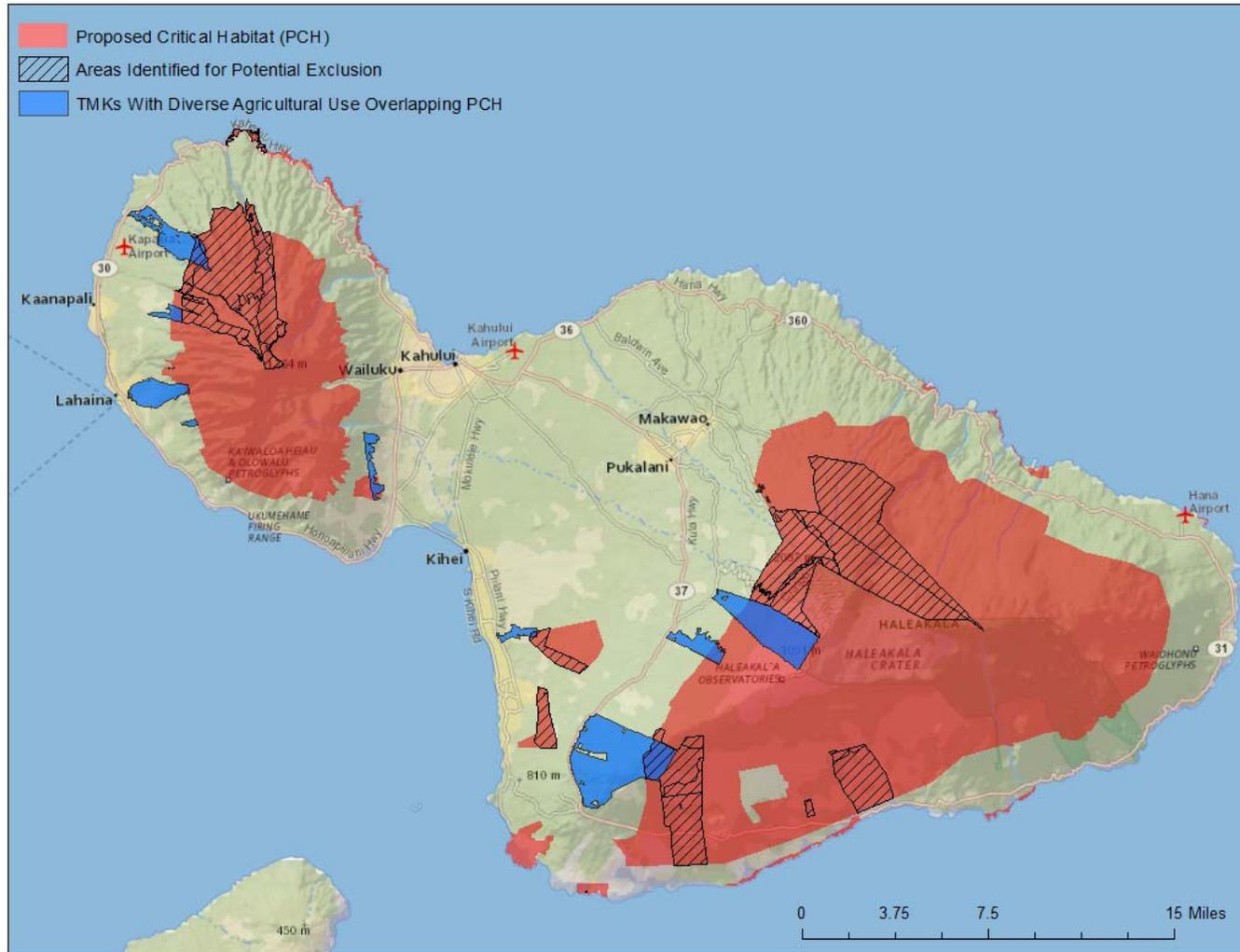


Sources: Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at <http://www.co.maui.hi.us/DocumentCenter/Index/231>; and State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated 5/8/12. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012.

EXHIBIT 5-5. OVERLAP BETWEEN PROPOSED CRITICAL HABITAT UNITS AND GRAZING LAND ON MAUI

MAUI UNIT	ACRES IN UNIT	ACRES OF OVERLAP WITH GRAZING LAND PARCELS*	PERCENT OF UNIT OVERLAPPING GRAZING LAND PARCELS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Alpine 01	2,091.8	413.4	19.8%
Coastal 02	68.2	25.8	37.9%
Coastal 03	53.6	40.4	75.3%
Coastal 04	243.1	129.8	53.4%
Coastal 07	187.2	146.2	78.1%
Coastal 10	434.2	180.8	41.6%
Lowland Dry 01	16,985.6	3,230.6	19.0%
Lowland Dry 04	1,282.8	6.4	0.5%
Lowland Dry 05	5,448.1	58.6	1.1%
Lowland Dry 06	579.2	167.8	29.0%
Lowland Mesic 01	1,930.3	20.2	1.0%
Lowland Wet 01	25,901.0	883.1	3.4%
Montane Dry 01	4,240.1	779.5	18.4%
Montane Mesic 01	14,021.2	2,578.6	18.4%
Montane Wet 01	1,874.4	30.2	1.6%
Subalpine 01	17,262.3	1,961.9	11.4%
Total Proposed for Designation	92,603.0	10,653.5	11.5%
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION			
Alpine 01	14.9	14.9	100.0%
Dry Cliff 01	263.7	263.7	100.0%
Dry Cliff 03	93.0	93.0	100.0%
Lowland Dry 01	5,210.7	5,203.4	99.9%
Lowland Dry 02	761.7	731.7	96.1%
Lowland Dry 03	900.8	900.8	100.0%
Montane Dry 01	747.9	747.9	100.0%
Montane Mesic 01	6,950.9	6,786.3	97.6%
Montane Wet 01	5,940.0	1,667.0	28.1%
Montane Wet 02	2,103.9	766.4	36.4%
Subalpine 01	2,138.3	2,137.9	100.0%
Subalpine 02	1,045.0	974.7	93.3%
Wet Cliff 01	170.2	96.4	56.6%
Total Identified for Potential Exclusion	26,341.1	20,384.1	77.4%
Notes: *The acreage associated with "pastureland parcels" is not necessarily entirely dedicated to grazing. The acreage is the full area of parcels that are reported as supporting some grazing activity. The extent and locations of the grazing activity within the parcels are unknown.			
Sources: Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at http://www.co.maui.hi.us/DocumentCenter/Index/231 ; and State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated 5/8/12. Available at http://hawaii.gov/dbedt/gis/download.htm , accessed on September 24, 2012.			

EXHIBIT 5-6. OVERVIEW OF MAUI NUI PROPOSED CRITICAL HABITAT AND PARCELS THAT CONTAIN CROPLAND



Sources: Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at <http://www.co.maui.hi.us/DocumentCenter/Index/231>; and State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated 5/8/12. Available at <http://hawaii.gov/dbedt/gis/download.htm>, accessed on September 24, 2012.

EXHIBIT 5-7. OVERLAP BETWEEN PROPOSED CRITICAL HABITAT UNITS AND CROPLAND ON MAUI

MAUI UNIT	ACRES IN UNIT	ACRES OF OVERLAP WITH CROPLAND PARCELS*	PERCENT OF UNIT OVERLAPPING CROPLAND PARCELS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION			
Alpine 01	2,091.8	413.4	19.8%
Lowland Dry 05	5,448.1	40.5	0.7%
Lowland Dry 06	579.2	167.2	28.9%
Lowland Mesic 02	2,621.1	129.7	4.9%
Montane Mesic 01	14,021.2	845.0	6.0%
Subalpine 01	17,262.3	1,889.2	10.9%
Wet Cliff 05	51.9	0.8	1.5%
Total Proposed for Designation	42,075.5	3,485.8	8.3%
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION			
Lowland Dry 01	5,210.7	7.4	0.1%
Lowland Dry 02	761.7	30.0	3.9%
Lowland Mesic 02	802.8	233.4	29.1%
Lowland Wet 02	4,997.4	119.9	2.4%
Montane Mesic 01	6,950.9	869.3	12.5%
Total Identified for Potential Exclusion	18,723.6	1,259.9	6.7%
Notes: *The acreage associated with "cropland parcels" is not necessarily entirely dedicated to farming. The acreage is the full area of parcels that are reported as supporting some "diversified agriculture". The extent and locations of the crops within the parcels are unknown. Sources: Maui County, Real Property Tax Division. Document Center: Full File Extracts. Available at http://www.co.maui.hi.us/DocumentCenter/Index/231 ; and State of Hawaii, Office of Planning, GIS Program. 2012. TMK Parcels, updated 5/8/12. Available at http://hawaii.gov/dbedt/gis/download.htm , accessed on September 24, 2012.			

193. As identified in these exhibits, much of the study area that overlaps grazing and farming land use is being considered for exclusion by the Service, as identified in the Proposed Rule. Overall, 10,653 acres of the identified grazing land parcels and 3,486 acres of the identified cropland parcels are being proposed for critical habitat designation and were not identified as being considered for exclusion. Approximately 20,384 acres of the identified grazing land parcels and 1,260 acres of the identified cropland parcels are being considered for exclusion based on existing land management practices, as follows.

- **Maui Land and Pineapple Company lands** (8,931 acres): This landowner owns parcels overlapping seven proposed critical habitat units for plants and eight proposed critical habitat units for birds in Northwest Maui. The area includes the Puu Kukui Wilderness Preserve, which is being considered for exclusion as the

lands are determined by the Service to be managed in a manner compatible with the conservation of the species. (FR 77 34579)

- **Ulupalakua Ranch** (6,537 acres): This ranch occurs on the southwest slope of east Maui and overlaps six units proposed for plants and four for birds. The landowner is currently involved in several important voluntary conservation agreements and is carrying out activities on these lands for the conservation of the species and their habitats, including constructing enclosure fences, propagation and outplanting of native plants, nonnative plant removal, and feral ungulate removal. (77 FR 34581)
- **Haleakala Ranch** (8,746 acres): Haleakala Ranch Company lands on east Maui overlap seven proposed units for plant species and six for bird species. The landowner is currently involved in voluntary conservation agreements, including a watershed management program to protect 100,000 acres of forest across east Maui. The project includes control of feral pigs, control of invasive plants, construction of ungulate enclosure fences, and actions to conserve and protect native dryland forest habitat. In 2009, the landowner entered into a Safe Harbor Agreement with the DLNR and Service to establish a population of the endangered nene on their lands. While not a species addressed in this rule, the Agreement for the bird demonstrates the willingness of the landowner to protect and conserve native species. (77 FR 34581)
- **East Maui Irrigation Company, Ltd. (EMI)** (6,721 acres): These lands on East Maui overlap six proposed units for plants and 12 for birds. EMI, a subsidiary of Alexander and Baldwin, owns and operates a ditch system that diverts more than 60 billion gallons per year of surface water from East Maui to Central Maui to irrigate the sugarcane fields of Hawaiian Commercial & Sugar Company (HC&S). Some of the water is also used to irrigate other farmlands and for domestic use. EMI entered into partnership with The Nature Conservancy, Maui County, the DLNR and private ranches to form the East Maui Watershed Partnership (EMWP). A 2009 Management Plan for the EMWP describes conservation measures undertaken for projects in these areas including control of feral animals, exclusion fencing, research surveying and monitoring, nonnatives management, propagating and outplanting (all in 2009 management plan). The Service has determined that this management is compatible with the conservation of the Maui Nui species. (77 FR 34583)

5.3 ECONOMIC IMPACTS OF CRITICAL HABITAT ON GRAZING AND FARMING ACTIVITIES

194. This section describes the potential effects of critical habitat designation for the Maui Nui species on grazing and farming activities. In summary, the direct effect of critical habitat on these activities (i.e., the regulation of these activities through section 7 consultation to avoid adverse modification of critical habitat) is likely to be limited. Landowners, in particular ranchers on Maui, are concerned about the potential for the rule to more indirectly affect their activities, for example in the case that the real or perceived risk of

additional regulation devalues their land or in the case that the land is re-districted by the State to limit grazing activities.

5.3.1 DIRECT EFFECTS OF THE CRITICAL HABITAT DESIGNATION

195. As described in Section 5.1, grazing and farming operations that have participated in Federal assistance programs, such as NRCS' EQIP and WHIP, have been subject to section 7 consultation considering potential effects on listed species and critical habitats. Outside of participation in these programs, the Service has not consulted on farming and grazing activities on Maui in the past nine years.
196. According to the Service's section 7 consultation history, approximately 16 informal consultations have been undertaken regarding Federal assistance programs for grazing and farming projects in Maui Nui over the past nine years. This is consistent with the estimation of the NRCS State Biologist, who estimates the NRCS participates in one to two consultations per year with the Service regarding effects of projects and activities on listed species and critical habitats.
197. Almost all of the land with which the NRCS works is degraded and does not support the physical and biological features of critical habitat for listed species on Maui. Even in the case that the projects overlapped areas that did support listed species or critical habitat, the objective of the NRCS in undertaking projects is to ensure that they are ecologically beneficial. The NRCS would not assist with projects that would degrade ecological resources regardless of critical habitat designation. As a result, all previous consultations on NRCS projects have been informal and have resulted in a not likely to adversely affect (NLAA) determination for listed species and critical habitats. The NRCS State Biologist stated that these consultations have not been time-intensive and have not resulted in modifications to projects or activities. The NRCS State Biologist expects that future consultations will be similar and that the critical habitat designation for the Maui Nui species would not limit the ability of the NRCS to implement its programs as planned.¹⁶¹
198. Similarly, the Service anticipates that areas that currently support farming and grazing activities are not likely to support the physical and biological features of critical habitat for the Maui Nui species. In this case, activities occurring on these lands will not constitute adverse modification of critical habitat and the Service would not expect to recommend project modifications through potential future section 7 consultations.
199. Based on communication with the NRCS and the Service, we conclude that it is unlikely that critical habitat designation will result in modifications to farming and grazing activities through section 7 consultation. The direct effects of the designation are most likely to be limited to additional administrative effort as part of future section 7 consultations.
200. Data are not available to quantify potential future consultations that will consider critical habitat for the Maui Nui species. As described in Section 5.1, 44 farms and ranches in

¹⁶¹ Personal communication with U.S. Department of Agriculture, Natural Resources Conservation Service, State Biologist, Pacific Islands Area, on November 13, 2012.

Maui County (approximately 3.8 percent of such operations) participated in Federal assistance programs in 2007 (44 operations total in Maui Nui). Of these, the NRCS estimates one or two per year are likely to be subject to section 7 consultation. The fraction of these one or two consultations per year that will overlap critical habitat for the Maui Nui species, and the particular unit(s) of critical habitat that will be involved, are unknown. As described by the NRCS, however, because the projects subject to consultation are ecologically beneficial, the effort involved in these consultations is expected to be minor.

5.3.2 POTENTIAL INDIRECT EFFECTS OF CRITICAL HABITAT DESIGNATION

201. While the NRCS and Service do not anticipate that critical habitat designation will change how they manage and regulate farming and grazing activities in Maui Nui, potential exists for these activities to be indirectly affected by the designation. In particular, ranchers are concerned that the designation may:
- Change the way the State or county manages and permits current and future activities on designated lands;
 - Result in perceptual effects on land values;
 - Limit the ability of ranch owners to diversify current land uses;
 - Generate costly lawsuits; and
 - Hinder the State's goal to work toward food sustainability.
202. Significant uncertainty surrounds the potential for these economic impacts. We discussed with key stakeholders whether previous critical habitat designations on Maui have resulted in these types of impacts. The types of indirect impacts anticipated, however, may be difficult to identify until such time as a landowner decides to sell or subdivide the land, or until a lawsuit is filed. Regardless of whether previous designations have resulted in these effects, however, landowners are concerned that the multiple, layered critical ESA listings and designations on Maui will ultimately affect their operations.
203. Exhibit 5-8 describes the potential for these categories of impacts of the designation and highlights the layered uncertainties that limit our ability to monetize the potential associated economic costs. Although the uncertainties described preclude quantification of indirect impacts by unit or overall, this analysis presents the qualitative discussion of these categories of impact to be considered alongside the quantified impacts in this analysis. The areas proposed for designation that support grazing land and cropland, as described in Section 5.2, are potentially vulnerable to these types of indirect impacts.

EXHIBIT 5-8. POTENTIAL INDIRECT ECONOMIC IMPACTS OF CRITICAL HABITAT DESIGNATION ON GRAZING AND FARMING

INDIRECT EFFECT	DESCRIPTION AND ECONOMIC IMPLICATIONS	UNCERTAINTIES PRECLUDING MONETIZATION
<p>Change in management of land by the State</p>	<p>The Hawaii Revised Statutes (HRS) Chapter 195D describes that “the department of land and natural resources shall initiate amendments to the conservation district boundaries... in order to include high quality native forest and the habitat of rare native species of flora and fauna within the conservation district.”</p> <p>Ranchers are therefore concerned that critical habitat designation on ranches within the Agricultural District will cause the State to reclassify these areas as Conservation District. As described in Section 5.1, while some grazing and farming activities may take place within Conservation District lands, any activities occurring within these lands requires a CDUP, adding additional administrative burden to the operations of the ranches and to any proposed changes in land use. Furthermore, in the case that land is redistricted to Conservation, ranchers are concerned additional permitting requirements and restrictions on the use of the land will reduce the land value.¹⁶²</p> <p>According to the Office of Conservation and Coastal Lands and the State Office of Planning, critical habitat designation does not automatically generate a district reclassification. It is, however, one factor taken into consideration both during the five year boundary reviews and review of petitions for boundary amendments, which occur regularly.¹⁶³ The last five year boundary review occurred in 1994. The major resulting change was a reduction of statewide Agricultural District lands of 17,500 acres (from 1.96 million acres to 1.94 million acres, a 0.9 percent reduction) and an increase in Conservation District lands of 15,700 acres (from 1.96 million acres to 1.97 million acres, a 0.8 percent increase).¹⁶⁴ While there were petitions regarding redistricting of sensitive habitat areas (i.e., the areas were outstanding aquatic resources and waterbird recovery habitat) to Conservation, not all of these changes occurred; a fraction of the sensitive habitat that was subject to the petition was redistricted as Conservation.¹⁶⁵</p> <p>Although a critical habitat designation does not from the State’s perspective automatically generate a reclassification of land use, ranchers are concerned that environmental groups may sue the State to compel the change. As described below, ranchers and farmers may then spend time, and hire attorneys and consultants to help defend their interests. These costs would be indirect costs of the critical habitat designation.</p>	<ul style="list-style-type: none"> • Portion of the proposed critical habitat that may be reclassified as Conservation District • Likelihood that legal challenges or other mechanism compels State to redistrict the critical habitat area as Conservation District lands • If redistricted as Conservation, the manner in which the State or county may preclude or otherwise restrict farming or grazing activity within these areas (e.g., specific conditions placed on CDUPs)

¹⁶² Personal communication with the representatives of the Hawaii Cattlemen’s Council and the Hawaii Farm Bureau on October 11, 2012.

¹⁶³ Personal communication with Office of Conservation and Coastal Lands on September 19, 2012 and with the State Office of Planning on November 9, 2012.

¹⁶⁴ State of Hawaii Department of Business, Economic Development and Tourism. State of Hawaii Data Book 2011. Table 6.03 - Estimated Acreage of Land Use Districts: 1969 to 2011.

INDIRECT EFFECT	DESCRIPTION AND ECONOMIC IMPLICATIONS	UNCERTAINTIES PRECLUDING MONETIZATION
<p>Change in management of land by the county</p>	<p>Many existing agricultural lots on Maui are large (thousands of acres). In the future, landowners may wish to subdivide these parcels in order, for example, to distribute land to heirs, sell portions of the lot, or develop country estates. As described in Section 3.1, the county was unable to identify an example of a critical habitat designation changing decisions related to zoning or permitting land. Ranchers are concerned that, however, in the case that critical habitat is designated, that the county may require an assessment of the impact on the listed species and their habitat. The costs of this assessment would reflect indirect, incremental impacts. Furthermore, additional administrative burden (such as development of such an assessment) and any potential restrictions on use by the county, may reduce the current value of the land in the case that buyers prefer areas outside of the critical habitat that may not be subject to restrictions.¹⁶⁶</p>	<ul style="list-style-type: none"> • Number and locations of agricultural lots that will subdivide • Likelihood that the county will require additional study, such as environmental assessment, of future agricultural subdivisions within critical habitat • Whether an environmental assessment of a subdivision within critical habitat will result in recommendations for mitigation or other restrictions and, if so, the level of mitigation required

¹⁶⁵ Personal Communication with State Office of Planning on November 9, 2012.

¹⁶⁶ Personal communication with the representatives of the Hawaii Cattlemen’s Council and the Hawaii Farm Bureau on October 11, 2012.

INDIRECT EFFECT	DESCRIPTION AND ECONOMIC IMPLICATIONS	UNCERTAINTIES PRECLUDING MONETIZATION
Perceptual effects on land values	<p>In addition to the above factors affecting property values, an additional concern of ranchers is that potential buyers of land, appraisers, and lenders will perceive that critical habitat designation restricts use of the land. In turn, this perception will reduce the value of the land. That is, buyers may react to the designation due to a lack of understanding of how the regulation may be implemented by the Service or interpreted by State or county land managers. As a result, even if no change in government management of land occurs, buyers may be unwilling to pay as much for the land if they view the designation as a potential limitation to future economic opportunities, and/or will involve additional cost and risk to potential development.</p> <p>In this case, the loss in land value would be equal to the fraction of the total land value associated with foregone potential future uses. For Maui Nui, the average “asset value” (described as estimated market value) for agricultural land (including buildings) was \$8,201 per acre in 2007.¹⁶⁷</p> <p>No studies exist that have evaluated the potential perceptual effect of critical habitat on land values in Hawaii. Some studies have shown, however, that critical habitat designation has the potential to change behavior even outside of the regulatory changes associated with the rule. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations, restrictions, and/or additional costs. A 2009 study determined that in California, critical habitat designation within urban growth areas resulted in measurable reductions in land values. The study did not identify statistically significant effects of the designation on land values outside of urban growth areas.¹⁶⁸ In addition, as the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease.</p> <p>In addition, ranchers rely on their land as an asset against which they can apply for loans. If the land is devalued for any reason, it may affect the ranchers’ abilities to secure loans. As described in Section 5.1, in a given year, many farms and ranches operate at a net loss (54 percent in 2007). Ranchers are concerned that such operations will be unviable in the case that the critical habitat designation limits their ability to obtain loans in certain years.¹⁶⁹</p>	<ul style="list-style-type: none"> • All uncertainties described above for change in State or county management of land • Potential for buyers to perceive additional risk associated with future economic use of the land • Reduced willingness to pay of the buyers for the parcels • Time component of the land value effect (i.e., whether the absence of a change in regulation of the land may alleviate the perception of risk)

¹⁶⁷ U.S. Department of Agriculture, National Agricultural Statistics Service, Data and Statistics: County Level Information for 2002 and 2007, accessed at http://www.nass.usda.gov/Data_and_Statistics/ on November 19, 2012.

¹⁶⁸ Auffhammer, M., M. Oren, and D. Sunding. 2009. “Economic Impacts of Critical habitat Designation: Evidence from the Market for Vacant Land.” Workshop Paper, The University of Arizona, Program on Economics, Law, and the Environment, available at <http://ele.arizona.edu/files/ELEsunding1-30-09.pdf>. Additional studies evaluation potential perceptual effects of critical habitat designation include:

INDIRECT EFFECT	DESCRIPTION AND ECONOMIC IMPLICATIONS	UNCERTAINTIES PRECLUDING MONETIZATION
Limitations on ability of ranch owners to diversify	A number of ranchers in Maui County plan to diversify the activities occurring on their ranches. In particular, a number of ranches now support recreation opportunities for tourists, such as all-terrain vehicle (ATV) use, horse rides, and zip lines. Ranchers are concerned that critical habitat designation may affect their ability to undertake these activities. Federal permitting is generally not required for such a change. The concern is therefore whether the State or county will place limits on these land use changes due to the designation of critical habitat. ¹⁷⁰	<ul style="list-style-type: none"> • Likelihood of individual ranches to pursue such changes in land use • All uncertainties described above for change in State or county management of land
Increased potential for legal actions	<p>Additional concern is focused on the potential for the critical habitat designation to increase the vulnerability of private landowners to legal challenges from environmental groups regarding their operations.</p> <p>Precedent exists for lawsuits brought about under the ESA and these lawsuits can be costly and time-consuming. For example, in 1991 the Hawaii Audubon Society and the National Audubon Society hired the Sierra Club Legal Defense Fund to sue McCandless Ranch and the Service under the ESA. McCandless Ranch had been limiting access to Federal biologists as the ranchers believed they were acting in the best interest of the listed 'alala (the Hawaiian crow), which was present on the Ranch, and the ranchers were concerned the presence of the biologists would interrupt their cattle operation. The suit was settled in 1994. McCandless Ranch estimates that the suit cost \$300,000 in expenses, such as attorney's fees, as well as significant time invested in meetings over the three years. Following the settlement, the Ranch owners also participated with the Service in the development of a recovery plan for the 'alala, allowing access to the Service over a five year time frame. Participation in this effort was an additional cost to the ranch owners, in terms of time spent in meetings and ranch management (road maintenance, liability insurance, etc.).¹⁷¹ While this lawsuit in particular was not related to critical habitat designation, this example demonstrates that ESA-related issues are sensitive and have the potential to generate legal actions and associated costs.</p>	<ul style="list-style-type: none"> • The extent to which the designation will increase probability of legal challenge (over and above the presence of the listed species or other critical habitats) • Direct costs of legal fees and time spent on lawsuit • The potential outcome of lawsuits (i.e., specific restrictions on the use of the land)

List, J.A., M. Margolis, and D. E. Osgood. 2006. "Is the Endangered Species Act Endangering Species?" National Bureau of Economic Research Working Paper Series, Working Paper 12777, available at <http://www.nber.org/papers/w12777>; and Lueck, Dean and Jeffrey A. Michael, April 2003, "Preemptive Habitat Destruction Under the Endangered Species Act," *Journal of Law and Economics*, 46: 27-60.

¹⁶⁹ Letter from President, Hawaii Cattlemen's Council to Field Supervisor, Pacific Islands Fish and Wildlife Office, U.S. Fish and Wildlife Service. "Hawaii Cattlemens Council's Comments on Proposal to Protect 40 Species on Molokai, Lanai, and Maui as Endangered and the Designation of Critical Habitat for 135 Species." Dated August 10, 2012.

¹⁷⁰ Personal communication with Representative, Hawaii Cattlemen's Council, on August 29, 2012.

¹⁷¹ Letter from General Manager, McCandless Ranch to Industrial Economics, Inc. "Economic Impact of Critical Habitat Designations." Dated November 12, 2012.

INDIRECT EFFECT	DESCRIPTION AND ECONOMIC IMPLICATIONS	UNCERTAINTIES PRECLUDING MONETIZATION
<p>Obstacle to statewide food sustainability</p>	<p>The State of Hawaii is currently advocating for food sustainability in order to decrease the share of the State’s food resources that are imported. Ranchers assert that if critical habitat designation limits the ability of ranches and farms to produce beef and food crops, Hawaii will need to rely increasingly on imports.</p> <p>As described above, the extent to which the designation will limit agricultural production is uncertain. However, a small fraction of the total State agricultural production overlaps the proposed critical habitat area.</p>	<ul style="list-style-type: none"> • Extent to which critical habitat designation will limit agricultural production • Availability of substitute sites statewide that may offset a reduction in production in critical habitat

COMMENTS OF THE HAWAII CATTLEMEN’S COUNCIL, INC.

The Hawaii Cattlemen’s Council, Inc. provided comments on a preliminary draft of the evaluation of impacts of critical habitat designation for the Maui Nui species on grazing and farming activities. The HCC expressed concern that this analysis characterizes the categories of impacts described in Exhibit 5-8 as “indirect,” “perceived,” or “potential.” The experience of the HCC is that these categories of economic impacts are, “direct and will harm our properties, our businesses, and our livelihoods.” In particular, the HCC comments identify that critical habitat designations have generated impacts on land values, as documented in economic analyses of critical habitat designations conducted for other species (e.g., the California red-legged frog, the Bay checkerspot butterfly, and Pacific Northwest salmonids). The HCC states that these studies demonstrate that a decrease in land value due to a critical habitat designation is real and can be quantified and monetized, and therefore this should be done in the Maui Nui analysis.

First, as discussed in Chapter 2, this analysis defines “direct impacts” of critical habitat designation as those impacts stemming from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. Because the categories of potential impact described in Exhibit 5-8 are not associated with section 7 consultation, they are considered “indirect.” Nonetheless, both the direct and indirect impacts of the rulemaking are relevant to the Service’s consideration of the potential benefits of excluding a particular area from critical habitat designation.

Second, we recognize that other economic analyses of critical habitat designations have quantified potential impacts to land values. This is because, in some cases, the Service has indicated that it would recommend limiting or restricting particular land use activities for the benefit of the species or its critical habitat as part of future section 7 consultations. In such cases, there would be a reduction in land value equivalent to the reduced option for future use (e.g., lost development option). Where information exists regarding the nature of restrictions on land use, or data exist demonstrating differences critical habitat has reduced land values, it is possible to monetize associated impacts. For the Maui Nui species, we anticipate it is unlikely that future consultations will occur on grazing and farming activities and result in restrictions on future activities on these lands. While we recognize the concern that the State or county may restrict or limit land use changes because of critical habitat designation, there is no identified precedent for this outcome in Maui County, and State and county representatives have indicated that it is not the intent of these governments to preclude future land use changes due to the presence of critical habitat (as discussed in detail in Section 3.1).

Despite the lack of intent of the Service, State, or county to preclude future land uses in critical habitat, we do recognize that critical habitat designation may affect land values, or otherwise increase costs to landowners in two primary ways: 1) future lawsuits asserting that critical habitat areas be incorporated into the State’s Conservation District or otherwise managed for conservation; and 2) uncertainty or perception on the part of potential land buyers regarding the effect of critical habitat on future land use and management reducing the amount they are willing to pay for land. We are unable to predict to what extent these effects will occur and, if so, the resulting effect on land values for the reasons described in Exhibit 5-8. For these reasons, we characterize land value effects as “potential.” Absent information that these lands would be managed differently, or data demonstrating that buyers would pay less due to the designation, monetizing impacts to land values of this rulemaking would be speculative. We therefore highlight the real potential for these outcomes for the Service’s consideration, and discuss the economic implications qualitatively.

5.4 ASSUMPTIONS AND LIMITATIONS

204. Exhibit 5-9 summarizes the major assumptions and caveats underlying the analysis of impacts to grazing and farming activities. As suggested by Exhibit 5-8, many of these uncertainties relate to the potential indirect effects of the designation. Overall, these

uncertainties result in an underestimate of the quantified impacts of the designation reported in this analysis.

EXHIBIT 5-9. ASSUMPTIONS AND LIMITATIONS OF THE FARMING AND GRAZING ANALYSIS

ASSUMPTION/SOURCE OF UNCERTAINTY	DIRECTION OF POTENTIAL BIAS OF QUANTIFIED IMPACTS	LIKELY SIGNIFICANCE WITH RESPECT TO ESTIMATED IMPACTS
We do not quantify incremental administrative costs of potential future consultations.	May result in an underestimate of costs.	Likely minor. A limited number of consultations are expected. These consultations would consider projects intended to be ecologically beneficial and would therefore be informal and involve minimal incremental effort to consider critical habitat.
Potential for portions of individual farms or ranches in the Agricultural District lands to be reclassified as Conservation District lands is unknown.	May result in an underestimate of costs.	Potentially major. In the case that critical habitat lands are all redistricted for conservation use, future land use opportunities may be restricted and the value of the land reduced.
Potential for proposed agricultural subdivisions to be subject to additional research and reporting (e.g., environmental assessments) and/or restrictions is unknown.	May result in an underestimate of costs.	Likely minor. Although ranchers are concerned that critical habitat may result in the need to spend on additional environmental assessments, Maui County has not thus far required additional study for proposed projects, such as agricultural subdivisions due to the presence of critical habitat. Nonetheless, in the case this occurs in the future (for example, due to a third party lawsuit), ranchers and farmers may bear additional costs of time, hiring consultants to develop the assessment, and any mitigation that may result.
Potential for critical habitat to reduce land values for grazing lands and cropland is unknown.	May result in an underestimate of costs.	Potentially major. Real and perceived expectations regarding additional land-management costs and use restrictions may increase the difficulty in selling land and also may reduce land values. In addition, land devaluation may limit a farmer's or rancher's ability to secure loans making operations unviable.
Geographic distribution of potentially affected activities is uncertain.	May result in either an underestimate or overestimate of costs in particular units.	Unknown. We rely on the best available information regarding where grazing and farming occur within the proposed designation. These data may not include all lands currently used for these activities, however. On the other hand, we may overestimate the presence of these activities in critical habitat to the extent that some of these areas are not actively managed for farming.

CHAPTER 6 | POTENTIAL ECONOMIC BENEFITS**6.1 INTRODUCTION**

205. The primary goal of designating critical habitat for a species is to support its long-term conservation and recovery. Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those that derive from the habitat conservation measures to achieve this primary goal (i.e., ancillary benefits).
206. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).
207. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation measures for species and habitat may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation measures undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may result from modifications to projects, or may be collateral to such actions. For example, a section 7 consultation may result in the need to conserve habitat in perpetuity to address habitat disturbance. This may lead to reduced density of development in an area, which may benefit water quality, and may also provide collateral benefits of preserving habitat for other species occupying these areas.

6.2 QUANTIFYING DIRECT ECONOMIC BENEFITS OF CRITICAL HABITAT DESIGNATION FOR THE MAUI NUI SPECIES

208. Economists apply a variety of methodological approaches in estimating both use and nonuse values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms,

these methods employ survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.

209. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value through their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.
210. Numerous published studies estimate individuals' willingness to pay to protect endangered species.¹⁷² The economic values reported in these studies reflect various groupings of benefit categories (including both use and non-use values). For example, these studies assess public willingness to pay for wildlife-viewing opportunities, for the option for seeing or experiencing the species in the future, to assure that the species will exist for future generations, and simply knowing a species exists, among other values. This literature, however, addresses a relatively narrow range of species and circumstances compared to the hundreds of species and habitats that are the focus of the Act. Specifically, existing studies focus primarily on large mammal, bird, and fish species, and generally do not report values for incremental changes in the probability of species conservation and recovery. Importantly for this analysis, we are not aware of any published studies that estimate the value the public places on preserving the Maui Nui species.
211. An ideal study for use in valuing the use and non-use values that may derive from critical habitat designation for the Maui Nui species would be specific to the species, the policy question at hand (economic benefits specifically of the critical habitat designation), and the relevant population holding such values (e.g., citizens of Hawaii or of the U.S.). No such study has been undertaken to date, however.
212. Absent primary research specific to the policy question, resource management decisions can often be informed by applying the results of existing valuation research to a new policy question – a process known to economists as benefit transfer. Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration.
213. OMB has written guidelines for conducting credible benefit transfers. The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and

¹⁷² See, for example, Richardson, L. and J. Loomis. March 2009. The Total Economic Value of Threatened, Endangered, and Rare Species: An Updated Meta-Analysis. *Ecological Economics* 68(5): 1535-1548.

(2) identify appropriate studies to conduct benefits transfer based on the following criteria:

- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques.
- The selected studies should document parameter estimates of the valuation function.
- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar.
- The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
- The relevant characteristics of the study and policy contexts should be similar.
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., if the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate).
- The availability of substitutes across study and policy contexts should be similar.

214. According to these criteria, no existing studies are available for transfer of value estimates to the current policy question in order to quantify the value the public would place on actions taken to enhance probability of conservation and recovery specifically for the Maui Nui species.

6.3 POTENTIAL INCREMENTAL BENEFITS OF CONSERVATION EFFORTS FOR THE MAUI NUI SPECIES

215. This section describes the categories of benefits potentially resulting from incremental conservation efforts for the Maui Nui species within the study area. Exhibit 6-1 summarizes potential benefits associated with the specific conservation efforts described in Chapters 3 through 5 of this report. The first column summarizes the conservation efforts. The second column identifies potential categories of ancillary benefits that may derive from implementation of these conservation efforts. A description of these categories of benefits is provided below. The final column of the exhibit identifies the units in which incremental benefits may occur.
216. The remainder of this Chapter includes a qualitative benefits discussion, summarizing the conservation efforts described in Chapters 3 through 5 of this report and linking them with potential categories of economic benefit that may derive from their implementation.
217. As described in Chapter 3, additional habitat conservation is expected to result due to critical habitat designation for one of the two development projects identified. For the other development project, critical habitat designation is not expected to change the

conservation measures being implemented. In addition, Chapter 3 discusses the uncertainty regarding whether critical habitat designation for the Maui Nui species will modify other future development projects, outside of the specific projects we identified as likely to occur over the next ten years.

218. The potential for critical habitat to generate economic benefits is therefore relevant to one of the development projects identified (the Honua'ula project) and potentially for future development activities outside of the specific projects identified in this analysis. Exhibit 6-1 identifies those units where development pressure exists but no specific projects are currently proposed or planned.
219. As discussed in Chapter 4, it is unlikely that critical habitat designation will generate additional conservation recommendations for future renewable energy projects. Economic benefits would only be expected to result to the extent that baseline management of future energy projects does not result in the project avoiding adverse modification of critical habitat.
220. In the case that critical habitat designation limits regional grazing or farming activities, there may be associated ancillary benefits associated with improved environmental conditions on those lands. As discussed in Chapter 5, however, the extent to which critical habitat designation will affect the locations or levels of farming and grazing activities is significantly uncertain.
221. The categories of economic benefit that may derive from incremental conservation measures described in this report include:
- **Property value benefits:** Open space or decreased density of development resulting from conservation efforts for the Maui Nui species may increase adjacent or nearby property values. As much of the land likely to experience development pressure is adjacent to significant amounts of open space, however, the additional open space generated by decreased density of development may be limited.
 - **Improved water quality:** Decreased density of development in a region may improve water quality in the case that less impervious surface reduces nutrient loading and sedimentation to water bodies. Reduced levels of agricultural activities may also generate water quality benefits to the extent that there is an associated reduction in the level of pesticide or herbicide use in the region. Improved water quality may reduce water treatment costs and have human or ecological health benefits.
 - **Increased potential for recreation or tourism:** Social welfare gains may be associated with enhanced aesthetic quality of habitat in the case that aesthetic improvements result in an increased willingness-to-pay to visit a habitat region for recreation or increased visitation. This may in turn have a positive effect on the regional economy to the extent that the increased visitation to the region results in increased spending on regional goods and services.

- **Educational benefits:** Monitoring of Maui Nui species habitat confers educational benefits in that more is known about the species and where populations exist. This knowledge could help direct future conservation efforts.

222. The extent to which critical habitat may generate such benefits is, however, significantly uncertain. In addition to these categories of potential benefits, all of the conservation efforts described in Exhibit 6-1 are related to the broader conservation and recovery of the species. All conservation efforts therefore relate to the maintenance or enhancement of the use and non-use value (e.g., existence value) that the public may hold specifically for the Maui Nui species. Further, many of the conservation efforts undertaken for the species may also result in improvements to ecosystem health that are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these conservation efforts.

EXHIBIT 6-1. MAUI NUI CONSERVATION EFFORTS AND POTENTIAL ASSOCIATED ANCILLARY BENEFITS

POTENTIAL INCREMENTAL CONSERVATION EFFORT	POTENTIAL ASSOCIATED INCREMENTAL BENEFITS	UNITS APPLIED*
DEVELOPMENT AND ENERGY PROJECTS		
Implementation of habitat offsets within the affected critical habitat unit or within critical habitat of the same type	<ul style="list-style-type: none"> • Property value benefits • Social welfare benefits associated with increased quantity or quality of recreational experiences • Regional economic benefits associated with increased potential for recreation and tourism • Improved water quality 	Lanai Coastal Unit 1, Lanai Dry Cliff Unit 1, Lanai Lowland Mesic Unit 1, Molokai Coastal Unit 1, Lowland Dry Critical Habitat**
Restriction of development (where developable land is in limited supply, the requirement to offset habitat loss may restrict the extent of development possible)	<ul style="list-style-type: none"> • Property value benefits • Social welfare benefits associated with increased quantity or quality of recreational experiences • Regional economic benefits associated with increased potential for recreation and tourism • Improved water quality 	Lanai Coastal Unit 1, Lanai Dry Cliff Unit 1, Lanai Lowland Mesic Unit 1, Molokai Coastal Unit 1
POTENTIAL INDIRECT EFFECT OF CRITICAL HABITAT	POTENTIAL ASSOCIATED INCREMENTAL BENEFITS	UNITS APPLIED*
GRAZING AND FARMING		
Restrict the level of grazing and agriculture occurring in critical habitat areas	<ul style="list-style-type: none"> • Property value benefits • Social welfare benefits associated with increased quantity or quality of recreational experiences • Regional economic benefits associated with increased potential for recreation and tourism • Improved water quality 	Maui Alpine Unit 1, Maui Coastal Unit 2, Maui Coastal Unit 3, Maui Coastal Unit 4, Maui Coastal Unit 7, Maui Coastal Unit 10, Maui Dry Cliff Unit 1, Maui Dry Cliff Unit 3, Maui Lowland Dry Unit 1, Maui Lowland Dry Unit 2, Maui Lowland Dry Unit 3, Maui Lowland Dry Unit 4, Maui Lowland Dry Unit 5, Maui Lowland Dry Unit 6, Maui Lowland Mesic Unit 1, Maui Lowland Mesic Unit 2, Maui Lowland Wet Unit 1, Maui Lowland Wet Unit 2, Maui Montane Dry Unit 1, Maui Montane Mesic Unit 1, Maui Montane Wet Unit 1, Maui Montane Wet Unit 2, Maui Subalpine Unit 1, Maui Subalpine Unit 2, Maui Wet Cliff Unit 1, Maui Wet Cliff Unit 5
<p>Notes:</p> <p>* The units identified for development and energy projects describe those areas that may be subject to development pressure in the future. Information is not available describing potential locations of energy projects beyond the three projects discussed in Chapter 4. The units identified for farming and grazing activities describe all units that currently support these activities.</p> <p>** As a result of the proposed critical habitat designation, the Honua'ula project will implement habitat conservation on 35 acres of lowland dry critical habitat. However, the exact location of the conservation is not known at this time.</p>		

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APPENDIX A
DISTRIBUTIONAL ANALYSES

1. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities, governments, and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211. In accordance with Title II of the Unfunded Mandates Reform Act (UMRA) of 1995, Section A.3 considers potential impacts of the rulemaking on State, local, and Tribal governments, as well as the private sector.
2. The analyses of impacts to small entities and the energy industry rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule.

A.1 SBREFA ANALYSIS

3. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).¹ No initial regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for Maui Nui critical habitat to affect small entities.

A.1.1 OVERVIEW OF RFA APPLICABILITY

4. This analysis is intended to improve the Service's understanding of the potential effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. The Endangered Species Act (ESA) requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. Section 4(b)(2) of the ESA requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of the Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat." However, the Secretary may not exclude an area if it "will result in the extinction of the species."
5. Three types of small entities are defined in the RFA:

¹ 5 U.S.C. § 601 et seq.

- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The SBA has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to NAICS industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
 - **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
 - **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.
6. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.²
7. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.³ The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of State plans that incorporated the standards. The court found that, while EPA imposed regulation on States, it did not have authority under this rule to impose regulations directly on small

² *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission*, 773 F. 2d 327 (D.C. Cir. 1985).

³ *American Trucking Associations, Inc. v. Environmental Protection Agency*, 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

entities and therefore small entities were not directly impacted within the definition of the RFA.

8. The SBA in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.⁴ "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."⁵
9. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.
10. This screening analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapters 3, 4, and 5 of this economic analysis. As discussed in greater detail in these chapters, the quantified incremental impacts of critical habitat designation are limited to additional administrative costs of section 7 consultations. Small entities may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for the Maui Nui species. Additional incremental costs of consultation that would be borne by the Federal action agency and the Service are not relevant to this screening analysis as these entities (Federal agencies) are not small.
11. In addition, Chapters 3 and 5 of this analysis describe unquantified potential economic impacts on development and grazing and farming activities, respectively. While significant uncertainty exists regarding the likelihood and potential magnitude of these impacts, this screening analysis provides information on the potential for small entities to bear these unquantified, incremental impacts of critical habitat designation.

⁴ Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

⁵ *Ibid.*, pg. 21.

A.1.2 ANALYSIS OF IMPACTS TO SMALL ENTITIES

12. As described in Chapters 3, 4, and 5, activities that may be affected by the designation include: residential and commercial development; renewable energy development; and grazing and farming activities.

Quantified Impacts of Critical Habitat Designation

13. Quantified incremental impacts that may be borne by small entities are limited to the administrative costs of section 7 consultation related to residential and commercial development, and renewable energy development. These potential impacts are described in greater detail below.
- *Development:* Chapter 3 of this analysis discusses the potential for Maui Nui critical habitat to affect development projects. As described in Chapter 3, two development projects are identified as occurring within Maui Nui critical habitat within the timeframe of the analysis: the Advanced Technology Solar Telescope expansion and the Honua'ula project. The two entities undertaking these projects are the University of Hawaii's Institute for Astronomy and Honua'ula Partners, LLC, respectively. The University of Hawaii, with total revenues of over \$25.5 million, is not considered a small entity.⁶ Honua'ula Partners, LLC is a division of Wailea 670 Associates, Inc. Because revenue information was not readily available for Wailea 670 Associates, Inc., we make the conservative assumption that it is a small entity. This one entity represents 0.1 percent of the total small entities engaged in residential and commercial development (NAICS 236115, 236116, 236117, and 237210) in the study area, as described in Exhibit A-1. The estimated third party cost to Wailea 670 Associates, Inc. of participating in the forecast consultation, which is a reinitiation of an informal consultation, is approximately \$100,000 (administrative effort and implementation of conservation recommendation), as described in Section 3.3.1 of this report.⁷ We estimate that this cost represents two percent of the entity's annual revenues.⁸
 - *Renewable Energy Development:* Chapter 4 of this report discusses the potential for Maui Nui critical habitat designation to affect renewable energy development activities. Overall, three projects are forecast to occur within Maui Nui critical habitat during the timeframe of the analysis. The entities undertaking these projects are: 1) Molokai Renewables, LLC, a joint venture between Pattern Energy Group LP and Bio-Logical Capital, LLC; 2) Castle & Cooke Resorts, LLC; and 3) ORMAT Technologies, Inc. With revenues in the hundreds of

⁶ University of Hawaii, State of Hawaii, Financial Statements for the 12 Month Period Ending June 30, 2010. More recent financial information was not readily available.

⁷ These costs are expected to be incurred in 2013, the year the final rule is expected to take effect. In 2013, we forecast two consultations related to development, only one of which will be borne by a small entity.

⁸ Annual revenues are estimated to be \$5 million using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012. Average annual revenues per entity are estimated to be \$5 million. This figure represents a weighted average across four NAICS codes (237210, 236115, 236116, 236117) and weighted based on the number of entities of varying size classes below the small entity threshold (e.g., \$0 to \$1 million, \$1 million to \$3 million, \$3 to \$5 million, etc.).

millions of dollars annually, ORMAT Technologies, Inc. is not considered to be a small entity.⁹ Revenue information was not available for the other two entities undertaking energy projects. We therefore make the conservative assumption that these two entities are small. The per-entity cost to participate in the consultation is approximately \$900, as described in Exhibit 2-2.¹⁰ This cost represents less than 0.1 percent of annual revenues.¹¹

As the number of renewable energy development projects is growing in Hawaii, additional businesses may be subject to consultation regarding Maui Nui critical habitat. As described above, however, we expect the estimated \$1,000 incremental cost to be a small fraction of annual revenues for these businesses. Exhibit A-1 describes the industry profile for energy development in Maui Nui. Information from Dun & Bradstreet indicates that only two energy development businesses exist in Maui County.¹² No businesses identified under the following NAICS codes were identified: Power and Communication Line and Related Structures Construction (237130), Wind Electric Power Generation (221115), Geothermal Electric Power Generation (221116), Biomass Electric Power Generation (221117), and Solar Electric Power Generation (221114).¹³ In fact, Dun & Bradstreet do not report any businesses within these NAICS codes within the entire United States. This may indicate that such energy development interests are generally part of larger companies that are registered under different NAICS codes. According to the 2010 County Business Patterns for County of Maui Nui, three entities were engaged in electric power generation, but none fell within the renewable energy NAICS codes mentioned above (all three were engaged in Fossil Fuel Electric Power Generation (NAICS 221112)).¹⁴ Regardless, due to the nature of renewable energy development, it is likely that energy developers working on projects within Maui Nui are not based within the county. These entities would therefore not be captured in figures from Dun & Bradstreet or 2010 County Business Patterns.

Potential Unquantified Impacts of Critical Habitat Designation

14. While we do not quantify potential impacts related to the designation of critical habitat for the following activities due to considerable uncertainty surrounding the nature and

⁹ ORMAT Technologies, Form 10-K for the 12 month period ending December 31, 2011.

¹⁰ These costs are expected to be incurred in 2013, the year the final rule is expected to take effect. In 2013, we forecast two consultations related to renewable energy development.

¹¹ Annual revenues are estimated to be \$9 million using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2012 to 2013*, 2012. Average annual revenues per entity are estimated to be \$9 million. This figure represents a weighted average of one NAICS code (221122).

¹² Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on November 19 and November 20, 2012.

¹³ *Ibid.*

¹⁴ United States Census Bureau. 2010 County Business Patterns. Accessed at <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdet.pl> on November 20, 2012.

magnitude of potential impacts, Chapters 3 and 5 discuss potential indirect impacts of critical habitat designation, as follows:

- Development:* Chapter 3 identifies planned or proposed development projects within the proposed critical habitat area and quantifies the potential effects of critical habitat designation on these projects, as described above. We recognize, however, that potential exists for additional development projects to be affected by critical habitat designation in the future, beyond those projects identified in Chapter 3. Chapter 3 therefore additionally identifies proposed critical habitat units that may experience development pressure. In the case that future development projects generate ground disturbance in these areas, the Service may recommend changes in the type conservation offsets implemented for these projects. Specifically, critical habitat may generate the additional specification that habitat offsets be located within the affected critical habitat unit, or a critical habitat unit of the same habitat type (e.g., lowland dry habitat). Whether this recommendation will increase the cost or decrease the value of the development projects, however, is uncertain, as described in Chapter 3. As identified in Exhibit A-1, as the majority of development-related businesses are small, to the extent that critical habitat designation results in economic impacts to development projects, it is most likely that affected businesses will be small.
- Grazing and Farming:* Chapter 5 of this analysis discusses the potential for Maui Nui critical habitat to affect cattle grazing and farming activities. Critical habitat designation is unlikely to directly affect these activities. These activities often do not involve a Federal nexus triggering section 7 consultation. As discussed in Chapter 5, while participation in a number of government cost share programs constitutes a Federal nexus, the Natural Resources Conservation Service (NRCS) has indicated that the projects it supports are ecologically beneficial, and therefore unlikely to result in adverse modification of critical habitat. Ranchers and farmers are concerned, however, about the potential indirect effects of the designation. First, concern exists that the designation may change the way the State or county manages lands, resulting in either restrictions on grazing and agricultural activities or increased permitting requirements for these activities. In addition, the ranchers and farmers suggest that critical habitat designation may generate perceptual effects on land values. In other words, buyers may be willing to pay less for a parcel designated as critical habitat due to uncertainty regarding potential restrictions on future economic activities on these lands.

Significant uncertainty exists regarding the likelihood and potential magnitude of these effects and, as such, we do not quantify them in this analysis. Exhibit A-1 identifies, however, that less than half of the grazing businesses in Maui Nui are considered small businesses, whereas the majority of the agricultural operations are small.

EXHIBIT A-1. SUMMARY OF POTENTIAL IMPACTS ON SMALL ENTITIES

ACTIVITY	INDUSTRY (NAICS CODES)	SMALL ENTITY SIZE STANDARD	TOTAL NUMBER OF ENTITIES IN STUDY AREA ¹	NUMBER OF SMALL ENTITIES IN STUDY AREA ¹	PERCENTAGE OF ENTITIES THAT ARE SMALL	LARGEST NUMBER OF SMALL ENTITIES AFFECTED IN A SINGLE YEAR ² (PERCENT OF TOTAL SMALL ENTITIES)
Energy ³	Electric Power Distribution (221122)	4 Million Megawatt Hours	2	-	-	2 (100%)
Development	New Single-family Housing Construction (236115)	\$33.5 million	400	399	99%	1 (0.2%)
	New Multifamily Housing Construction (236116)	\$33.5 million	34	33	97%	
	New Housing For-Sale Builders (236117)	\$33.5 million	6	6	100%	
	Land Subdivision (237210)	\$7 million	61	56	92%	
Grazing	Beef Cattle Ranching and Farming (112111)	\$0.75 million	12	5	42%	-
Agriculture	Floriculture Production (111422)	\$0.75 million	25	21	84%	-
	Other Noncitrus Fruit Farming (111339)	\$0.75 million	20	13	65%	-
	Orange Groves (111310)	\$0.75 million	1	1	100%	-
	Other Vegetable (except Potato) and Melon Farming (111219)	\$0.75 million	17	14	82%	-
	All Other Miscellaneous Crop Farming (111998)	\$0.75 million	187	185	99%	-

Notes:

- Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on November 19 and November 20, 2012.
- To estimate the number of affected small entities, this analysis assumes that each consultation affects one small entity, unless specifically stated otherwise.
- Dun & Bradstreet reports no entities in the following renewable energy industries occurring in the United States, and thereby within Maui County: Power Related Structures Construction (237130), Wind Electric Power Generation (221115), Geothermal Electric Power Generation (221116), Biomass Electric Power Generation (221114). Further information on the standards for inclusion within these NAICS codes was not readily available, however, this list is based on the 2010 County Business Patterns for County of Maui, HI, three entities were engaged in electric power generation, but none fell within the categories mentioned above (all three were engaged in Fossil Fuel Electric Power Generation (NAICS 221112)). Importantly, due to the nature of renewable energy development, that energy project proponents acting within Maui County are not based within Maui County. Such entities and are not captured in figures from Dun & Bradstreet's County Business Patterns.
- We conservatively estimate that all costs will be incurred by the small entity in a single year (specifically, 2013, the year the Service is expected to finalize the project).
- Annual revenues related to development activities are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks*. For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, and \$5 million or more. Based on the number of entities and total net sales falling within each sales category, we developed an estimate of the weighted average net sales for residential and commercial development firms, revenues are estimated at \$4 million annually; for energy development firms, revenues are estimated at \$5 million annually.
- "-" denotes information unavailable.
- The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates reported in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.

15. Of note, under the RFA, as amended, Federal agencies are required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking. Critical habitat rules are implemented through section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the Agency is not likely to adversely modify critical habitat. Accordingly, only Federal agencies are directly subject to the regulation. The entities discussed in this analysis are therefore expected to be indirectly affected by the critical habitat designation.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

16. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal agencies must prepare and submit a “Statement of Energy Effects” for all “significant energy actions.” The purpose of this requirement is to ensure that all Federal agencies “appropriately weigh and consider the effects of the Federal Government’s regulations on the supply, distribution, and use of energy.”¹⁵
17. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
 - Reductions in fuel production in excess of 4,000 barrels per day;
 - Reductions in coal production in excess of 5 million tons per year;
 - Reductions in natural gas production in excess of 25 million Mcf (1,000 cubic feet) per year;
 - Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
 - Increases in energy use required by the regulatory action that exceed the thresholds above;
 - Increases in the cost of energy production in excess of one percent;
 - Increases in the cost of energy distribution in excess of one percent; or
 - Other similarly adverse outcomes.¹⁶
18. As described in Chapter 4, renewable energy projects, including wind and geothermal developments, are expected to be subject to section 7 consultation considering potential effects on critical habitat for the Maui Nui species. This analysis concludes that impacts of critical habitat designation on these activities are most likely limited to additional

¹⁵ Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, <http://www.whitehouse.gov/omb/memoranda/m01-27.html>.

¹⁶ *Ibid.*

administrative costs of section 7 consultation. Consequently, reductions in oil and natural gas production are not anticipated and administrative consultation costs (\$900 per consultation) are not anticipated to reduce energy production or increase the cost of energy production or distribution in the United States in excess of one percent. Thus, this rulemaking is not expected to constitute a significant adverse effect on energy supply, distribution, or use.

A.3 POTENTIAL IMPACTS TO GOVERNMENTS

19. Title II of UMRA requires agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector.¹⁷ Under Section 202 of UMRA, the Service must prepare a written statement, including a cost-benefit analysis, for rules that may result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of \$100 million or more in any one year. If a written statement is needed, Section 205 of UMRA requires the Service to identify and consider a reasonable number of regulatory alternatives. The Service must adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule, unless the Secretary publishes an explanation of why that alternative was not adopted. The provisions of Section 205 do not apply when they are inconsistent with applicable law.
20. As stated in the Proposed Rule, “the designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, maybe indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency”¹⁸ Therefore, this rule does not place an enforceable duty upon State, local, or Tribal governments, or the private sector.

¹⁷ 2 U.S.C. 1531 et seq.

¹⁸ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Endangered Status for Six West Texas Aquatic Invertebrate Species and Designation of Critical Habitat; Proposed Rule. 77 FR 49637. August 16, 2012.

APPENDIX B

SENSITIVITY OF RESULTS TO DISCOUNT RATE

1. This appendix summarizes the costs of Maui Nui conservation quantified in Chapters 3 and 4 of this report. It presents impacts assuming an alternative real discount rate of three percent (the main text of the report assumes a real discount rate of seven percent).¹⁹ Exhibits B-1 through B-3 summarize potential incremental impacts of the designation overall and by activity, including Residential and Commercial Development and Renewable Energy Development (as described in Chapters 3 and 4, respectively). The exhibits present impacts separately for areas proposed for critical habitat designation that are not being considered for exclusion, and the areas being considered for exclusion.

EXHIBIT B-1. SUMMARY OF TOTAL INCREMENTAL IMPACTS BY UNIT (2012\$, THREE PERCENT DISCOUNT RATE)

PROPOSED CRITICAL HABITAT UNIT	PRESENT VALUE	ANNUALIZED
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION		
Maui Alpine Unit 1	\$5,000	\$500
Maui Lowland Dry Unit 3	\$100,000	\$10,000
Molokai Coastal 2	\$5,000	\$600
Lanai Lowland Mesic Unit 1	\$5,000	\$600
Total Proposed for Designation	\$100,000	\$20,000
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION		
Maui Montane Mesic 1	\$2,000	\$300
Maui Subalpine 1	\$2,000	\$300
Total Identified for Potential Exclusion	\$5,000	\$600
Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.		

¹⁹ A more detailed discussion of how to calculate present and annualized values, as well as the relevant discount rates, is provided in Chapter 2 of this report.

EXHIBIT B-2. SUMMARY OF INCREMENTAL IMPACTS TO DEVELOPMENT BY UNIT (2012\$, THREE PERCENT DISCOUNT RATE)

PROPOSED CRITICAL HABITAT UNIT	PRESENT VALUE	ANNUALIZED
Maui Alpine Unit 1	\$5,000	\$500
Maui Lowland Dry Unit 3	\$100,000	\$10,000
TOTAL	\$100,000	\$20,000
<p>Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.</p>		

EXHIBIT B-3. SUMMARY OF INCREMENTAL IMPACTS TO RENEWABLE ENERGY DEVELOPMENT BY UNIT (2012\$, THREE PERCENT DISCOUNT RATE)

PROPOSED CRITICAL HABITAT UNIT	PRESENT VALUE	ANNUALIZED
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION		
Molokai Coastal 2	\$5,000	\$600
Lanai Lowland Mesic Unit 1	\$5,000	\$600
Total Proposed for Designation	\$10,000	\$1,000
AREAS IDENTIFIED FOR POTENTIAL EXCLUSION		
Maui Montane Mesic 1	\$2,000	\$300
Maui Subalpine 1	\$2,000	\$300
Total Identified for Potential Exclusion	\$5,000	\$600
<p>Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.</p>		

APPENDIX C

UNDISCOUNTED IMPACTS BY ECONOMIC ACTIVITY

1. This appendix summarizes undiscounted impacts by year for each economic activity. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: “include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars.”²⁰ Exhibit C-1 summarizes potential undiscounted incremental impacts by activity in areas proposed for critical habitat designation. Exhibit C-2 summarizes potential undiscounted incremental impacts by activity in areas identified for potential exclusion.

EXHIBIT C-1. SUMMARY OF INCREMENTAL IMPACTS IN AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION BY YEAR BY ACTIVITY (2012\$)

YEAR	DEVELOPMENT	RENEWABLE ENERGY DEVELOPMENT	TOTAL
2013	\$100,000	\$10,000	\$100,000
2014	\$0	\$0	\$0
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$0	\$0	\$0
2020	\$0	\$0	\$0
2021	\$0	\$0	\$0
2022	\$0	\$0	\$0

Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.

²⁰ Office of Management and Budget, Circular A-4, September 17, 2003, p. 18. The reference to “constant” dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index.

**EXHIBIT C-2. SUMMARY OF INCREMENTAL IMPACTS IN AREAS IDENTIFIED FOR POTENTIAL
EXCLUSION BY YEAR BY ACTIVITY (2012\$)**

YEAR	DEVELOPMENT	RENEWABLE ENERGY DEVELOPMENT	TOTAL
2013	\$0	\$5,000	\$5,000
2014	\$0	\$0	\$0
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$0	\$0	\$0
2020	\$0	\$0	\$0
2021	\$0	\$0	\$0
2022	\$0	\$0	\$0
<p>Note: The level of effort per consultation and the potential costs of project modifications represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to one significant digit to reflect this imprecision. The cost estimates may therefore not sum to the total costs reported due to rounding.</p>			

APPENDIX D

INCREMENTAL EFFECTS MEMORANDUM FOR THE ECONOMIC ANALYSIS FOR PROPOSED RULE TO
DESIGNATE CRITICAL HABITAT FOR 135 SPECIES ON THE ISLANDS OF KAHOOLAWE, LANAI, MAUI,
AND MOLOKAI

Memorandum

Email Transmission

Revised December 27, 2012

Revised January 3, 2013

To: IEC

From: Field Supervisor
Pacific Islands Fish and Wildlife Office, Honolulu, Hawaii

Subject: Incremental Effects Memorandum for the Economic Analysis of the Proposed Rule to List 38 Species on Molokai, Lanai, and Maui as Endangered, and to Designate Critical Habitat for 135 Species on Molokai, Lanai, Maui, and Kahoolawe (Maui Nui)

The purpose of this memorandum is to provide information to serve as a basis for conducting an economic analysis for the proposed designation of critical habitat for 135 species. We are proposing critical habitat for 39 proposed species, revising critical habitat for 85 listed plant species, and proposing critical habitat for 11 listed plant and bird species that do not have designated critical habitat. The proposed critical habitat designation totals 271,062 acres (ac) (109,695 hectares (ha)) on the islands of Molokai, Lanai, Maui, and Kahoolawe (collectively called Maui Nui).

Determining the economic impacts of critical habitat designation involves evaluating the "without critical habitat" baseline (area only with species listed but without critical habitat) versus the "with critical habitat" scenario (area with critical habitat). Impacts of a designation equal the difference, or the increment, between these two scenarios. Measured differences between the baseline (area without critical habitat) and the designated critical habitat (area with critical habitat) may include (but are not limited to) changes in land or resource use, environmental quality, or time and effort expended on administrative and other activities by Federal landowners, Federal action agencies, and in some instances, State and local governments or private third parties. These are the "incremental effects" that serve as the basis for the economic analysis.

There are a number of ways that designation of critical habitat could influence activities, but one of the important functions of this memorandum is to explain any differences between conservation actions required to avoid jeopardy versus actions that may be required to avoid adverse modification. To perform this analysis, the Service considers how the proposed action is likely to affect the function of the critical habitat unit to serve the intended conservation role. The information provided below is intended to identify the possible differences for these species under the different section 7 standards.

Background

In total, we are proposing to list 35 plant species and 3 tree snail species as endangered, reaffirming the listing of 2 plant species, and proposing critical habitat for 135 species on the

islands of Molokai, Maui, Kahoolawe, and Lanai (see Table 1). We are newly proposing critical habitat for 49 plant and animal species and revising critical habitat for 86 plant species. The proposed critical habitat totals 271,062 ac (109,695 ha) on four islands (Molokai, Lanai, Maui, and Kahoolawe) in 100 units for plants, 44 identical units for each of the two forest birds, 5 identical units for each of the Lanai tree snails, and one unit for the Newcomb's tree snail. The proposed critical habitat units for plants, birds, and tree snails overlap each other in many areas and the proposed critical habitat for the two Lanai tree snails and the two forest birds corresponds to the same geographic area proposed for critical habitat for plants. The proposed critical habitat includes lands under Federal (10 percent), state (36 percent), private (53 percent), and County (1 percent) land ownership (see Tables 6A-D, H in the June 11, 2012, Maui Nui proposed rule). Approximately 47 percent of the area being proposed as critical habitat is already designated as critical habitat for 85 plant species or 3 insect species (Blackburn's sphinx moth (*Manduca blackburni*), and two picture-wing flies (*Drosophila differens* and *Drosophila neoclavisetae*)). Critical habitat was designated for the Blackburn's sphinx moth in 2003 (68 FR 34710) on the islands of Maui, Molokai, Kahoolawe, and Hawaii, and for 12 picture-wing flies on 5 islands, including *Drosophila neoclavisetae* on Maui and *Drosophila differens* on Molokai, in 2008 (73 FR 73794). Designated critical habitat for Blackburn's sphinx moth, *Drosophila differens*, and *Drosophila neoclavisetae* would not be revised in the June 11, 2012, Maui Nui proposed rule. Previous plant critical habitat would be replaced by the new proposed designation for Maui Nui.

Our approach to the Maui Nui listing and critical habitat proposal is based on the recovery recommendations from 14 recovery plans for plants and the Revised Recovery Plan for Hawaiian Forest Birds (Service 2006) (see Table 2); the report "Habitat Essential to the Recovery of Hawaiian Plants" (HPPRCC 1998); the report "An Ecoregional Assessment of Biodiversity Conservation for the Hawaiian High Islands" by The Nature Conservancy (including Geographic Information System (GIS) data for ecosystem mapping) (TNC 2006 and 2007); and other species-specific information provided by the Hawaii Biodiversity and Mapping Program (HBMP 2010); species experts, and other databases and GIS resources. We have proposed critical habitat for the species addressed in this proposed rule based on the ecosystems upon which they depend. The critical habitat proposed falls into 11 ecosystem types (Coastal, Lowland Dry, Lowland Mesic, Lowland Wet, Montane Wet, Montane Mesic, Montane Dry, Subalpine, Alpine, Dry Cliff, and Wet Cliff). Although the listing determination for each species is analyzed separately, native species that occur in the same ecosystems depend upon many of the same essential physical or biological features and the successful functioning of the ecosystem to survive. The species that share the same ecosystem also face a suite of common factors that may threaten them, and implementation of management actions for these threats benefits all the species found in the same managed area. In the 1984 and 2003 plant critical habitat designations, we targeted individual populations and some additional unoccupied habitat to provide for expansion of the populations and to meet recovery goals. Currently, our primary goal is to designate critical habitat occupied at the time of listing and that contains the physical and biological features associated with the ecosystem on which each species depends and the unoccupied habitat in each ecosystem that is essential to reaching the numerical and habitat recovery goals for each species established in the recovery plans. Each critical habitat unit identified in this proposed rule contains the physical or biological features essential to the conservation of the species that occupy that particular unit, or areas essential for the conservation of those species that may not

have occupied that unit at the time of listing. Where the unit is not occupied by a particular species, we believe it is still essential for the conservation of that species as it allows for the expansion of its range and reintroductions where the species occurred historically, and provides for recovery in the case of stochastic events that may eliminate the species from one or more locations where it is presently found.

Incremental impacts may be the direct compliance costs associated with additional effort for consultations, reinitiated consultations, and new consultations occurring specifically because of the designation of critical habitat that would not have been required under the jeopardy standard. One modification that may occur is that the Service will recommend offsetting project impacts to designated critical habitat only in other areas of designated critical habitat, preferably in the unit being impacted. This will limit the areas where a project proponent could purchase, or establish a land conservation reserve, to offset project impacts. Further, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat, triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.

QUESTIONS FROM IEC

CONSULTATION HISTORY FOR MAUI NUI

We were able to query the TAILS database for the information requested below for the years 2007-2012. TAILS does not include information prior to 2007. This earlier information could be retrieved from paper records, stored in our archives. IEC agreed that, for now, the records prior to 2007 were not needed for their analysis because guidance provided prior to 2007 has been replaced by updated recommendations developed since that time.

- 1. Please provide us with the types/categories of projects or activities that you have provided technical assistance, informal consultations, and formal consultations with a Federal nexus on Maui, Molokai, Lanai, and Kahoolawe.**

The types/categories of projects or activities that we have provided technical assistance or consulted on (for both the species and critical habitat), include: military training, geothermal mining leasing, airport development, air tour operations, highway construction, housing/resort development, habitat restoration, ungulate exclusion fencing, telescope construction, grazing and other agricultural activities, communications tower replacement or upgrade.

- 2. Please identify the Federal agencies you consult with.**

We consult with the DOI-National Park Service (NPS), National Science Foundation, USDA-Natural Resources Conservation Service (NRCS), Federal Aviation Administration (FAA), Federal Communications Commission (FCC), and U.S. Coast Guard.

3. How frequently (percentage of total) do you consult with a particular Federal agency?

Between 2007 and 2012 we conducted a total of two formal consultations for listed species. One formal consultation was with the U.S. Coast Guard (regarding replacement of a communications tower on Haleakala) and one was with the National Science Foundation (regarding construction and operation of the Advanced Technology Solar Telescope on Haleakala). For both consultations, we determined the projects were not likely to adversely affect critical habitat. Sixty-four percent of our informal consultations were conducted internally (Service), 27% were conducted with USDA-NRCS, and 9% were conducted with the DOI-NPS.

4. What type of project modifications do you request?

First and foremost, we request project modifications to avoid and minimize impacts to listed species and designated critical habitat. For example, we generally request placement of project structures, access roads, and other associated infrastructure be planned to minimize soil disturbance and clearing of native vegetation, critical habitat, areas occupied by listed species, and native habitats. Measures should be taken to ensure invasive species are not spread to areas where they may impact listed species or critical habitat. Any increased threat of wildfire to listed species or their habitats should be minimized and measures to ensure any such areas burned are restored or impacts of fire to the species are offset should be incorporated into project plans. Noise from construction or operation that may adversely affect listed vertebrates should be avoided, especially during the breeding season. In addition, we make the following species-specific recommendations:

- Reduce ambient lights that inadvertently attract listed species such as sea turtles, seabirds or insects;
- Request project impacts such as construction should not occur during the nesting or breeding season for listed Hawaiian waterbirds, Hawaiian hoary bat, and Hawaiian goose;
- Avoid potential adverse impacts to forest birds (such as the crested honeycreeper (akohekohe) and Maui parrotbill (kiwikiu)) because their habitats are rare and difficult to mitigate;
- Establish buffer areas around sensitive species or critical habitat to reduce indirect effects of a project such as increased human use, lights, dust, etc.

OUTCOME OF SECTION 7 CONSULTATIONS IN UNOCCUPIED HABITAT

Unoccupied Habitat Included In the Proposed Designation

- 1. Does the designation include unoccupied habitat that was not previously subject to the requirements of section 7?**

Yes, the designation includes unoccupied habitat that was not previously subject to the requirements of section 7.

(a) Identify unoccupied units or subunits.

There are a total of 11 unoccupied plant units that do not overlap with unoccupied bird or tree snail units (see Table 3). There are a total of 34 unoccupied plant units that overlap with unoccupied bird units (see Table 3). There are a total of 4 unoccupied plant units that overlap with unoccupied Lanai tree snail units (see Table 3). There are no occupied or unoccupied bird units on Lanai and, therefore, there is no overlap between bird units and tree snail units on Lanai. There are no unoccupied units proposed on Maui for the Newcomb's tree snail.

(b) In areas considered to be occupied at a "population scale," provide information about the likelihood that project proponents would have known about the potential presence of the species absent critical habitat.

Our office receives requests for comments on all development projects requiring Maui County permits. Our comment letters include a list of species known to occupy the proposed project site and we also recommend the project proponents conduct surveys to further assess the presence of listed species. Prior to coordinating with the County (and, prior to the County's coordination with us), project proponents may be unaware of the presence of the species.

(c) Describe typical project modifications the Service will recommend when considering adverse modification. Provide recommendations applicable across a broad suite of projects, or if uncertain, provide range of potential outcomes.

The Service recommends that adverse impacts to critical habitat be avoided. Where critical habitat is temporarily impacted (for instance by project-related vegetation disturbance, wildfire, and non-native invasive species impacts), measures to avoid or minimize the potential for introduction of nonnative species and to restore and conserve temporarily disturbed areas should be incorporated into project plans. Where permanent impacts to critical habitat are unavoidable, habitat loss should be offset elsewhere, preferably within the critical habitat unit. The Service may recommend adverse impacts to critical habitat be offset by restoring and conserving, in perpetuity, 2 or more acres of comparable habitat for every acre of habitat that is permanently removed. The ratio of acres of habitat to be restored for each acre within the critical habitat that may be adversely impacted would depend on the severity of the impact, the condition of the habitat to be impacted, and the rarity of the type of habitat being impacted. Permanent impacts to rare habitat types in good condition should be offset at higher ratios. Habitat that is already degraded could be offset with lower habitat conservation ratios if the quality of the habitat conserved is significantly greater than that of the habitat to be impacted. Typically recommended habitat restoration and protection actions for the plant, invertebrate, and vertebrate species include propagation and outplanting of native plants, control of non-native invasive species (including rats, slugs, snails, and nonnative insects), construction of ungulate fences and barriers and control of ungulates, and wildfire threat minimization. See Table 4.

To avoid adverse modification, the Service may recommend similar measures; however, the habitat conserved should be within the affected critical habitat unit or, where that is not possible, be within critical habitat of the type to be impacted.

OUTCOME OF SECTION 7 CONSULTATIONS IN OCCUPIED HABITAT

2. Once critical habitat is designated, will the outcome of section 7 consultations in occupied habitat be different?

The Service's recommendations for offsetting adverse project impacts to habitat that is occupied by a listed bird, invertebrate, or plant species under the jeopardy standard are often the same as recommendations we would make to offset adverse impacts to critical habitat with the exception of the conservation project's location. This is because the habitat requirements of the species (such as Blackburn's sphinx moth) are often very similar (e.g., native vegetation) to the physical and biological features identified in critical habitat. For example, adult Blackburn's sphinx moths feed on nectar from native plants ranging in elevation from sea level to 5,000 feet, including beach morning glory (*Ipomoea pescaprae*), iliee (*Plumbago zeylanica*), and maiapilo (*Capparis sandwichiana*). Blackburn's sphinx moth larvae feed upon the native aiea (*Nothocestrum sp.*), which is found in dry to moist forests at elevations ranging from 1,500 to 5,000 feet. These plants are often identical to, or coexist with the physical or biological features that are essential to the conservation of species for which critical habitat is designated. Thus, actions to promote native habitats that would contain plants supporting Blackburn's sphinx moth will also be beneficial in establishing and providing ecosystems that support species identified as physical or biological features for critical habitat, such as *Myoporum*, *Pleomele*, *Chamaesyce*, *Dodonaea*, *Bidens*, *Chenopodium* and other genera found in lowland dry ecosystem.

For most ongoing and currently planned projects identified in this analysis, habitat conservation measures have been implemented or are currently being planned to occur within the affected critical unit, or in a unit with similar conservation value, even absent critical habitat designation such that the Service believes they may avoid adverse modification. However, such projects would still need to be evaluated on a case-by-case basis after critical habitat is designated. For other projects, habitat conservation project locations may shift from previously-planned areas into critical habitat units to ensure the conservation value of critical habitat will not be appreciably diminished. Where conservation measures are shifted to critical habitat units from other sites, incremental impacts of critical habitat designation will also include a change to mitigation costs. In contrast, on projects where no changes to the conservation site locations are made, incremental impacts of critical habitat designation are expected to be limited to the costs of additional administrative effort in section 7 consultations to consider adverse modification.

(a) What laws, conservation plans, or policies currently provide protection to the species and their habitat?

Laws

Endangered Species Act of 1973, as amended (ESA)

Hawaii Revised Statute 195-D (Haw. Rev. Stat. 195-D). Currently, Hawaii’s Department of Land and Natural Resources (DLNR) administers the Conservation of Aquatic Life, Wildlife, and Land Plants Act Endangered and Threatened Species (Haw. Rev. Stat. 195-D), through Hawaii Administrative Rules, Title 13, Subtitle 5, Chapter 107, Threatened and Endangered Plants; and Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife, and Introduced Wild Birds. This law is Hawaii’s endangered species act, and incorporates the list of endangered and threatened species under the Federal ESA. The DLNR is authorized to add other indigenous Hawaiian species to the established list of state endangered and threatened species. Unlike the Federal ESA, Hawaii State law recognizes “take” for plants. The Hawaii statute makes it unlawful for any person to take, possess, transport, or sell any species on either the Federal or State list. However, **pursuant to Haw. Rev. Stat. 195D, a landowner may seek an Incidental Take License (ITL) from the DLNR for take of a threatened or endangered species that is incidental to an otherwise lawful activity provided that the applicant prepares an accompanying State Habitat Conservation Plan (HCP) that meets the requirements enumerated under Haw. Rev. Stat. 195D including measures for avoidance, minimization, mitigation, monitoring, and net recovery benefit to the affected species.**

Migratory Bird Treaty Act (MBTA). The MBTA (16 U.S.C. 701-711) was enacted in 1916 between the governments of the United States and Great Britain (representing Canada), subsequently Mexico in 1936, Japan in 1972, and the Union of Soviet Socialist Republics in 1976. The MBTA expanded the definition of migratory birds to include virtually all birds found in the United States. It establishes provisions regulating take, possession, transport, and import of migratory birds, including nests and eggs. On March 1, 2010, 24 bird species occurring naturally only in Hawaii were added to the list of birds protected under the MBTA in the first revision of the list since 1985. The list of birds includes the endangered akohekohe (*Palmeria dolei*) and kiwikiu (*Pseudonestor xanthophrys*) for which critical habitat is proposed in this rule.

Conservation Plans

Federal Agencies

The Fish and Wildlife Service Recovery Plans—While not regulatory documents, the Service’s recovery plans for listed species describe conservation strategies and those measures that can be implemented to recover the species. Recovery plans are in place for 96 listed plant and animal species included in the Maui Nui proposed rule, and will be in development for 40 species if listed endangered or threatened in the Maui Nui final rule. Recovery actions may include, but are not limited to: collection, propagation, and maintenance of genetic stock; protection of remaining wild individuals, identification and mapping of all extant wild populations; delineation of management units, provision for long-term habitat protection by fencing, ungulate control, nonnative plant control, rodent control, and wildfire control; prevention of human disturbance; outplanting in prepared and protected sites; study of pollination limitations, disease vectors, and reproductive viability; and development of a long-term monitoring program using adaptive management methods. These actions are carried out by a collection of agencies, land managers and owners (see Table 2). Service recovery plans can be accessed online at: <http://www.fws.gov/endangered/species/recovery-plans.html>.

The National Park Service Management Plans—The management plans for Haleakala National Park (HALE) can be accessed online at:

<http://www.nps.gov/hale/parkmgmt/index.htm>.

Although Kalaupapa National Historical Park (KALA) on Molokai is mostly on State-owned land, it is managed by the National Park Service. The management plans for KALA can be accessed online at: <http://www.nps.gov/kala/parkmgmt/planning.htm>.

The U.S. Coast Guard—On Molokai the U.S. Coast Guard and/or the National Park Service manage(s) State-owned land for maintenance of a lighthouse (Kalaupapa Lighthouse). We are unaware of conservation or management plans for species or their habitat on the lighthouse lands.

State of Hawaii Agencies

The Hawaii State Natural Area Reserves Management Plans—Critical habitat is proposed in Ahihi-Kinohiwa Natural Area Reserve (NAR) and Hanawi NAR on Maui. Management plans for these two Natural Area Reserves may be accessed online at:

<http://www.hawaii.gov/dlnr/dofaw/nars/reserves/maui>.

The Hawaii State Forest Reserve System—There are nine forest reserves on the islands of Maui (Hana Forest Reserve (FR), Kahikinui FR, Kipahulu FR, Koolau FR, Kula FR, Makawao FR, Waihou FR, and West Maui FR) and Molokai (Molokai FR). There are no forest reserves on the islands of Lanai or Kahoolawe, although there is a State Division of Forestry and Wildlife (DOFAW) office on Lanai. Critical habitat is proposed on State forest reserve lands on Maui and Molokai. Management goals for the forest reserves may be accessed online at: <http://www.state.hi.us/dlnr/dofaw/frs>. Management plans for these forest reserves may be available online or by contacting the individual district forestry offices (Maui, 808/984-8100; Molokai, 808/553-1745; Lanai, 808/565-7916).

Hawaii Wildlife Conservation Strategy—Hawaii's Comprehensive Wildlife Conservation Strategy (CWCS) presents strategies for long-term conservation of Hawaii's native species and their habitats. The CWCS builds on and synthesizes information gathered from existing conservation partnerships and cooperative efforts, to develop a strategy that is based on collaboration with other local, State, and Federal agencies, non-governmental organizations, private landowners, and interested citizens. To address the major threats facing Hawaii's native wildlife and plants the CWCS identifies multiple strategies to implement seven priority conservation objectives for the State. The CWCS can be accessed online at: <http://www.state.hi.us/dlnr/dofaw/cwcs>.

Kahoolawe Island Reserve—In 1993 the Kahoolawe Island Reserve Commission (KIRC) was established by the Hawaii State Legislature to manage the Reserve [the island of Kahoolawe]. In 2003, control of access to Kahoolawe was transferred from the U.S. Navy to the State of Hawaii, following 10 years of ordnance removal. KIRC is responsible for the restoration and sustainable management of the island until it can be transferred to a native Hawaiian entity to manage. The KIRC strategic plan can be accessed online at: <http://www.kahoolawe.hawaii.gov>.

Private Organizations and Partnerships

The Nature Conservancy Preserves Management Plans—The Nature Conservancy (TNC) preserves resulting from past private land acquisition or management of privately owned lands provide site-specific benefits to the species. Although critical habitat is proposed on TNC's Kapunakea and Waikamoi Preserves on Maui we are considering excluding these lands from critical habitat designation under section 4(b)(2) of the ESA. Information on these preserves can be accessed online at:

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/hawaii/places we protect/kapunakea.xml> and

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/hawaii/places we protect/waikamoi.xml>. In addition, we are considering excluding TNC's Kamakou and Moomomi Preserves on Molokai from critical habitat designation under section 4(b)(2) of the

ESA. Information on these preserves can be accessed online at:

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/hawaii/places we protect/kamakou.xml> and

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/hawaii/places we protect/moomomi.xml>. Critical habitat is proposed on TNC's Pelekunu Preserve on Molokai.

Information on this preserve can be accessed online at:

<http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/hawaii/places we protect/pelekunu.xml>.

Federally Funded Conservation Actions

The Pacific Islands Fish and Wildlife Office's Conservation Partnerships Program—This program is a collection of voluntary habitat restoration programs (Partners for Fish and Wildlife, Coastal Conservation Program, Invasive Species Program, and Environmental Contaminants Program) with the goal of restoring native Pacific Island ecosystems through collaborative projects. The program seeks to implement large-scale conservation efforts for the benefit of native ecosystems by working cooperatively with private landowners, conservation organizations, community groups, and other government agencies. Assistance provided by the Service ranges from informal advice on the potential restoration project design and location to cost-share funding of project implementation under a formal cooperative agreement with the landowner. Funding is limited and highest priority projects are those that reestablish natural biological communities and provide long-term benefits to listed (endangered or threatened), proposed or candidate species; declining migratory bird and fish species; and private lands projects that satisfy the needs of wildlife populations on National Wildlife Refuges. Information on the Pacific Islands Partners for Fish and Wildlife Program can be accessed online at: <http://www.fws.gov/pacificislands/partners.html>.

U.S.D.A. Natural Resources Conservation Service (NRCS)—The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides financial and technical assistance through contracts up to a maximum of 10 years. The contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and provide opportunities to improve soil, water, plant and animal resources on

agricultural land and nonindustrial private forest land. The Wildlife Incentives Program (WHIP) is a voluntary program for conservation-minded landowners who wish to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and tribal land.

Information on these two programs in Hawaii can be accessed online at:

<http://www.pia.nrcs.usda.gov/programs>.

U.S. Forest Service—The Forest Service provides funding for private and government entities in Hawaii for issues pertaining to 1) water quality and quantity, 2) forest health: invasive species, insects, and disease, 3) wildfire prevention and suppression, 4) urban forest health and sustainability, 5) climate change/sea level rise, 6) conservation of native biodiversity, 7) hunting, nature-based recreation and tourism, and 9) regional issues specific to the Pacific Islands.

Information on their programs in Hawaii can be accessed online at:

<http://www.fs.fed.us/psw/hawaii>.

[NOTE: No lands are specifically owned or managed by the U.S. Forest Service that fall within the proposed critical habitat on Maui, Molokai, Lanai, and Kahoolawe].

Other State and Privately-Funded Conservation Actions

Watershed Partnerships—The Hawaii Association of Watershed Partnerships is comprised of 11 island-based watershed partnerships that work collaboratively with more than 70 public and private partners on six islands, including Maui, Molokai, and Lanai, to protect over 2.2 million acres of forested watershed lands. Within Maui Nui there are five watershed partnerships: East Maui Watershed Partnership, West Maui Mountains Watershed Partnership, Leeward Haleakala Restoration Partnership, East Molokai Watershed Partnership, and Lanai Forest and Watershed Partnership. Information on these partnerships can be accessed online at:

<http://hawp.org>.

Hawaii Invasive Species Council—This council was established to provide policy level direction, coordination, and planning among Hawaii's government departments, Federal agencies, and international and local initiatives for the control and eradication of harmful invasive species throughout the state and to prevent the introduction of other invasive species that may be potentially harmful. Further information can be accessed online at:

<http://www.hawaiiinvasivespecies.org>.

Maui Invasive Species Committee and Molokai Invasive Species Committee—These two committees are part of an island-based partnership of government agencies, non-government organizations, and private businesses working to protect these two islands from the most threatening invasive pests. Each committee has a paid staff and field crew to implement rapid response and control plans. Further information can be accessed online at:

<http://www.hawaiiinvasivespecies.org/iscs>.

(b) What types of project modifications are currently recommended by the Service to avoid jeopardy?

Project modifications currently recommended by our office to avoid jeopardy to **listed plants** may include a combination of any of the following:

- (1) Actions to avoid destruction of individual listed plants.
- (2) Actions to control feral ungulates (e.g., pigs (*Sus scrofa*), axis deer (*Axis axis*), mouflon sheep (*Ovis gmelini musimon*), goats (*Capra hircus*), and cattle (*Bos taurus*).
- (3) Actions to control nonnative plants.
- (4) Actions to control seed predators such as rats.
- (5) Actions to control nonnative invertebrates (e.g., slugs).
- (6) Actions to control wildfire.
- (7) Actions to avoid destruction of habitat for listed plants.
- (8) Actions to offset destruction of listed plants including propagating, outplanting and conserving the plants elsewhere such that no net reduction to the species' range or numbers results from the project.

Project modifications currently recommended by our office to avoid jeopardy to **listed forest birds** such as the endangered akohekohe (crested honeycreeper) and the endangered kiwikiu (Maui parrotbill), both included in this proposed rule, may include a combination of the following:

- (1) Actions to avoid destruction of individual birds, active nests, and eggs.
- (2) Actions to control feral ungulates (pigs).
- (3) Actions to control nonnative plants.
- (4) Actions to avoid destruction of habitat for listed forest birds.
- (5) Actions to offset destruction of forest bird habitat, including conservation and restoration (e.g., fencing, removal of feral ungulates, control of nonnative plants, control of rats, planting of native species) of habitat elsewhere within the range of the species.
- (6) Egg collection, hatching, rearing, and introduction of juveniles into protected, good-quality native habitat.
- (7) Captive rearing and reintroduction into protected, good-quality native habitat.

Project modifications currently recommended by our office to avoid jeopardy to **listed tree snails** may include a combination of the following:

- (1) Actions to avoid destruction of individual snails.
- (2) Actions to avoid destruction of snail habitat.
- (3) Actions to offset adverse impacts to individual snails or their habitat including conserving listed snails or restoring and conserving, in perpetuity, snail habitat. Snail conservation actions could include propagating the listed snails and native plants and managing snail populations and snail habitat in areas that are restored to good-quality native habitat and protected from snail predators (including mongoose, rats, and predatory snails), ungulate browsing, wildfire, competition from invasive species, and other disturbances.

(c) What recommendations will the Service make during a section 7 consultation that considers both jeopardy and adverse modification?

We assess jeopardy and adverse modification separately. Our assessment of the species' needs is not compounded if the consultation considers both the jeopardy and adverse

modification standards. See (b) above, for project modification recommendations to avoid jeopardy to listed plants, forest birds (akohekohe and kiwikiu), and tree snails.

Project modifications that our office may recommend during a section 7 consultation that **considers adverse modification of critical habitat** would include similar habitat-based measures as for a consultation considering jeopardy, except that we would recommend such measures to offset adverse modification to critical habitat be located in similar critical habitat (preferably in the impacted unit). In contrast, for a jeopardy analysis, the measures need not necessarily be near the project area, but could be elsewhere. In addition, for the forest birds and tree snails, we would not necessarily recommend propagation or captive rearing and reintroduction of the listed animal as a measure to avoid adverse modification.

BEHAVIOR CHANGES AS A RESULT OF NEW INFORMATION

Will the designation provide new information to stakeholders that results in different behavior [i.e., will the designation compel stakeholders to consult with us where not otherwise required]?

In a limited subset of areas, the designation will compel Federal stakeholders to consult with us pursuant to section 7, where it would not otherwise be required. The subset of areas where Federal stakeholders would now consult, where it would not have been required in the absence of the critical habitat designation, are those where listed species are not currently present and critical habitat was previously absent (not including critical habitat being revised in this rule). Within the areas planned for future project implementation, the extent of the areas where there have been no previous consultations is limited. All areas of Maui Nui are traversed by listed seabirds. The Hawaiian hoary bat and Hawaiian goose are likely to occur at many of the sites identified for future development. The Blackburn's sphinx moth's historical range, which is likely to be occupied by this species, overlaps with all of the proposed critical habitat units within which proposed development projects are known to be situated. The designation of new critical habitat (i.e., critical habitat proposed in the Maui Nui rule) may change the design of the conservation actions used to offset adverse project impacts in that the future projects may be completed within the critical habitat unit, rather than elsewhere.

In instances where loss of feeding or breeding habitat results from the action, that loss of habitat for a species, under the jeopardy standard, may be offset with conservation actions that are similar to those the Service would recommend to compensate for impacts to critical habitat. Loss of a species' habitat should be offset, at a minimum, by the conservation of two comparable acres of habitat for each acre impacted. Where habitat at the conservation site is of lower quality to the impacted habitat, higher habitat conservation ratios are needed; where habitat at the conservation site is of higher quality than the impacted habitat, lower habitat conservation ratios may be appropriate. Permanent habitat loss should be offset with maintenance, in perpetuity, of the conservation project site. Where impacts are not permanent, shorter-term management of the conservation site, or lower habitat conservation ratios, may be appropriate. The Service's habitat conservation ratios and management timeline recommendations for impacts to critical habitat are similar to these recommendations under the jeopardy standard. For example, in instances where a

conservation project is developed to offset adverse project impacts to a species at a particular site, the conservation project that most benefits that species may not be within the critical habitat unit to be impacted by the project. In contrast, to offset the adverse impacts to a critical habitat unit, the conservation project may need to be located within the same unit of critical habitat the project is impacting and should be in a critical habitat unit that provides the same conservation benefit as the unit to be impacted. For example, because the Blackburn's sphinx moth range is substantial, many Maui Nui projects would address impacts to this species in the absence of critical habitat designation. The Service recommends the project-related loss of Blackburn's sphinx moth habitat be offset with the restoration and conservation of Blackburn's sphinx moth habitat elsewhere. Because the Blackburn's sphinx moth range extends over most of the Maui Nui landscape, a wide array of sites are suitable for Blackburn's sphinx moth conservation. If the impacted area is also critical habitat, measures to offset impacts to critical habitat must be undertaken within the impacted critical habitat unit or a unit similar to the impacted one. Measures to conserve the Blackburn's sphinx moth and the critical habitat may be located in the same conservation project area or they may be distinct.

(a) Are Federal agencies (Action agencies) or project proponents more likely to consult under section 7 or to pursue habitat conservation plans (HCPs) under section 10 after the designation of critical habitat? Describe actions taken by stakeholders as a result of critical habitat

Action agencies will likely have more actions that may affect critical habitat after the designation than they did prior to the critical habitat designation and, therefore, will need to consult more. These additional actions are only in areas where critical habitat was not previously designated (including critical habitat being revised in this rule) or where listed species are not currently present.

As there is no take prohibition of critical habitat, we do not expect non-federal project proponents to pursue HCPs solely because of newly designated critical habitat.

(b) Will local land use or resource agencies view designated critical habitat differently when making permitting or other decisions? Describe how local land agencies might change project requirements

We are not aware if local land use or resource agencies view designated critical habitat differently when making permitting or other decisions. We have asked Maui County planning staff this question but have not received a response, yet. We are not aware of any additional "requirements" pursuant to State law (Hawaii Revised Statue 195-D) that would be triggered due to designation of critical habitat. However, we work jointly with the State's Division of Fish and Wildlife (DOFAW) and the applicant to develop HCPs pursuant to both Federal and State laws. The Service and DOFAW process the State and Federal HCPs concurrently working collaboratively to come to a consensus regarding the estimated take and the mitigation to offset that take. The end result is that the final State HCP and the Federal HCP are very similar documents. This assists both agencies in monitoring the actions and the mitigation of the HCPs. Therefore, if the Service requests additional land to be conserved to offset impacts to CH, that mitigation will be the same in the State HCP.

CHANGES IN ADMINISTRATIVE EFFORT

4. How much additional administrative effort will the Service expend to address adverse modification in its section 7 consultations? How great will the increase in effort be on average? Describe the increase in administrative effort [i.e., number of hours] on average in absolute terms or as a percentage of current effort.

Addressing adverse modification of critical habitat in our section 7 consultations will not increase our administrative effort in approximately 95% of our consultations. This is because most consultations occur in areas that are already designated critical habitat for species not subject to the current proposed rule or occupied by listed species and measures to offset adverse project impacts to avoid jeopardy or adverse modification may be incorporated into the project in the absence of the Maui Nui designation. To address those instances where additional or different conservation measures are needed, the workload would increase by approximately 5%.

CHANGES IN STATE OR LOCAL LAWS

5. Does the designation of critical habitat trigger additional “requirements” (i.e., project modifications) under State or local laws to protect sensitive habitat?

We are not aware of any additional “requirements” pursuant to State law (Hawaii Revised Statute 195-D) that would be triggered due to designation of critical habitat. However, we work jointly with the State’s Division of Fish and Wildlife (DOFAW) and the applicant to develop HCPs pursuant to both Federal and State laws. The Service and DOFAW process the State and Federal HCPs concurrently working collaboratively to come to a consensus regarding the estimated take and the mitigation to offset that take. The end result is that the final State HCP and the Federal HCP are very similar documents. This assists both agencies in monitoring the actions and the mitigation of the HCPs. Therefore, if the Service requests additional land to be conserved to offset impacts to CH, that mitigation will be the same in the State HCP.

MITIGATION IN EXISTING CRITICAL HABITAT

6. Is there already (absent the new critical habitat designation for the Maui Nui species) mitigation recommended to offset disturbance from development activities in the existing critical habitat areas?

Yes

7. If so, is that mitigation in existing critical habitat recommended at similar ratios as would be for the Maui Nui species (2:1 for native habitat and 1:1 for degraded habitat)?

The Service recommends adverse permanent impacts to critical habitat be avoided. Where critical habitat is temporarily impacted, measures to restore and conserve temporarily disturbed areas should be incorporated into project plans. Where permanent impacts to critical habitat are unavoidable, habitat loss should be offset elsewhere within the critical habitat unit. Adverse impacts to critical habitat should be offset by restoring and conserving, in perpetuity, at least 2 acres or more of comparable habitat within the critical habitat unit for every acre of habitat that is permanently impacted. These ratios may be higher for particularly rare native habitat. To offset adverse impacts to degraded areas of critical habitat, smaller habitat conservation ratios of native habitat restored for each acre of degraded habitat lost may be recommended.

8. Would additional critical habitat in those areas (for the Maui Nui species) change the recommended mitigation ratios?

The designation of additional critical habitat in areas that are already critical habitat would not change the recommended mitigation ratios.

9. Is mitigation for disturbance in existing critical habitat recommended to be implemented within those existing critical habitat units?

Yes, we would recommend any habitat conservation measures be implemented within the critical habitat unit being impacted by the proposed action. If this is impossible, habitat conservation measures should at least be within nearby critical habitat units that provide the same conservation value as the impacted unit.

TABLE 1. THE MAUI NUI SPECIES ADDRESSED IN THE PROPOSED RULE (NOTE THAT MANY OF THE SPECIES SHARE THE SAME COMMON NAME. “E” DENOTES ENDANGERED STATUS UNDER THE ACT; “C” DENOTES A SPECIES CURRENTLY ON THE CANDIDATE LIST)			
Species Proposed for Listing as Endangered			
Plants			
Scientific name	Common Name(s)	Listing Status	Critical Habitat Status
<i>Bidens campylotheca</i> ssp. <i>Pentamera</i>	kookoolau	Proposed– Endangered (C)	Proposed
<i>Bidens campylotheca</i> ssp. <i>Waihoiensis</i>	kookoolau	Proposed– Endangered (C)	Proposed
<i>Bidens conjuncta</i>	kookoolau	Proposed– Endangered (C)	Proposed
<i>Calamagrostis hillebrandii</i>	[NCN]	Proposed– Endangered (C)	Proposed
<i>Canavalia pubescens</i>	awikiwiki	Proposed– Endangered (C)	Proposed
<i>Cyanea asplenifolia</i>	Haha	Proposed– Endangered (C)	Proposed
<i>Cyanea duvalliorum</i>	Haha	Proposed– Endangered	Proposed
<i>Cyanea horrida</i>	haha nui	Proposed– Endangered	Proposed
<i>Cyanea kunthiana</i>	Haha	Proposed– Endangered (C)	Proposed
<i>Cyanea magnicalyx</i>	Haha	Proposed– Endangered	Proposed
<i>Cyanea maritae</i>	Haha	Proposed– Endangered	Proposed
<i>Cyanea mauiensis</i>	Haha	Proposed– Endangered	Not determinable
<i>Cyanea munroi</i>	Haha	Proposed– Endangered	Proposed
<i>Cyanea obtusa</i>	Haha	Proposed– Endangered (C)	Proposed
<i>Cyanea profuga</i>	Haha	Proposed– Endangered	Proposed
<i>Cyanea solanacea</i>	popolo	Proposed– Endangered	Proposed
<i>Cyrtandra ferripilosa</i>	haiwale	Proposed– Endangered	Proposed

<i>Cyrtandra filipes</i>	haiwale	Proposed– Endangered (C)	Proposed
<i>Cyrtandra oxybapha</i>	haiwale	Proposed– Endangered (C)	Proposed
<i>Festuca molokaiensis</i>	[NCN]	Proposed– Endangered	Proposed
<i>Geranium hanaense</i>	nohoanu	Proposed– Endangered (C)	Proposed
<i>Geranium hillebrandii</i>	nohoanu	Proposed– Endangered (C)	Proposed
<i>Mucuna sloanei</i> var. <i>persericea</i>	sea bean	Proposed– Endangered	Proposed
<i>Myrsine vaccinioides</i>	Kolea	Proposed– Endangered (C)	Proposed
<i>Peperomia subpetiolata</i>	alaala wai nui	Proposed– Endangered (C)	Proposed
<i>Phyllostegia bracteata</i>	[NCN]	Proposed– Endangered (C)	Proposed
<i>Phyllostegia haliakalae</i>	[NCN]	Proposed– Endangered	Proposed
<i>Phyllostegia pilosa</i>	[NCN]	Proposed– Endangered	Proposed
<i>Pittosporum halophilum</i>	hoawa	Proposed– Endangered	Proposed
<i>Pleomele fernaldii</i>	hala pepe	Proposed– Endangered (C)	Proposed
<i>Schiedea jacobii</i>	[NCN]	Proposed– Endangered	Proposed
<i>Schiedea laui</i>	[NCN]	Proposed– Endangered	Proposed
<i>Schiedea salicaria</i>	[NCN]	Proposed– Endangered (C)	Proposed
<i>Stenogyne kauaulaensis</i>	[NCN]	Proposed– Endangered	Proposed
<i>Wikstroemia villosa</i>	Akia	Proposed– Endangered	Proposed
Animals			
<i>Newcombia cumingi</i>	Newcomb's tree snail	Proposed– Endangered (C)	Proposed
<i>Partulina semicarinata</i>	Lanai tree snail	Proposed– Endangered (C)	Proposed
<i>Partulina variabilis</i>	Lanai tree snail	Proposed– Endangered (C)	Proposed
Species reevaluated for listing			

<i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> (change in range)	Haha	Reevaluation of Listing–Endangered	Proposed revision
<i>Santalum freycinetianum</i> var. <i>lanaiense</i> (taxonomic revision proposed, to <i>S. haleakalae</i> var. <i>lanaiense</i>)	Iliahi	Reevaluation of Listing–Endangered	Proposed
Listed species without critical habitat designations			
Scientific name	Common Name(s)	Listing Status	Status of Existing Critical Habitat
Plants			
<i>Abutilon eremitopetalum</i>	[NCN]	Listed 1991–E	None–Proposed
<i>Acaena exigua</i>	Liliwai	Listed 1992–E	None–Proposed*
<i>Cyanea macrostegia</i> ssp. <i>gibsonii</i> (taxonomic revision proposed, to <i>C. gibsonii</i>)	Haha	Listed 1991–E	None–Proposed
<i>Hedyotis schlechtendahlia</i> var. <i>remyi</i> (taxonomic revision proposed, to <i>Kadua cordata</i> ssp. <i>remyi</i>)	Kopa	Listed 1999–E	None–Proposed
<i>Kokia cookei</i>	Cooke’s kokio	Listed 1979–E	None–Proposed*
<i>Labordia tinifolia</i> var. <i>lanaiensis</i>	kamakahala		None–Proposed
<i>Melicope munroi</i>	Alani	Listed 1999–E	None–Proposed
<i>Phyllostegia hispida</i>	[NCN]	Listed 2009–E	None–Proposed†
<i>Viola lanaiensis</i>	[NCN]	Listed 1991–E	None–Proposed
Animals			
<i>Palmeria dolei</i>	Akohekohe, crested honeycreeper	Listed 1967–E	None–Proposed‡
<i>Pseudonestor xanthophrys</i>	Kiwikiu, Maui parrotbill	Listed 1967–E	None–Proposed‡
Listed species for which revisions to existing critical habitat are proposed			
Scientific name	Common Name(s)	Year of Critical Habitat Designation–Current Proposed Action	
<i>Adenophorus periens</i>	pendent kihi fern	2003–Proposed Revision of Critical Habitat	
<i>Alectryon macrococcus</i>	mahoe	2003–Proposed Revision of Critical Habitat	
<i>Argyroxiphium sandwicense</i> ssp. <i>macrocephalum</i>	ahinahina, (= Haleakala silversword)	2003–Proposed Revision of Critical Habitat	

<i>Asplenium fragile</i> var. <i>insulare</i> (taxonomic revision proposed, to <i>A. peruvianum</i> var. <i>insulare</i>)	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Bidens micrantha</i> ssp. <i>kalealaha</i>	kookoolau	2003–Proposed Revision of Critical Habitat
<i>Bidens wiebkei</i>	kookoolau	2003–Proposed Revision of Critical Habitat
<i>Bonamia menziesii</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Brighamia rockii</i>	pua ala	2003–Proposed Revision of Critical Habitat
<i>Canavalia molokaiensis</i>	awikiwiki	2003–Proposed Revision of Critical Habitat
<i>Cenchrus agrimonioides</i>	kamanomano (= sandbur, agrimony)	2003–Proposed Revision of Critical Habitat
<i>Centaurium sebaeoides</i> (taxonomic revision proposed, to <i>Schenkia sebaeoides</i>)	Awiwi	2003–Proposed Revision of Critical Habitat
<i>Clermontia lindseyana</i>	oha wai	2003–Proposed Revision of Critical Habitat
<i>Clermontia oblongifolia</i> ssp. <i>brevipes</i>	oha wai	2003–Proposed Revision of Critical Habitat
<i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i>	oha wai	2003–Proposed Revision of Critical Habitat
<i>Clermontia peleana</i>	oha wai	2003–Proposed Revision of Critical Habitat
<i>Clermontia samuelii</i>	oha wai	2003–Proposed Revision of Critical Habitat
<i>Colubrina oppositifolia</i>	Kauila	2003–Proposed Revision of Critical Habitat
<i>Ctenitis squamigera</i>	Pauoa	2003–Proposed Revision of Critical Habitat
<i>Cyanea copelandii</i> ssp. <i>haleakalaensis</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea dunbarii</i> (spelling correction proposed, to <i>C. dunbariae</i>)	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea glabra</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea hamatiflora</i> ssp. <i>hamatiflora</i>	Haha	2003–Proposed Revision of Critical Habitat

<i>Cyanea lobata</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea mannii</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea mceldowneyi</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyanea procera</i>	Haha	2003–Proposed Revision of Critical Habitat
<i>Cyperus trachysanthos</i>	puukaa	2003–Proposed Revision of Critical Habitat
<i>Cyrtandra munroi</i>	haiwale	2003–Proposed Revision of Critical Habitat
<i>Diellia erecta</i> (taxonomic revision proposed, to <i>Asplenium dielirectum</i>)	Asplenium-leaved diellia	2003–Proposed Revision of Critical Habitat
<i>Diplazium molokaiense</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Dubautia plantaginea</i> ssp. <i>Humilis</i>	naenae	2003–Proposed Revision of Critical Habitat
<i>Eugenia koolauensis</i>	Nioi	2003–Proposed Revision of Critical Habitat
<i>Flueggea neowawraea</i>	mehamehame	2003–Proposed Revision of Critical Habitat
<i>Geranium arboreum</i>	Hawaiian red-flowered geranium	2003–Proposed Revision of Critical Habitat
<i>Geranium multiflorum</i>	nohoanu	2003–Proposed Revision of Critical Habitat
<i>Gouania hillebrandii</i>	[NCN]	1984–Proposed Revision of Critical Habitat
<i>Gouania vitifolia</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Hedyotis coriacea</i> (taxonomic revision proposed, to <i>Kadua coriacea</i> **)	Kioele	2003–Proposed Revision of Critical Habitat
<i>Hedyotis mannii</i> (taxonomic revision proposed, to <i>Kadua laxiflora</i>)	Pilo	2003–Proposed Revision of Critical Habitat
<i>Hesperomannia arborescens</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Hesperomannia arbuscula</i>	[NCN]	2003–Proposed Revision of Critical Habitat

<i>Hibiscus arnottianus</i> ssp. <i>immaculatus</i>	kokio keokeo	2003–Proposed Revision of Critical Habitat
<i>Hibiscus brackenridgei</i>	mao hau hele	2003–Proposed Revision of Critical Habitat
<i>Huperzia mannii</i>	wawaeiole	2003–Proposed Revision of Critical Habitat
<i>Ischaemum byrone</i>	Hilo ischaemum	2003–Proposed Revision of Critical Habitat
<i>Isodendrion pyriformium</i>	wahine noho kula	2003–Proposed Revision of Critical Habitat
<i>Kanaloa kahoolawensis</i>	kohe malama malama o kanaloa	2003–Proposed Revision of Critical Habitat
<i>Labordia triflora</i>	kamakahala	2003–Proposed Revision of Critical Habitat
<i>Lipochaeta kamolensis</i> (taxonomic revision proposed, to <i>Melanthera kamolensis</i>)	Nehe	2003–Proposed Revision of Critical Habitat
<i>Lysimachia lydgatei</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Lysimachia maxima</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Mariscus fauriei</i> (taxonomic revision proposed, to <i>Cyperus fauriei</i>)	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Mariscus pennatiformis</i> (taxonomic revision proposed, to <i>Cyperus pennatiformis</i> **)	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Marsilea villosa</i>	ihi ihi	2003–Proposed Revision of Critical Habitat
<i>Melicope adscendens</i>	Alani	2003–Proposed Revision of Critical Habitat
<i>Melicope balloui</i>	Alani	2003–Proposed Revision of Critical Habitat
<i>Melicope knudsenii</i>	Alani	2003–Proposed Revision of Critical Habitat
<i>Melicope mucronulata</i>	Alani	2003–Proposed Revision of Critical Habitat
<i>Melicope ovalis</i>	Alani	2003–Proposed Revision of Critical Habitat
<i>Melicope reflexa</i>	Alani	2003–Proposed Revision of Critical Habitat

<i>Neraudia sericea</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Nototrichium humile</i>	Kului	2003–Proposed Revision of Critical Habitat
<i>Peucedanum sandwicense</i>	makou	2003–Proposed Revision of Critical Habitat
<i>Phyllostegia mannii</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Plantago princeps</i>	laukahi kuahiwi	2003–Proposed Revision of Critical Habitat
<i>Platanthera holochila</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Portulaca sclerocarpa</i>	Poe	2003–Proposed Revision of Critical Habitat
<i>Pteris lidgatei</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Remya mauiensis</i>	Maui remya	2003–Proposed Revision of Critical Habitat
<i>Sanicula purpurea</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Schiedea haleakalensis</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Schiedea lydgatei</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Schiedea sarmentosa</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Sesbania tomentosa</i>	Ohai	2003–Proposed Revision of Critical Habitat
<i>Silene alexandri</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Silene lanceolata</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Solanum incompletum</i>	popolo ku mai	2003–Proposed Revision of Critical Habitat
<i>Spermolepis hawaiiensis</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Stenogyne bifida</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Tetramolopium capillare</i>	pamakani	2003–Proposed Revision of Critical Habitat
<i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Tetramolopium remyi</i>	[NCN]	2003–Proposed Revision of Critical Habitat

<i>Tetramolopium rockii</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Vigna o-wahuensis</i>	[NCN]	2003–Proposed Revision of Critical Habitat
<i>Zanthoxylum hawaiiense</i>	Ae	2003–Proposed Revision of Critical Habitat

TABLE 2. RECOVERY PLANS THAT INCLUDE ONE OR MORE OF THE MAUI NUI SPECIES*

Recovery Plan Date	Recovery Plan
July 1990	Recovery plan for <i>Gouania hillebrandii</i> (Rhamnaceae)
September 1995	Recovery plan for the Kauai plant cluster
September 1995	Lanai plant cluster recovery plan
April 1996	Recovery plan for <i>Marsilea villosa</i>
September 1996	Recovery plan for Molokai plant cluster
September 1996	Recovery plan for the Big Island plant cluster
July 1997	Recovery plan for the Maui plant cluster
April 1998	Final recovery plan for four species of Hawaiian ferns
May 1998	Molokai II: addendum to the recovery plan for the Molokai plant cluster
June 1998	Recovery plan for <i>Kokia cookei</i>
August 1998	Recovery plan for the Oahu plants
July 1999	Recovery plan for the multi-island plants
September 2002	Addendum to the recovery plan for multi-island plants
September 2006	Revised recovery plan for Hawaiian forest birds
June 2011	Draft recovery plan for <i>Phyllostegia hispida</i> , addendum to the Molokai plant cluster recovery plan

* Recovery Plans are available at <http://www.fws.gov/endangered/species/recovery-plans.html>

TABLE 3. UNOCCUPIED PROPOSED CRITICAL HABITAT UNITS

Plant critical habitat unit, unoccupied by plants*	Bird critical habitat unit corresponding to same area as plant critical habitat, unoccupied by birds	Tree snail critical habitat unit corresponding to same area as plant critical habitat, unoccupied by snails
MAUI		
Maui—Coastal—Unit 2		
Maui—Coastal—Unit 6		
Maui—Coastal—Unit 7		
Maui—Coastal—Unit 8		
Maui—Lowland Mesic—Unit 3	Bird Unit 1 Lowland Mesic	
	Bird Unit 2 Lowland Wet (corresponds to Maui—Lowland Wet—1)	

	Bird Unit 3 Lowland Wet (corresponds to Maui— Lowland Wet—2)	
	Bird Unit 4 Lowland Wet (corresponds to Maui— Lowland Wet—3)	
	Bird Unit 5 Lowland Wet (corresponds to Maui— Lowland Wet—4)	
	Bird Unit 6 Lowland Wet (corresponds to Maui— Lowland Wet—5)	
	Bird Unit 7 Lowland Wet (corresponds to Maui— Lowland Wet—6)	
Maui—Lowland Wet—Unit 7	Bird Unit 8 Lowland Wet	
Maui—Lowland Wet—Unit 8	Bird Unit 9 Lowland Wet	
Maui—Montane Wet—Unit 5	Bird Unit 14 Montane Wet	
	Bird Unit 15 Montane Wet (corresponds to Maui— Montane Wet—6)	
	Bird Unit 16 Montane Wet (corresponds to Maui— Montane Wet—7)	
Maui—Montane Wet—Unit 8	Bird Unit 17 Montane Wet	
	Bird Unit 19 Montane Mesic (corresponds to Maui— Montane Mesic—2)	
	Bird Unit 20 Montane Mesic (corresponds to Maui— Montane Mesic—3)	
	Bird Unit 21 Montane Mesic (corresponds to Maui— Montane Mesic—4)	
	Bird Unit 22 Montane Mesic (corresponds to Maui— Montane Mesic—5)	
Maui—Montane Mesic—Unit 6	Bird Unit 23 Montane Mesic	
Maui—Dry Cliff—Unit 3	Bird Unit 27 Dry Cliff	
Maui—Dry Cliff—Unit 4	Bird Unit 28 Dry Cliff	
Maui—Dry Cliff—Unit 5	Bird Unit 29 Dry Cliff	
Maui—Dry Cliff—Unit 6		
Maui—Dry Cliff—Unit 7		
Maui—Wet Cliff—Unit 3	Bird Unit 32 Wet Cliff	
	Bird Unit 33 Wet Cliff	

	(corresponds to Maui—Wet Cliff—4)	
	Bird Unit 34 Wet Cliff (corresponds to Maui—Wet Cliff—5)	
	Bird Unit 35 Wet Cliff (corresponds to Maui—Wet Cliff—6)	
	Bird Unit 36 Wet Cliff (corresponds to Maui—Wet Cliff—7)	
MOLOKAI		
Molokai—Coastal—Unit 7		
Molokai—Lowland Dry—Unit 1		
Molokai—Lowland Dry—Unit 2		
	Bird Unit 37 Lowland Mesic (corresponds to Molokai—Lowland Mesic—1)	
	Bird Unit 38 Lowland Wet (corresponds to Molokai—Lowland Wet—1)	
	Bird Unit 39 Lowland Wet (corresponds to Molokai—Lowland Wet—2)	
	Bird Unit 40 Montane Wet (corresponds to Molokai—Montane Wet—1)	
Molokai—Montane Wet—Unit 2	Bird Unit 41 Montane Wet	
	Bird Unit 42 Montane Mesic (corresponds to Molokai—Montane Mesic—1)	
	Bird Unit 43 Wet Cliff (corresponds to Molokai—Wet Cliff—1)	
	Bird Unit 44 Wet Cliff (corresponds to Molokai—Wet Cliff—2)	
Molokai—Wet Cliff—Unit 3		
LANAI		
Lanai—Coastal—Unit 1		
Lanai—Coastal—Unit 2		
Lanai—Coastal—Unit 3		
Lanai—Lowland Dry—Unit 2		
		Lanai tree snail Unit 2 Lowland Wet (corresponds to

		Lanai—Lowland Wet—Unit 2)
		Lanai tree snail Unit 3 Montane Wet (corresponds to Lanai—Montane Wet—Unit 1)
Lanai—Dry Cliff—Unit 1		
Lanai—Dry Cliff—Unit 3		
		Lanai tree snail Unit 4 Wet Cliff (corresponds to Lanai— Wet Cliff—Unit 1)
		Lanai tree snail Unit 5 Wet Cliff (corresponds to Lanai— Wet Cliff—Unit 2)
KAHOOLAWE		
Kahoolawe—Lowland Dry—1		
Kahoolawe—Lowland Dry—2		

*Unoccupied by the listed and/or proposed plants for which the unit is proposed critical habitat.

APPENDIX E

CRITICAL HABITAT SPECIES INFORMATION

1. This appendix provides information on the proposed critical habitat by unit. Exhibit E-1 summarizes land ownership information for each Maui Nui critical habitat unit and lists the group of species (plants, birds, snails) for which the unit was designated.

EXHIBIT E-1. CRITICAL HABITAT SPECIES AND OWNERSHIP INFORMATION

CRITICAL HABITAT UNITS	SIZE OF UNIT (ACRES)	STATE OWNERSHIP (ACRES)	FEDERAL OWNERSHIP (ACRES)	COUNTY OWNERSHIP (ACRES)	PRIVATE OWNERSHIP (ACRES)	PROPOSED FOR	OCCUPIED BY
Kahoolawe Coastal Unit 1	1,515	1,515	0	0	0	P	P
Kahoolawe Coastal Unit 2	12	12	0	0	0	P	P
Kahoolawe Coastal Unit 3	339	339	0	0	0	P	-
Kahoolawe Lowland Dry Unit 1	1,380	1,380	0	0	0	P	-
Kahoolawe Lowland Dry Unit 2	3,205	3,205	0	0	0	P	-
TOTAL KAHOO LAWE	6,451	6,451	0	0	0		
Lanai Coastal Unit 1	373	0	0	0	373	P	-
Lanai Coastal Unit 2	2	2	0	0	0	P	-
Lanai Coastal Unit 3	509	0	0	0	509	P	-
Lanai Lowland Dry Unit 1	9,766	0	0	0	9,766	P	P
Lanai Lowland Dry Unit 2	939	0	0	0	939	P	-
Lanai Lowland Mesic Unit 1	11,172	0	0	3	11,170	P	P
Lanai Lowland Wet Unit 1/Snail Unit 1	374	0	0	0	374	P, S	P, S
Lanai Lowland Wet Unit 2/Snail Unit 2	232	0	0	0	232	P, S	P
Lanai Montane Wet Unit 1/Snail Unit 3	248	0	0	0	248	P, S	P, S
Lanai Dry Cliff Unit 1	83	0	0	0	83	P	-
Lanai Dry Cliff Unit 2	354	0	0	0	354	P	P
Lanai Dry Cliff Unit 3	398	0	0	0	398	P	-
Lanai Wet Cliff Unit 1/Snail Unit 4	731	0	0	0	731	P, S	P, S
Lanai Wet Cliff Unit 2/Snail Unit 5	230	0	0	0	230	P, S	P
TOTAL LANAI	25,413	0	0	2	25,408		
Maui Alpine Unit 1	2,107	761	918	0	428	P	P
Maui Coastal Unit 1	2	2	0	0	0	P	P
Maui Coastal Unit 2	68	42	0	0	26	P	-
Maui Coastal Unit 3	54	13	0	0	40	P	P
Maui Coastal Unit 4	243	107	0	0	136	P	P
Maui Coastal Unit 5	27	27	0	0	0	P	P
Maui Coastal Unit 6	357	357	0	0	0	P	-
Maui Coastal Unit 7	187	40	0	0	147	P	-
Maui Coastal Unit 8	597	597	0	0	<1	P	-

CRITICAL HABITAT UNITS	SIZE OF UNIT (ACRES)	STATE OWNERSHIP (ACRES)	FEDERAL OWNERSHIP (ACRES)	COUNTY OWNERSHIP (ACRES)	PRIVATE OWNERSHIP (ACRES)	PROPOSED FOR	OCCUPIED BY
Maui Coastal Unit 9	393	184	0	5	205	P	P
Maui Coastal Unit 10	434	215	0	0	219	P	P
Maui Coastal Unit 11	6	6	0	0	0	P	P
Maui Dry Cliff Unit 1/Bird Unit 26	1,018	0	755	0	264	P, B	P
Maui Dry Cliff Unit 2	688	0	688	0	0	P	P
Maui Dry Cliff Unit 3/Bird Unit 27	293	0	200	0	93	P, B	-
Maui Dry Cliff Unit 4/Bird Unit 28	315	0	315	0	0	P, B	-
Maui Dry Cliff Unit 5/Bird Unit 29	1,536	1,298	0	0	238	P, B	-
Maui Dry Cliff Unit 6	279	279	0	0	0	P	-
Maui Dry Cliff Unit 7	808	0	0	0	808	P	-
Maui Lowland Dry Unit 1	22,196	12,999	0	0	9,197	P	P
Maui Lowland Dry Unit 2	2,612	1,851	0	0	762	P	P
Maui Lowland Dry Unit 3	1,089	0	0	<1	1,089	P	P
Maui Lowland Dry Unit 4	1,283	1,283	0	0	0	P	P
Maui Lowland Dry Unit 5	5,448	3,685	0	0	1,763	P	P
Maui Lowland Dry Unit 6	579	4	0	0	575	P	P
Maui Lowland Mesic Unit 1	1,930	1,172	502	0	256	P	P
Maui Lowland Mesic Unit 2	3,424	1,315	0	0	2,109	P	P
Maui Lowland Mesic Unit 3/Bird Unit 1	477	477	0	0	0	P, B	-
Maui Lowland Wet Unit 1/Bird Unit 2	26,703	10,822	2,038	0	13,844	P, B	P
Maui Lowland Wet Unit 2/Bird Unit 3	5,066	65	0	0	5,001	P, B	P
Maui Lowland Wet Unit 3/Bird Unit 4	1,427	1,247	0	0	180	P, B	P
Maui Lowland Wet Unit 4/Bird Unit 5	1,165	864	0	301	0	P, B	P
Maui Lowland Wet Unit 5/Bird Unit 6	2,112	30	0	0	2,082	P, B	P
Maui Lowland Wet Unit 6/Bird Unit 7	639	136	0	0	503	P, B	P
Maui Lowland Wet Unit 7/Bird Unit 8	898	898	0	0	0	P, B	-
Maui Lowland Wet Unit 8/Bird Unit 9	230	230	0	0	0	P, B	-
Maui Montane Dry Unit 1	4,988	2,962	323	0	1,703	P	P
Maui Montane Mesic Unit 1/Bird Unit 18	20,972	7,277	2,897	18	10,781	P, B	P, B
Maui Montane Mesic Unit 2/Bird Unit 19	366	124	0	0	242	P, B	P
Maui Montane Mesic Unit 3/Bird Unit 20	218	174	0	0	44	P, B	P

CRITICAL HABITAT UNITS	SIZE OF UNIT (ACRES)	STATE OWNERSHIP (ACRES)	FEDERAL OWNERSHIP (ACRES)	COUNTY OWNERSHIP (ACRES)	PRIVATE OWNERSHIP (ACRES)	PROPOSED FOR	OCCUPIED BY
Maui Montane Mesic Unit 4/Bird Unit 21	72	72	0	0	0	P, B	P
Maui Montane Mesic Unit 5/Bird Unit 22	304	170	0	0	134	P, B	P
Maui Montane Mesic Unit 6/Bird Unit 23	94	0	0	0	94	P, B	-
Maui Montane Wet Unit 1/Bird Unit 10	7,815	1,067	0	0	6,747	P, B	P, B
Maui Montane Wet Unit 2/Bird Unit 11	16,687	4,075	875	0	11,737	P, B	P, B
Maui Montane Wet Unit 3/Bird Unit 12	2,228	0	2,228	0	0	P, B	P, B
Maui Montane Wet Unit 4/Bird Unit 13	1,833	180	1,653	0	0	P, B	P
Maui Montane Wet Unit 5/Bird Unit 14	387	222	165	0	0	P, B	-
Maui Montane Wet Unit 6/Bird Unit 15	3,964	1,113	0	471	2,380	P, B	P
Maui Montane Wet Unit 7/Bird Unit 16	608	80	0	0	528	P, B	P
Maui Montane Wet Unit 8/Bird Unit 17	46	0	0	0	46	P, B	-
Maui Snail Unit 1	599	56	0	0	542	S	S
Maui Subalpine Unit 1/Bird Unit 24	19,401	10,866	2,770	0	5,764	P, B	P, B
Maui Subalpine Unit 2/Bird Unit 25	10,931	0	9,836	0	1,095	P, B	P, B
Maui Wet Cliff Unit 1/Bird Unit 30	460	0	0	0	460	P, B	P, B
Maui Wet Cliff Unit 2/Bird Unit 31	1,407	475	912	0	20	P, B	P, B
Maui Wet Cliff Unit 3/Bird Unit 32	438	5	433	0	0	P, B	-
Maui Wet Cliff Unit 4/Bird Unit 33	184	184	0	0	0	P, B	P
Maui Wet Cliff Unit 5/Bird Unit 34	2,048	35	0	0	2,013	P, B	P
Maui Wet Cliff Unit 6/Bird Unit 35	9,103	1,858	0	2,917	4,328	P, B	P
Maui Wet Cliff Unit 7/Bird Unit 36	781	557	0	0	224	P, B	P
Maui Wet Cliff Unit 8	337	337	0	0	0	P	P
TOTAL MAUI	192,362	72,839	27,508	3,713	88,305		
Molokai Coastal Unit 1	250	0	54	0	195	P	P
Molokai Coastal Unit 2	3,544	1,032	0	0	2,511	P	P
Molokai Coastal Unit 3	862	859	3	0	<1	P	P
Molokai Coastal Unit 4	10	10	0	0	0	P	P
Molokai Coastal Unit 5	1	1	0	0	0	P	P
Molokai Coastal Unit 6	1,913	202	0	0	1,711	P	P

CRITICAL HABITAT UNITS	SIZE OF UNIT (ACRES)	STATE OWNERSHIP (ACRES)	FEDERAL OWNERSHIP (ACRES)	COUNTY OWNERSHIP (ACRES)	PRIVATE OWNERSHIP (ACRES)	PROPOSED FOR	OCCUPIED BY
Molokai Coastal Unit 7	306	3	0	0	303	P	-
Molokai Lowland Dry Unit 1	70	0	0	0	70	P	-
Molokai Lowland Dry Unit 2	3,201	945	0	0	2,255	P	-
Molokai Lowland Mesic Unit 1/Bird Unit 37	10,330	3,538	0	0	6,792	P, B	P
Molokai Lowland Wet Unit 1/Bird Unit 38	3,628	2,195	0	0	1,433	P, B	P
Molokai Lowland Wet Unit 2/Bird Unit 39	1,952	1,356	0	0	597	P, B	P
Molokai Lowland Wet Unit 3	8,074	1,128	0	0	6,945	P	P
Molokai Montane Mesic 1/Bird Unit 42	1,629	257	0	0	1,373	P, B	P
Molokai Montane Wet 1/Bird Unit 40	4,818	1,518	0	0	3,300	P, B	P
Molokai Montane Wet 2/Bird Unit 41	910	871	0	0	39	P, B	-
Molokai Montane Wet 3	803	77	0	0	726	P	P
Molokai Wet Cliff 1/Bird Unit 43	1,888	1,399	0	0	489	P, B	P
Molokai Wet Cliff 2/Bird Unit 44	1,280	462	0	0	818	P, B	P
Molokai Wet Cliff 3	1,362	1,137	0	0	225	P	-
TOTAL MOLOKAI	46,831	16,922	57	0	0		
TOTAL ALL ISLANDS	271,062	96,212	27,565	3,715	113,713		
NOTE: Totals may not sum due to rounding.							
SOURCE: 2012 Proposed Listing and Critical Habitat Rule, 77 FR 34464.							

APPENDIX F

PARCELS SUPPORTING GRAZING ACTIVITIES THAT OVERLAP WITH PROPOSED CRITICAL HABITAT

	PROPOSED CRITICAL HABITAT UNIT(S) OVERLAPPED BY PARCEL
110010220000	Coastal 02
110010250000	Coastal 02
110010290000	Coastal 02
110020030000	Lowland Wet 01
110070200000	Coastal 03
110080110000	Coastal 03
110080120000	Coastal 03
120010010000	Coastal 04
120010020000	Coastal 04
120010040000	Coastal 04
120010110000	Coastal 04
120010120000	Coastal 04
120010270000	Coastal 04
120010340000	Coastal 04
140010030000	Lowland Wet 01
170010330000	Lowland Mesic 01
170020140000	Lowland Mesic 01
170030120000	Coastal 07
170030180000	Coastal 07
170030190000	Coastal 07
170030200000	Coastal 07
170030210000	Coastal 07
170030240000	Coastal 07
170030270000	Coastal 07
170030310000	Coastal 07
170030320000	Coastal 07
170030330000	Coastal 07
170030340000	Coastal 07
170030350000	Coastal 07
170030380000	Coastal 07
170040010000	Coastal 07
170040040000	Lowland Dry 01
170040040000	Montane Dry 01
180010030000	Lowland Dry 01
180010040000	Lowland Dry 01
180010040000	Montane Dry 01
180010050000	Lowland Dry 01
180010050000	Montane Dry 01
180010050000	Montane Mesic 01
180010110000	Subalpine 01
180010110000	Lowland Dry 01
180010110000	Montane Dry 01
180010110000	Montane Mesic 01
190010010000	Lowland Dry 01
190010010000	Montane Dry 01
190010010000	Montane Mesic 01
190010020000	Lowland Dry 01
190010040000	Lowland Dry 01

	PROPOSED CRITICAL HABITAT UNIT(S) OVERLAPPED BY PARCEL
190010060000	Subalpine 01
190010060000	Lowland Dry 01
190010060000	Montane Dry 01
190010060000	Montane Mesic 01
190010080000	Montane Mesic 01
190010090000	Lowland Dry 01
190010110000	Montane Mesic 01
210040490000	Lowland Dry 04
210041140000	Lowland Dry 04
210080010000	Lowland Dry 03
210080540000	Lowland Dry 03
210081070000	Lowland Dry 03
210090010000	Montane Mesic 01
210090250000	Montane Mesic 01
220010010000	Montane Mesic 01
220010340000	Montane Mesic 01
220020010000	Lowland Dry 02
220020500000	Lowland Dry 02
220020840000	Lowland Dry 02
220040330000	Montane Mesic 01
220050520000	Montane Mesic 01
220060090000	Montane Mesic 01
220060320000	Montane Mesic 01
230050020000	Alpine 01
230050020000	Subalpine 01
230050020000	Montane Mesic 01
230050030000	Alpine 01
230050030000	Subalpine 01
230050030000	Montane Mesic 01
230050040000	Dry Cliff 01
230050040000	Dry Cliff 03
230050040000	Montane Wet 01
230050040000	Montane Wet 02
230050040000	Subalpine 01
230050040000	Subalpine 02
230050040000	Wet Cliff 01
230050040000	Montane Mesic 01
240130590000	Montane Mesic 01
240130640000	Montane Mesic 01
240131930000	Montane Mesic 01
240150180000	Montane Mesic 01
240150230000	Montane Mesic 01
240150260000	Montane Mesic 01
240150290000	Montane Mesic 01
240150450000	Montane Mesic 01
240160010000	Montane Wet 01
240160010000	Montane Mesic 01
240190010000	Montane Mesic 01
240330020000	Montane Mesic 01

	PROPOSED CRITICAL HABITAT UNIT(S) OVERLAPPED BY PARCEL
240330090000	Montane Mesic 01
270150010000	Lowland Wet 01
270150220000	Lowland Wet 01
270150360000	Lowland Wet 01
280080070000	Lowland Wet 01
280080090000	Lowland Wet 01
310010040000	Coastal 10
310010080000	Coastal 10
310010150000	Coastal 10
310010220000	Coastal 10
310010270000	Coastal 10
310010410000	Coastal 10
310010420000	Coastal 10
310010510000	Coastal 10
310020100000	Coastal 10
310020110000	Coastal 10
360010150000	Lowland Dry 06
360010150000	Lowland Dry 05
460180210000	Lowland Dry 05
460180220000	Lowland Dry 05
480030400000	Lowland Dry 05