

KE KAI
PLANNING

FEBRUARY 3, 2022

Wai'ehu Kou Phase 3 Association Board Meeting Powerpoint Presentation

KE KAI PLANNING

DAWN HEGGER-
NORDBLOM



KE KAI PLANNING PROJECTS



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DHHL – PAUKŪKALO- WAI`EHU KOU JUNE 2010 FEASIBILITY STUDY WAI`EHU KOU VACANT LANDS BETWEEN WAI`EHU KOU III AND IV

Priority Project - Investigate Feasibility of Use of Wai`ehu Kou Vacant Lands between Wai`ehu Kou III and IV

Description:

The Wai`ehu Kou beneficiaries are interested in investigating possible uses for vacant lands located between Wai`ehu Kou III and IV. As the site is currently located within a flood zone, no permanent structures can be developed because adjacent residents' flood insurance rates would be adversely affected. Several options for this site include a community garden, agricultural production, permaculture, and crop planting. In addition, Wai`ehu Kou beneficiaries expressed the need for research to be completed regarding the historical background of flooding and wild fires in the area.

Estimated Completion Date:

June 2011

Location:

DHHL owned vacant land between the Wai`ehu Kou III and IV homesteads.

Status:

Discussion with project partners, DHHL, and Wai`ehu Kou homesteads to be scheduled to explore possible uses of the site.

Partners:

Wai`ehu Kou beneficiaries and DHHL

Cost:

Unknown

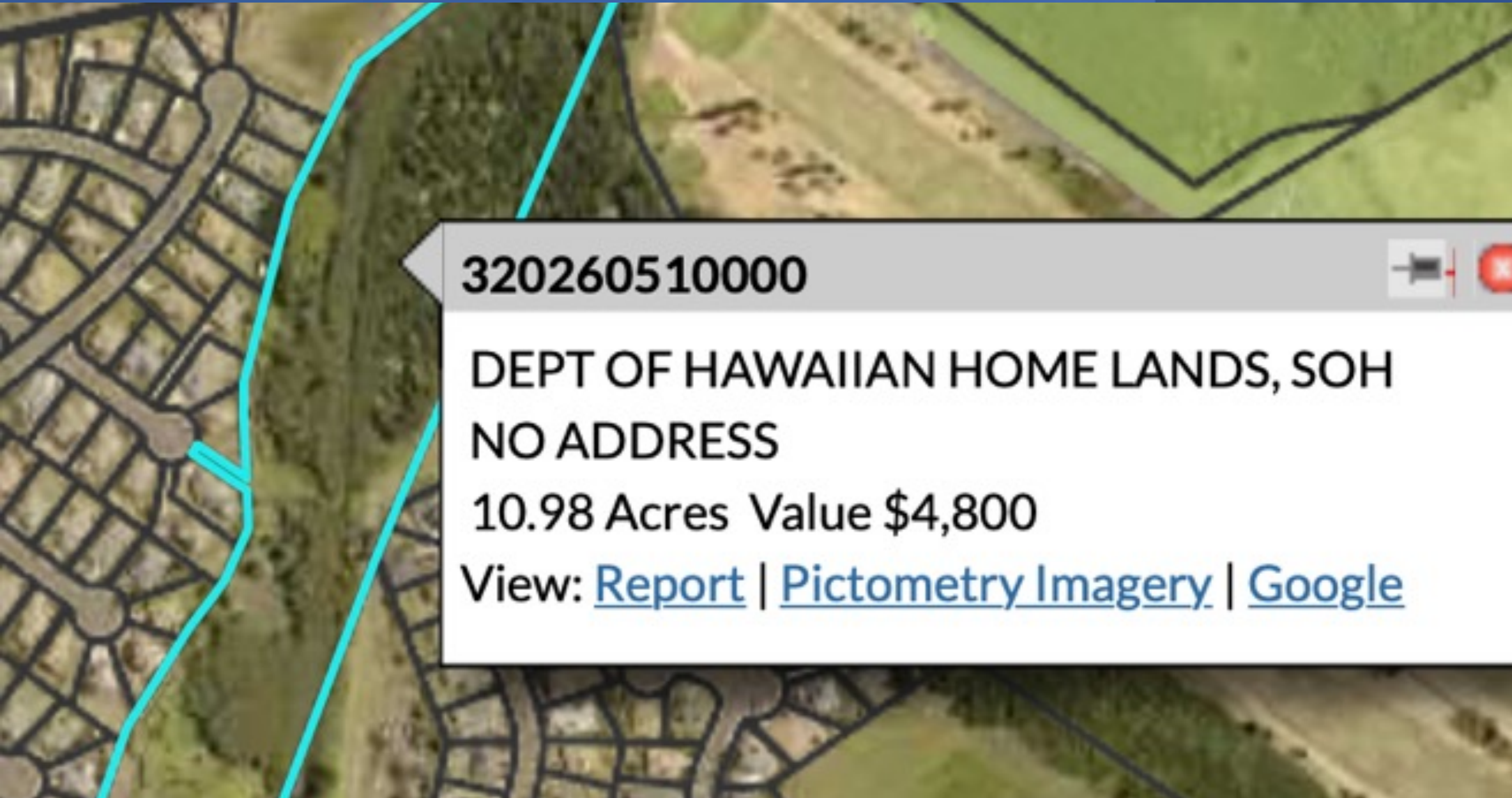
CRITICAL PATH

- Complete feasibility study of the site including legal and insurance considerations for potential users, Wai`ehu Kou III homeowners and DHHL.
- Coordinate between project partners to determine possible uses for the site.



WAI`EHU KOU 3





320260510000

DEPT OF HAWAIIAN HOME LANDS, SOH
NO ADDRESS

10.98 Acres Value \$4,800

View: [Report](#) | [Pictometry Imagery](#) | [Google](#)



320120050000

HAWAIIAN HOME LANDS

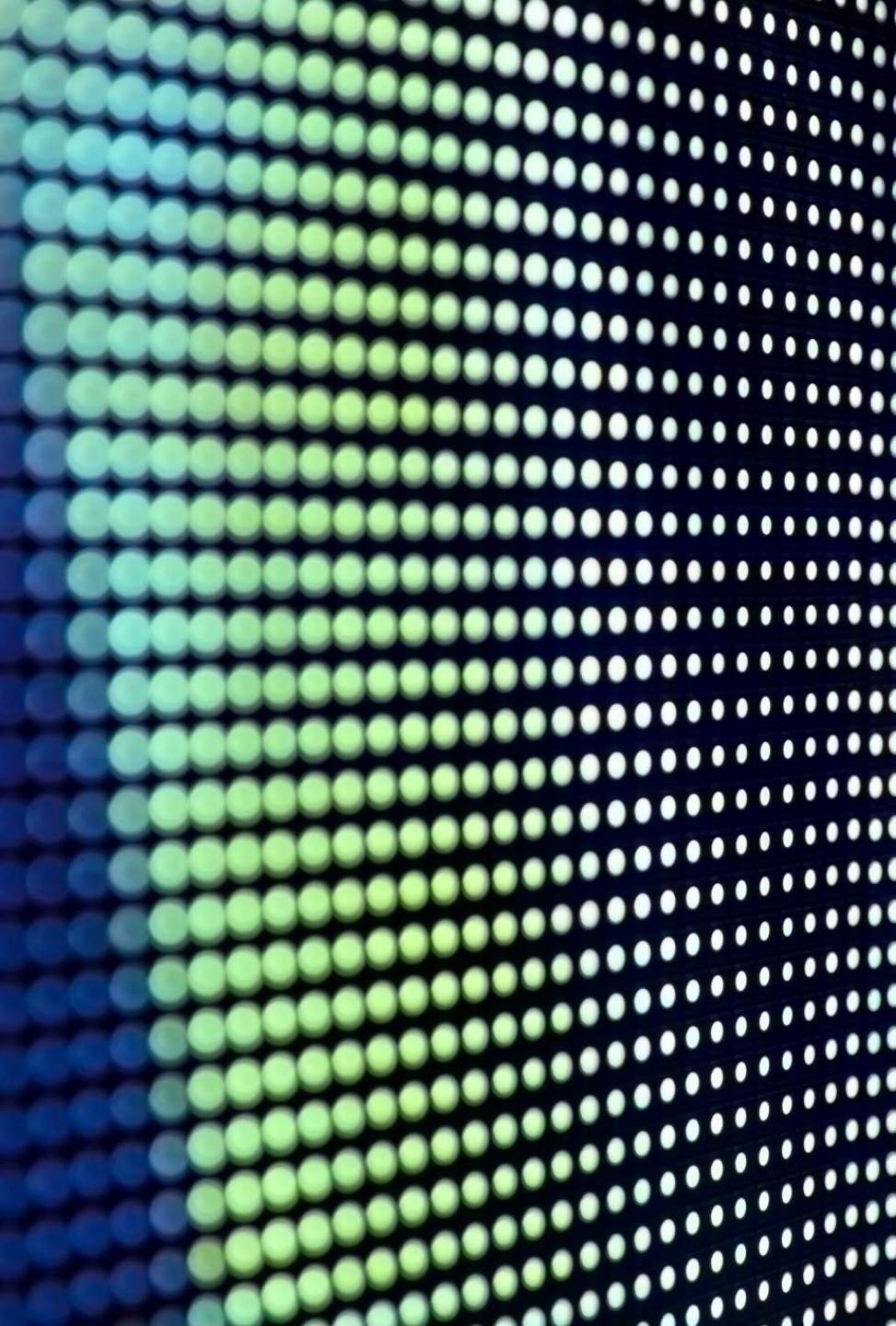
KAHEKILI HWY

4.88 Acres Value \$100

[View](#) [Report](#) [Dictionetry](#) [Images](#) [Google Maps opens](#)

GRANT
RFP-21-HHL-002

**Waiehu Kou Phase 3
Association (WK3)
Community Garden Land
Use Feasibility Project for
Use of Waiehu Kou
Vacant Lands Located
between Waiehu Kou III
and IV, Waihee - Waiehu,
Island of Maui, TMK's: (2)
3-002-012:005 and (2) 3-
002-026:051**



FEASIBILITY STUDY

RESEARCH DUE
DILIGENCE

RESEARCH PARCEL
HISTORY AND
ATTRIBUTES

RESEARCH PAST
PERMITS

RESEARCH
PROPERTY
RECORDS

RESEARCH LAND
USE ORDINANCES
AND DOCUMENTS

CREATE ROADMAP
FOR CURRENT AND
FUTURE PROJECTS

RESEARCH
ESTIMATED COSTS
FOR CONSULTANTS
AND FEES

RESEARCH
ALTERNATIVES

LIKELIHOOD OF
SUCCESS

NEIGHBORHOOD
AND COMMUNITY
SENTIMENT

POLITICAL
SENTIMENT AND
ENVIRONMENT



SITE VISIT

SITE VISIT



COMMUNITY GARDEN COMPARISONS

DHHL KAUPUNI –
Hale Kumuwaiwai
Community Resource
– Public Land

DOE - Maunaloa
Elementary Farm to
School - Public Land

Kauluwehi
Biocultural Garden -
UH Maui College
Campus - Public Land

Hailimaile
Community Gardens
– Private Land Maui
Land and Pine

Napili Community
Garden – Private
Land
Maui Land and Pine

Lanai Community
Garden – Private
Land Pulama Lanai

Carpinteria
Community Garden –
Public Land

Trinity Gardens Santa
Barbara – Private
Land

COMMON ELEMENTS



- o ENTRY GATE
- o SIGNAGE
- o PLOT SIZE
- o ORGANIC FARMING PRACTICES
- o TOOLS
- o SECURITY
- o LEASE
- o BYLAWS
- o COMMUNITY SPACES
- o WATER
- o COMMUNITY FOOD PROGRAM PARTNER

DOE – Maunaloa Elementary Farm to School – Public Land



DHHL KAUPUNI – Hale Kumuwaiwai Community Resource – Public Land





Kauluwehi Biocultural Garden

UH Maui College Campus -

Public Land

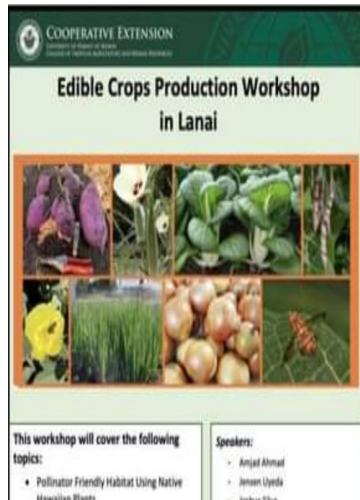
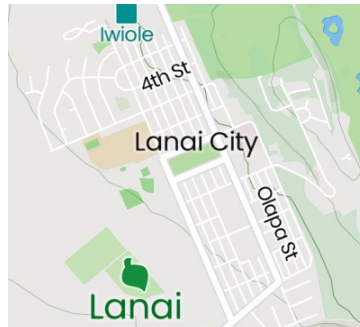
Hali'imaile Community Garden – Private Land Maui Land and Pine Co. CLOSED



Napili Community Garden – Private Land- Maui Land and Pine Co.



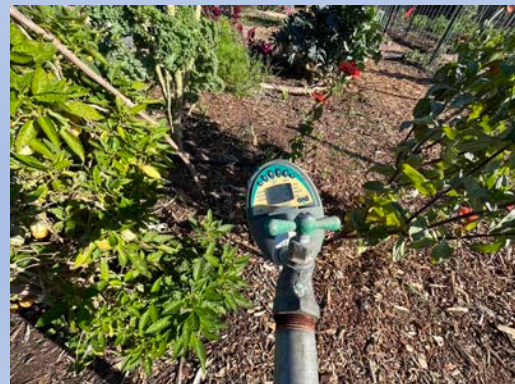
LANAI COMMUNITY GARDEN – Private Land - Pulama Lanai



Carpinteria Community Garden – Public Land



Trinity Church Gardens Santa Barbara - Private Land



**WHAT DO YOU
WANT IN YOUR
COMMUNITY
GARDEN?**



WAI`EHU KOU 3 COMMUNITY OUTREACH





DATES TO REMEMBER

FEBRUARY 31 TO MARCH 15,
2022 – DRAFT FEASIBILITY
STUDY REPORT

MARCH 14 TO 18, 2022 – KEIKI
ON SPRING BREAK – POSSIBLE
COMMUNITY OUTREACH

THANK YOU

Dawn
Hegger-
Nordblom

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LLC



KE KAI PLANNING

CHECKLIST

	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTANICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
LOCATION	CALIFORNIA Carpinteria	CALIFORNIA Santa Barbara	MAUI	MAUI	LANAI	MOLOKAI	MAUI	MAUI
ADDRESS	4855 5th St, Carpinteria, CA 93013	909 N La Cumbre Rd, Santa Barbara, CA 93110	Napili, HI, 96761	UH Maui College Campus 310 W Kaahumanu Ave. Kahului, HI 96732	12th Avenue, Lanai, HI maun	128 Maunaloa Rd, Maunaloa, HI 96770	325 Punakea Loop, Lahaina, HI 96767	Aoiki Street, Haliimaile, HI 96768
AHUPUAA	n/a	n/a	KANAPALI	WAILUKU	KAMOKU	KALUAKOI	LAHAINA	HAMAKUAP OKO
PRIVATE/PUBLIC	Public	Private	Private	Public	Private	Public School	Private	n/a
MUNICIPAL ORDINANCES/ RULES	YES	NO	NO	NO	NO	YES	n/a	NO
TMK	n/a	n/a	(2) 4-3- 001:001	(2) 3-8- 007:040	(2) 4-9- 014:001	(2) 5-1-002:003	(2) 4-7-001:001	(2) 2-5- 003:005
STATE ZONING	n/a	n/a	AG	URBAN	AG	URBAN	AG	AG
NEIGHBORHOOD CODE	n/a	n/a	4343-5	3863-1	4942-6	5161-1	4751-5	2544-5
ZONING	n/a	n/a						
SPECIAL MANAGEMENT AREA	n/a	n/a	NO	YES	NO	NO	NO	NO

	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTANICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
TOTAL AREA	38,000 Sq. Ft.	2 Acres	5.4 Acres / 1,377 Acres	1 Acres/48 Acres	2 Acres/83.98 Acres	X Acres/8.89 Acres	2 Acres /69 Acres	2 Acres / 41 A
YEARS OF PREP		2 Years		3 Years	2 Years			n/a
SOIL/MULCH	YES	YES	YES	YES	YES	YES	NO	YES
TOTAL AMOUNT INVESTED	\$500K	\$125K to \$150K		12K to \$250K	Millions			n/a
ANNUAL REGISTRATIO N	\$120 Annual	\$200 Annual	\$600 to \$960 Annual	NO	\$600 Annual	NONE	\$0	\$100 Annual
PLOT SIZE	10 x 5	10x 10/10x20	10x10/20x20	1 Acre	10 x 20		2 Acres	10 x 20
PLOTS	Bi- Annual/Annual	Annual	Annual	NO		n/a	n/a	Annual
NUMBER OF BEDS	100	20 - 24/depend on food program	127 - 200	1 Bed	80 - 40 plots/40 livestock			n/a
ORGANIC	YES	YES	YES	YES	YES	YES	YES	YES
FLOWERS	YES	YES	YES	YES	YES		YES	YES
VEGETABLES	YES	YES	YES	YES	YES	YES	YES	YES
NATIVE PLANTS	YES	YES	YES	YES	YES	YES		

	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTANICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
LIVESTOCK	NO	YES	NO	NO	YES	NO		n/a
WATER CONSERVATION	YES	YES	YES	YES	YES	YES	YES/NO	n/a
WATER	YES	YES	YES	YES	YES	YES	YES	YES
WATER SUPPLIES	YES	YES	YES		YES	YES	YES	n/a
INFRASTRUCTURE	YES	YES	YES	YES	YES	YES	YES	n/a
GREEN WASTE COMPOST SYSTEM	YES	YES	YES	YES				n/a
BULLETIN BOARD	YES	YES	YES	NO				n/a
TOOL SHED/SHARED TOOLS	YES	YES	YES	NO	YES	YES		n/a
RAIN GARDEN	NO	NO	NO	YES	NO			n/a
HALE	n/a	n/a	NO	YES	NO	YES	n/a	n/a
MAINTENANCE	YES	YES	Yes - Volunteers	YES	YES	YES	YES	YES
MOWING SERVICE	NO	NO	Yes - Volunteers	NO		NO		YES
BATHROOM	YES	YES	YES	NO		YES School		n/a
PARKING	YES	YES	YES	YES		YES School		
FENCING	YES	YES	YES	NO	YES	YES		n/a

PETS	NO	NO	NO	NO				n/a
CHILDREN	YES	YES		YES		YES		n/a
PESTS	YES	YES	YES	YES	YES	YES	YES	n/a
	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTA NICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
GARDEN COORDINATO R	YES	YES	YES	YES	YES	YES	NO	n/a
GARDEN STEERING COMMITTEE	YES		YES	NO		NO	NO	n/a
CHURCH SUBCOMMITT EE	NO	YES		NO		NO	NO	n/a
GARDEN MEETINGS	YES	YES	YES	YES	NO	YES - Daily	NO	n/a
TEACHER	NO	NO	NO	NO	NO	YES	n/a	na
PAID STAFF	YES	YES	NO	YES	YES	YES School	NO	n/a
VOLUNTEERS	YES	YES	YES	YES	NO	YES	YES	n/a
VOLUNTEER TIME	16 Hr Annual	24 Hr Annual	24 Hrs Annual/\$20 Fine per month	YES	NO	160 Hr Annual Classtime	YES	n/a

VOLUNTEER TASKS - Events, Maintain Public Spaces/Compost Pile, Community Outreach, Education, Fundraising, Social Media, Weeding	YES	YES	YES	YES	NO	YES - 40 Students	YES	YES
CLEAN UP DAYS	NO	NO	NO	YES	YES	YES		
	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTANICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
MEMBERSHIP APPLICATION	YES	YES		NO	YES	NO	NO	n/a
1 PLOT PER HOUSEHOLD	YES	YES	NO LIMIT	NO	NO LIMIT	SCHOOL	n/a	n/a
BACKGROUND CHECK	NO	YES	NO	NO	NO	SCHOOL	NO	n/a
USER AGREEMENT	YES	YES		YES			NO	n/a
VOLUNTEER APPLICATION FORM	YES		NO	NO	NO	NO	NO	n/a
LIABILITY INSURANCE	YES	YES	YES	YES	NO	SCHOOL	YES	n/a
BYLAWS	YES	NO	YES	NO	YES	SCHOOL	YES	n/a
NUMBER OF ADA BEDS	27		NO	NO				n/a

ADA ACCESSIBILITY	YES	YES		NO			NO	n/a
GARDENING START	2 Weeks		3 Weeks	n/a		NO		
USER SELECTION	YES - Point System		NO	NO	NO	NO	n/a	n/a
TERMINATION	YES	NO	YES	NO		NO		n/a
2 WEEK WRITTEN NOTICE	YES	NO		NO		NO		n/a
GARDEN HOURS	YES	YES	YES	YES	YES	YES School	YES	n/a
WAIT LIST	YES	YES	YES	NO		NO		n/a
	CARPINTERIA COMMUNITY GARDEN PARK	TRINITY GARDENS	NAPILI COMMUNITY GARDEN	UH MAUI KAULUWEHI ETHNOBOTANICAL GARDEN	LANAI COMMUNITY GARDEN	MOLOKAI - MAUNALOA ELEMENTARY SCHOOL - FARM TO SCHOOL	LAHAINA FAMILY FARMS - CLOSED	HALIIMAILE COMMUNITY GARDEN - CLOSED
FOOD DONATIONS	YES	YES	YES	YES	NO	YES	YES	YES
NON-PROFIT	NO	NO		SCHOOL	NO	SCHOOL	NO	n/a
FOR PROFIT	NO	NO	NO	SCHOOL	NO	NO	NO	NO
ORGANIZATIONAL USE	YES	NO	NO	NO	NO	NO	NO	n/a
MONETARY DONATIONS		YES	YES	YES	NO	NO		
MAUI COUNTY FUNDS	n/a	n/a	NO	NO	NO	YES		
STATE FUNDS	n/a	n/a	NO	YES	NO	YES		
501-3-C	YES	NO	YES	NO		NO		

LOW INCOME EXCHANGE	YES - Increase Volunteer Hours		NO	NO			YES	n/a
SCHOLARSHIP	NO	YES	NO	NO		NO		n/a
COOKBOOK	NO	NO	NO	NO	NO	NO		YES
COOKING LESSONS	NO	YES		NO	NO			
EDUCATION PROGRAMS	YES	YES	NO	YES	YES	YES	NO	YES
PREVIOUS STUDY	NO	NO	NO	NO	YES	YES	NO	NO

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SURVEY MONKEY

Wai'ehu Kou Phase 3 Association Community Garden Survey

1. Do you live in Waiehu Kou?

- ☐ Yes
- ☐ No
- ☐ Sometimes
- ☐ when I visit family-friends

2. If yes, what phase of Waiehu Kou?

- ☐ One
- ☐ Two
- ☐ Three
- ☐ Four



3. Are you a homesteader in another area?

☐ Yes

☐ No

4. Where do you live?

- ☐ Central Maui
- ☐ West Maui
- ☐ Upcountry Maui
- ☐ East Maui

5. Family Size

☐ 1-3

☐ 4-6

☐ 6+

6. If WK3 had a community garden, would you use it?

- ☐ Yes
- ☐ Yes
- ☐ Maybe
- ☐ I want to but have to find the time

7. What would you like to have in a community garden?

- ☐ Facilities - Imu, storage building, bathroom
- ☐ Infrastructure - water, fencing, electricity
- ☐ security - signage - operating hours, etc.
- ☐ Flowers - fruits - vegetables
- ☐ ALL OF THE ABOVE
- ☐ OTHER - NOT IDENTIFIED

8. What would you like to see produced in a community garden?

- ☐ Fruits
- ☐ Flowers
- ☐ Trees
- ☐ Crops
- ☐ Plants
- ☐ Livestock
- ☐ OTHER

9. What is the size of the garden plot you would need?

- ☐ 100 to 500 square feet
- ☐ 501 to 1,000 square feet
- ☐ 1,001 +

10. What would be the purpose and intent of your garden plot?

- Supplemental food for home consumption
- Hobby
- Exercise
- Family Education
- Cultural Activity
- Supplemental Income

11. Other than a community garden, what else would you like to see developed for the Waiehu Kou Homestead community?

- Community Center
- Park Improvements
- Road Improvements
- Better Signage

12. What outcomes would you like a community garden to accomplish?

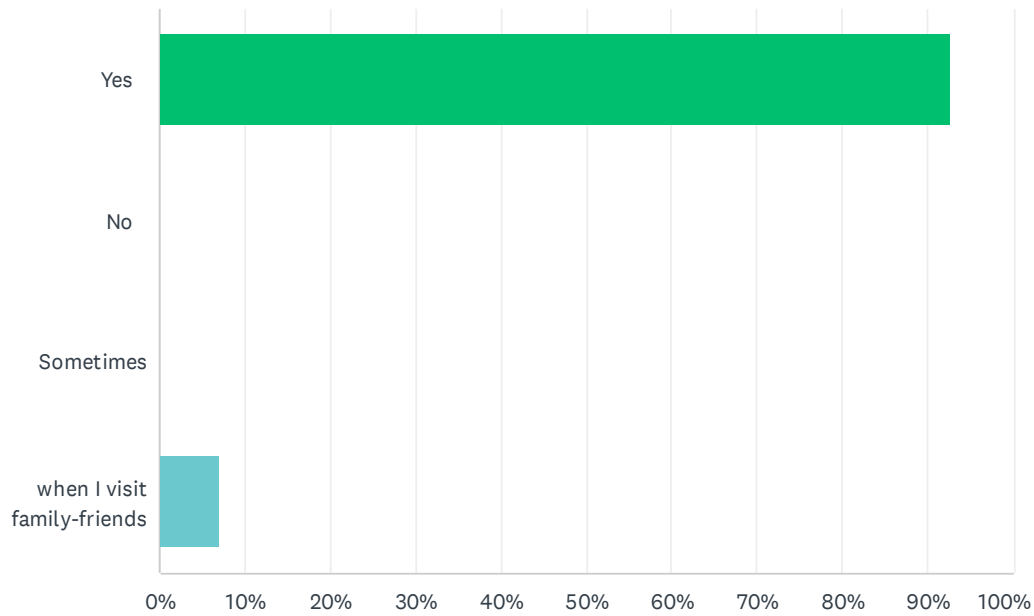
- Education
- Improved Health
- Community Gathering
- Income Generation
- Expanded Cultural Activities

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SURVEY MONKEY RESULTS

Q1 Do you live in Waiehu Kou?

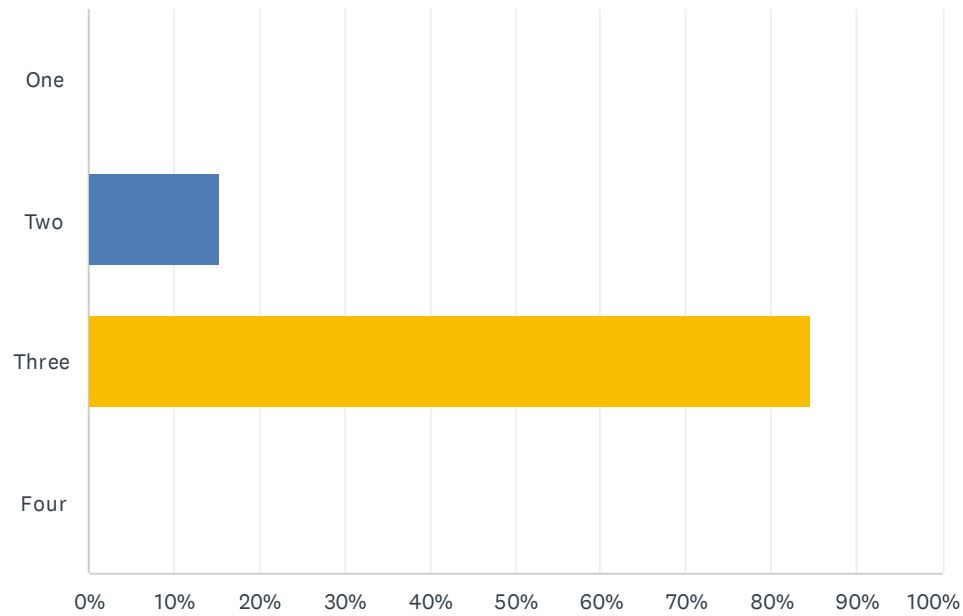
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	92.86%	13
No	0.00%	0
Sometimes	0.00%	0
when I visit family-friends	7.14%	1
TOTAL		14

Q2 If yes, what phase of Waiehu Kou?

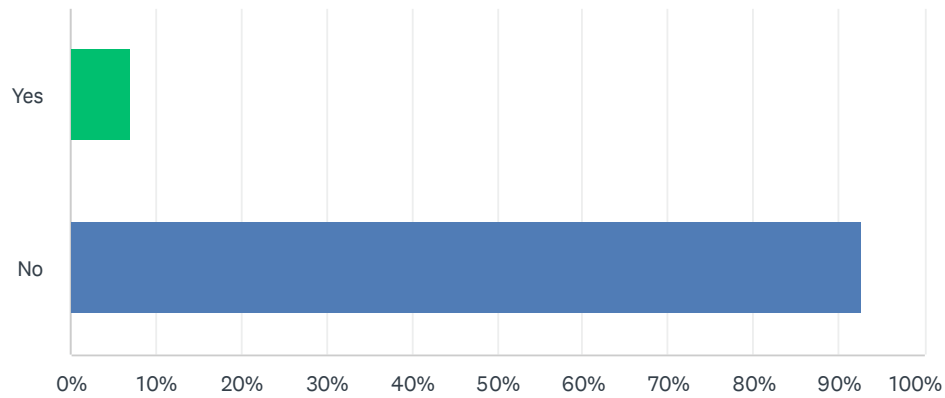
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
One	0.00%	0
Two	15.38%	2
Three	84.62%	11
Four	0.00%	0
TOTAL		13

Q3 Are you a homesteader in another area?

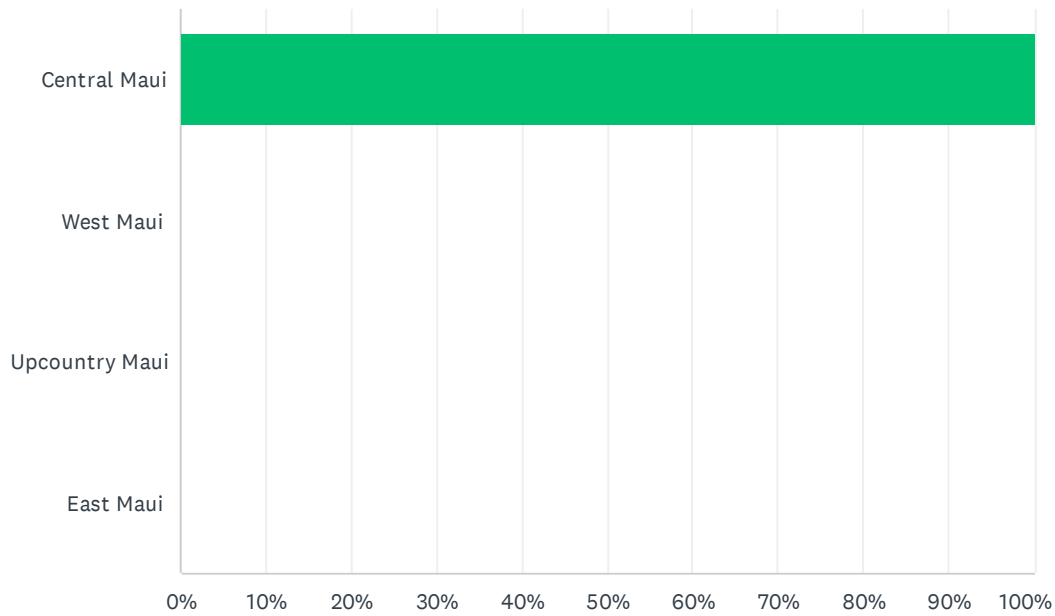
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	7.14%	1
No	92.86%	13
TOTAL		14

Q4 Where do you live?

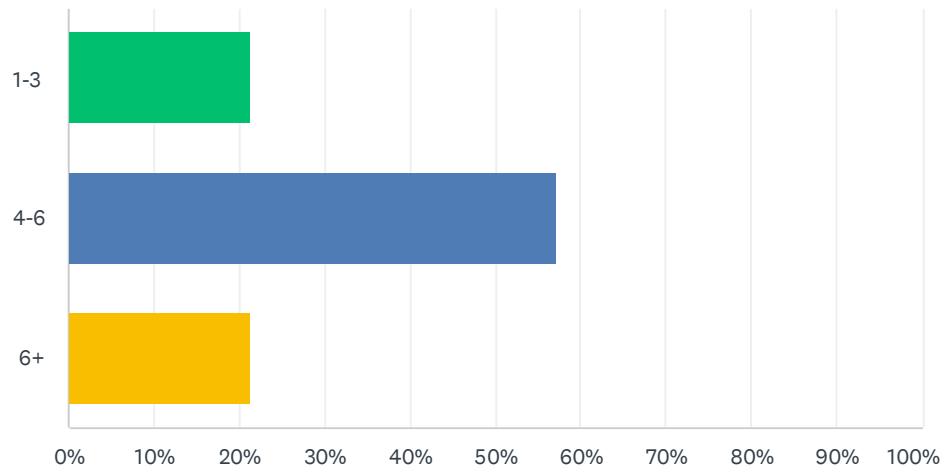
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
Central Maui	100.00%	13
West Maui	0.00%	0
Upcountry Maui	0.00%	0
East Maui	0.00%	0
TOTAL		13

Q5 Family Size

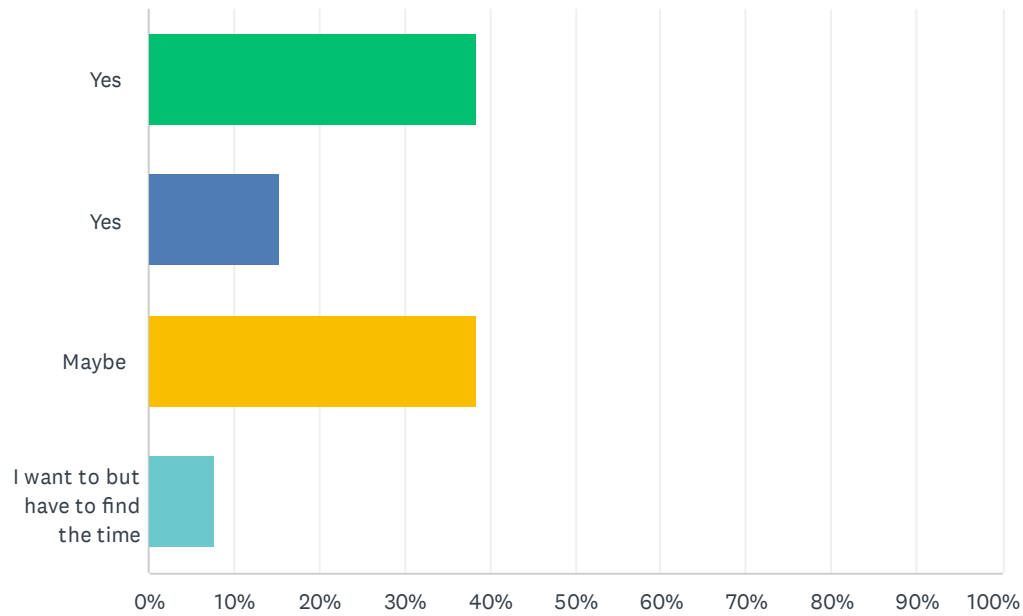
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
1-3	21.43%	3
4-6	57.14%	8
6+	21.43%	3
TOTAL		14

Q6 If WK3 had a community garden, would you use it?

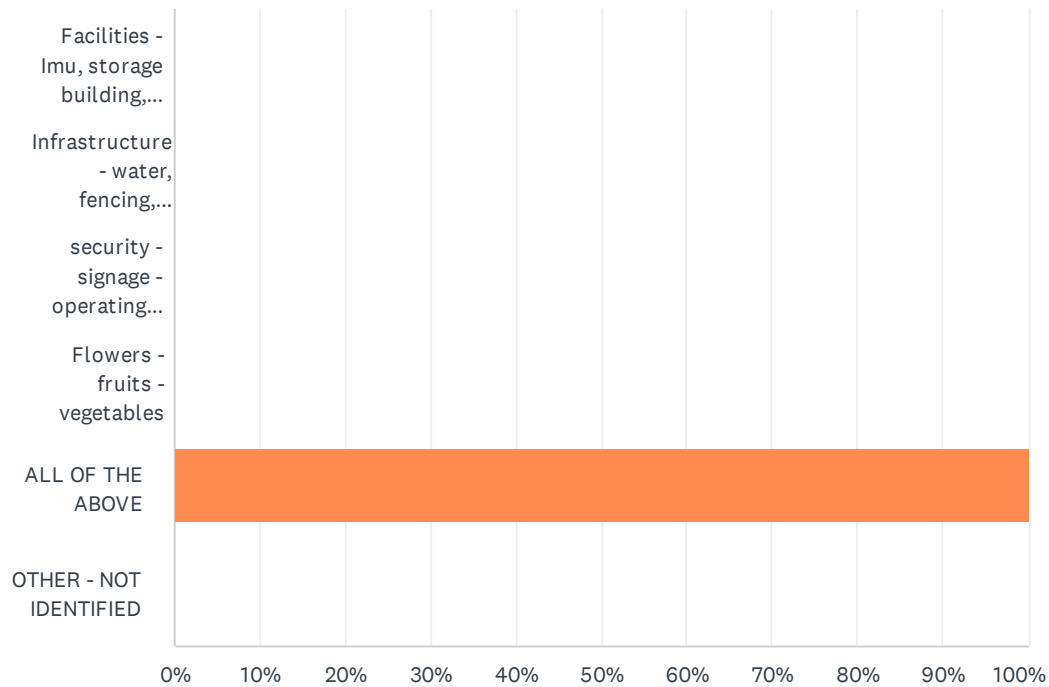
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	38.46%	5
Yes	15.38%	2
Maybe	38.46%	5
I want to but have to find the time	7.69%	1
TOTAL		13

Q7 What would you like to have in a community garden?

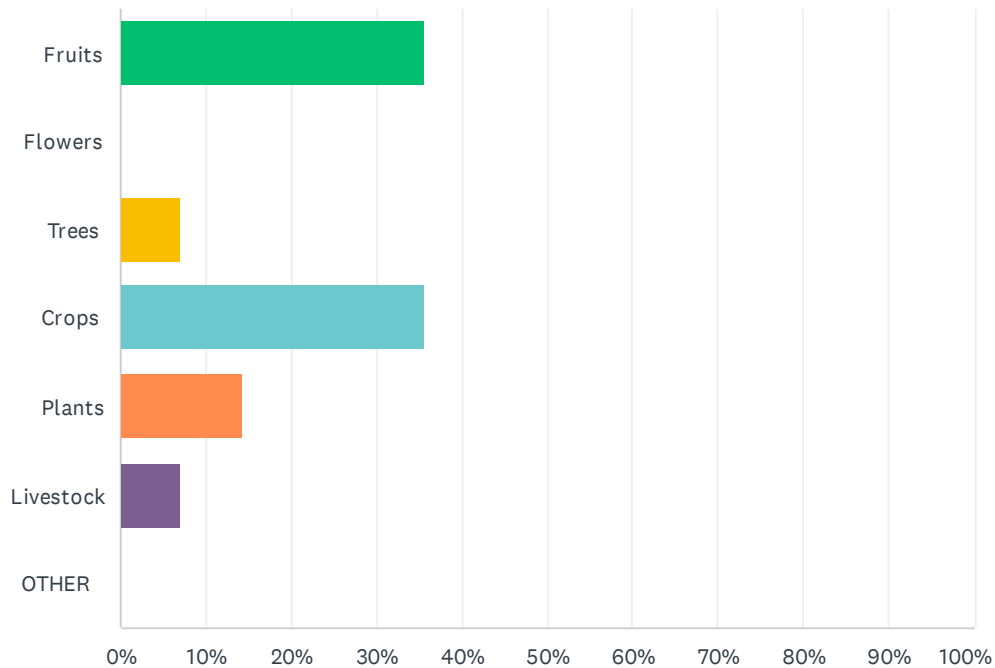
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Facilities - Imu, storage building, bathroom	0.00%	0
Infrastructure - water, fencing, electricity	0.00%	0
security - signage - operating hours, etc.	0.00%	0
Flowers - fruits - vegetables	0.00%	0
ALL OF THE ABOVE	100.00%	14
OTHER - NOT IDENTIFIED	0.00%	0
TOTAL		14

Q8 What would you like to see produced in a community garden?

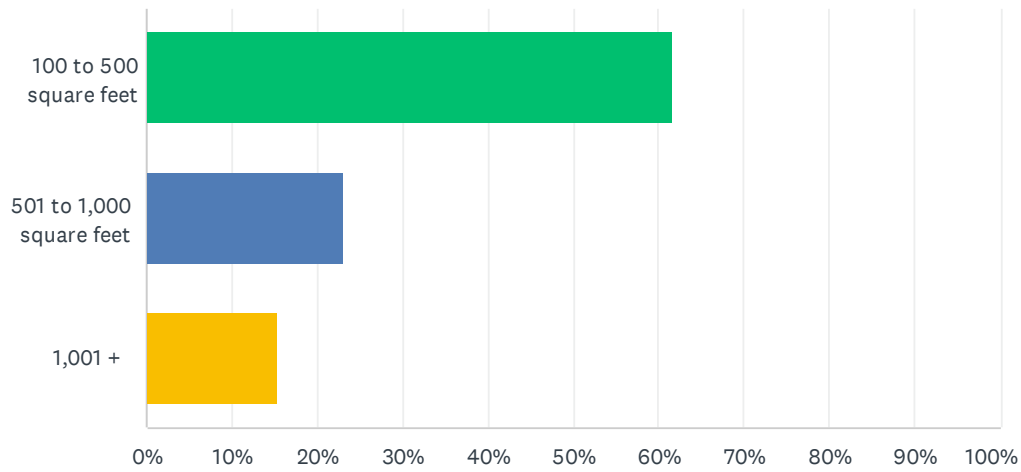
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Fruits	35.71%	5
Flowers	0.00%	0
Trees	7.14%	1
Crops	35.71%	5
Plants	14.29%	2
Livestock	7.14%	1
OTHER	0.00%	0
TOTAL		14

Q9 What is the size of the garden plot you would need?

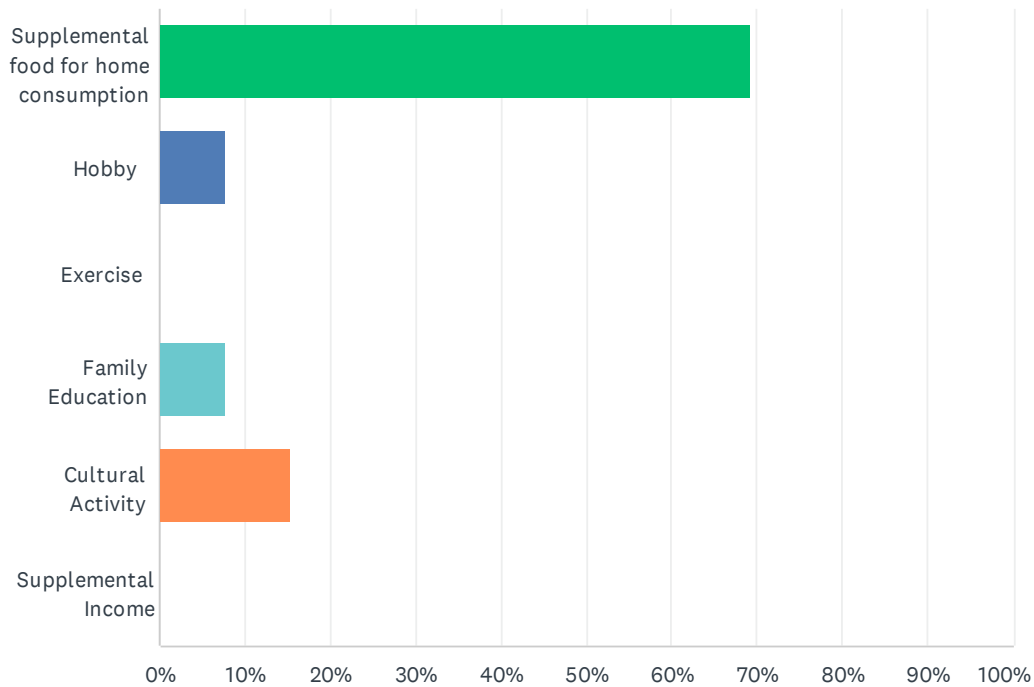
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ANSWER CHOICES	RESPONSES	
100 to 500 square feet	61.54%	8
501 to 1,000 square feet	23.08%	3
1,001 +	15.38%	2
TOTAL		13

Q10 What would be the purpose and intent of your garden plot?

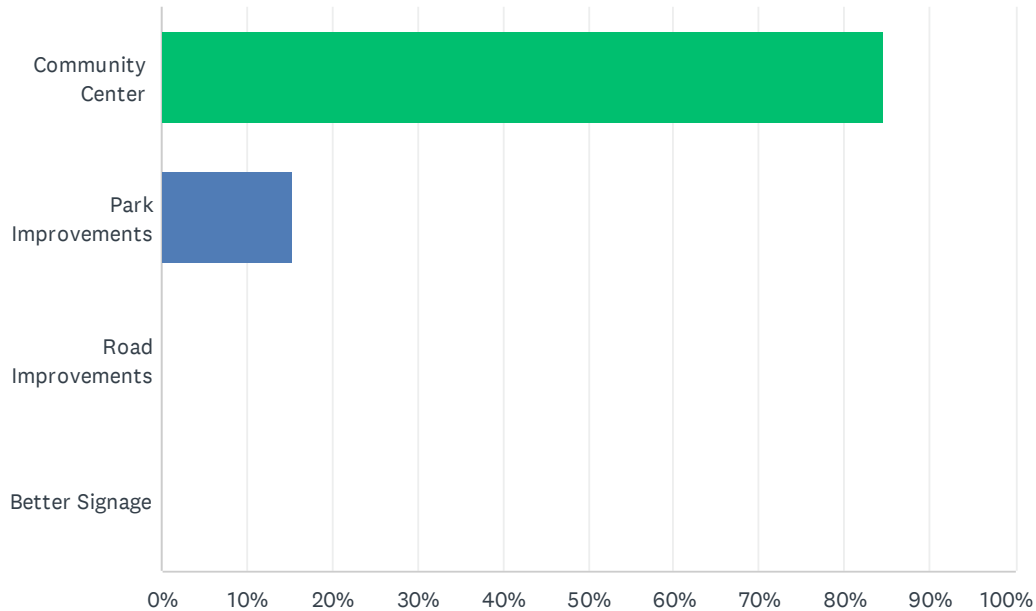
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ANSWER CHOICES	RESPONSES	
Supplemental food for home consumption	69.23%	9
Hobby	7.69%	1
Exercise	0.00%	0
Family Education	7.69%	1
Cultural Activity	15.38%	2
Supplemental Income	0.00%	0
TOTAL		13

Q11 Other than a community garden, what else would you like to see developed for the Waiehu Kou Homestead community?

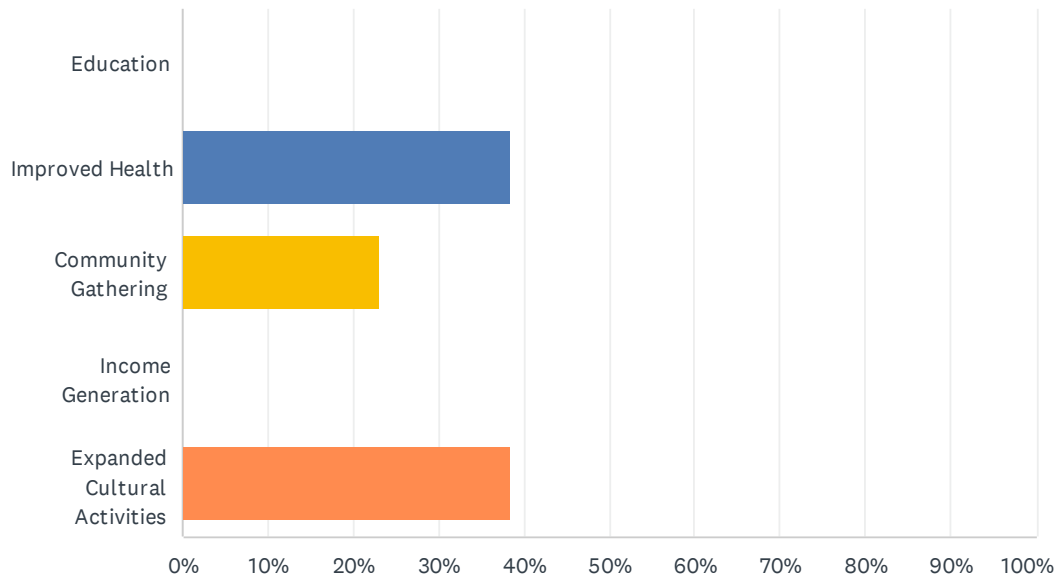
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
Community Center	84.62%	11
Park Improvements	15.38%	2
Road Improvements	0.00%	0
Better Signage	0.00%	0
TOTAL		13

Q12 What outcomes would you like a community garden to accomplish?

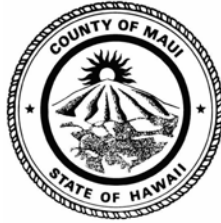
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
Education	0.00%	0
Improved Health	38.46%	5
Community Gathering	23.08%	3
Income Generation	0.00%	0
Expanded Cultural Activities	38.46%	5
TOTAL		13

KE KAI
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MAUI COUNTY LAND USE DESIGNATION FORMS



LAND USE DESIGNATION FORM

TAX MAP KEY 2320120050000

PLAN NUMBER LUD2024-00478

PROPERTY ADDRESS _____

☐ Yes ☒ No Will this Land Use Designation Form be used with a Subdivision Application?

IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A) ☐ Yes ☒ No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?

IF YES, which exemption? (No. 1, 2, 3, 4 or 5) _____

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law):
N/A

(This section to be completed by ZAED)

LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION:¹

STATE DISTRICT: ☐ Urban ☐ Rural ☒ Agriculture ☐ Conservation

☒ (SMA)

Special
Management Area

MAUI Growth Boundary:² ☒ Urban ☐ Small Town ☐ Rural ☐ Planned Growth Area ☐ Outside Growth Boundaries

ISLAND Protected Area:² ☐ Preservation ☐ Park ☐ Greenbelt ☐ Greenway ☐ Sensitive Land ☒ Outside Protected Areas

PLAN COMMUNITY PLAN:² AGRICULTURE & OPEN SPACE

COUNTY ZONING: AGRICULTURE & INTERIM

OTHER/COMMENTS: DEPARTMENT OF HAWAIIAN HOMELANDS

FEMA FLOOD INFORMATION: A Flood Development Permit is required if any portion of a parcel is designated V, VE, A, AO, AE, AH, D, or Floodway, and the project is on that portion.

FLOOD HAZARD AREA ZONES³

& BASE FLOOD ELEVATIONS: ZONE: X,XS,AE(45'-60')

☐ FEMA DESIGNATED FLOODWAY

For Flood Zone AO, FLOOD DEPTH:

☐ (PD)
Planned
Development
☐ (PH)
Project District
☐ See
Additional
Comments (Pg. 2)
☐ See
Attached LUD Map

SUBDIVISION LAND USE CONSISTENCY: ☐ Not Consistent, (LUDs appear to have NO permitted uses in common).

☐ Not Applicable, (Due to processing under consistency exemption No. ☐ 1, ☐ 2, ☐ 3, ☐ 4, ☐ 5).

(Signature) _____

☐ Interim Zoning, (The parcel or portion of the parcel that is zoned interim shall not be subdivided).

☐ Consistent, (LUDs appear to have ALL permitted uses in common).

☐ Consistent, upon obtaining an SMA, PD, or PH subdivision approval from Planning.

☐ Consistent, upon recording a permissible uses unilateral agreement processed by Public Works (See Pg. 2).

NOTES:

- 1) The conditions and/or representations made in the approval of a State District Boundary Amendment, Community Plan Amendment, County Change in Zoning, SMA Permit, Planned Development, Project District and/or a previous subdivision, may affect building permits, subdivisions, and uses on the land.
- 2) Please review the Maui Island Plan and the Community Plan document for any goals, objectives, policies or actions that may affect this parcel.
- 3) Flood development permits might be required in zones X and XS for any work done in streams, gulches, low-lying areas, or any type of drainageway might require the following designations to be shown on the subdivision map: 100-year flood inundation limits; base flood elevations; drainage reserves.
- 4) Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code]

REVIEWED & CONFIRMED BY:

Jacob Alison

05/13/2024

Date

For: Planning Program Administrator, Jordan E. Hart

DESIGNATIONS MAY CHANGE



LAND USE DESIGNATION FORM

TAX MAP KEY 2320260510000

PROPERTY ADDRESS _____

☐ Yes ☒ No Will this Land Use Designation Form be used with a Subdivision Application?

IF YES, answer questions A and B below and comply with instructions 2 & 3 below:

A) ☐ Yes ☒ No Will it be processed under a consistency exemption from Section 18.04.030(B), MCC?

IF YES, which exemption? (No. 1, 2, 3, 4 or 5) _____

B) State the purpose of subdivision and the proposed land uses (ie 1-lot into 2-lots for all land uses allowed by law): _____

- INSTRUCTIONS:**
- 1) Please use a separate Land Use Designation Form for each Tax Map Key (TMK) number.
 - 2) If this will be used with a subdivision application AND the subject property contains multiple districts/designations of (1) State Land Use Districts, (2) Maui Island Plan Growth Boundaries, (3) Community Plan Designations, or (4) County Zoning Districts; submit a signed and dated Land Use Designations Map, prepared by a licensed surveyor, showing the metes & bounds of the subject parcel and of each district/designation including any subdistricts.
 - 3) If this will be used with a subdivision application AND the subject property contains multiple State Land Use Districts; submit an approved District Boundary Interpretation from the State Land Use Commission.

(This section to be completed by ZAED)

LAND USE DISTRICTS/DESIGNATIONS (LUD) AND OTHER INFORMATION:¹

STATE DISTRICT: ☐ Urban ☐ Rural ☒ Agriculture ☐ Conservation

☒ (SMA)

Special
Management Area

MAUI ISLAND PLAN Growth Boundary:² ☒ Urban ☐ Small Town ☐ Rural ☐ Planned Growth Area ☐ Outside Growth Boundaries

Protected Area:² ☐ Preservation ☐ Park ☐ Greenbelt ☐ Greenway ☐ Sensitive Land ☒ Outside Protected Areas

COMMUNITY PLAN:² PROJECT DISTRICT 4 (WAIHEE) & OPEN SPACE

COUNTY ZONING: WK-PD4 (Conditional) Ord. 2201

OTHER/COMMENTS: Department of Hawaiian Homelands

FEMA FLOOD INFORMATION: A Flood Development Permit is required if any portion of a parcel is designated V, VE, A, AO, AE, AH, D, or Floodway, and the project is on that portion.

FLOOD HAZARD AREA ZONES³

& BASE FLOOD ELEVATIONS: X, XS, AE (36'-70'), AEF (36'-93')

☒ FEMA DESIGNATED FLOODWAY

For Flood Zone AO, FLOOD DEPTH:

☐ (PD)
Planned
Development
☒ (PH)
Project District
☐ See
Additional
Comments (Pg. 2)
☐ See
Attached LUD Map

SUBDIVISION LAND USE CONSISTENCY: ☐ Not Consistent. (LUDs appear to have NO permitted uses in common).

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(Signature) _____

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- 4) Subdivisions will be further reviewed during the subdivision application process to verify consistency, unilateral agreement requirements, and the conditions associated with a unilateral agreement [Section 18.04.030.D, Maui County Code]

REVIEWED & CONFIRMED BY:

Sheila Nakagawa

10/11/2022

Date

For: Planning Program Administrator

VALID FOR 2 YEARS FROM THE DATE ISSUED. DESIGNATIONS MAY CHANGE

KE KAI
PLANNING

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
CUSTOM SOIL RESOURCE REPORT
FEBRUARY 2022



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Island of Maui, Hawaii



February 23, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Island of Maui, Hawaii

Survey Area Data: Version 19, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 29, 2017—Oct 11, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
laA	lao silty clay, 0 to 3 percent slopes, MLRA 163	0.9	6.1%
lcB	lao clay, 3 to 7 percent slopes, MLRA 163	9.5	62.9%
PZUE	Puuone sand, 7 to 30 percent slopes	2.3	15.1%
WvB	Wailuku silty clay, 3 to 7 percent slopes, MLRA 163	2.4	15.9%
Totals for Area of Interest		15.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Island of Maui, Hawaii

laA—lao silty clay, 0 to 3 percent slopes, MLRA 163

Map Unit Setting

National map unit symbol: 2yyrn
Elevation: 100 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

lao and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of lao

Setting

Landform: Mountain slopes, alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Convex, concave
Parent material: Alluvium derived from basalt

Typical profile

Ap - 0 to 15 inches: clay
Bw1 - 15 to 25 inches: clay
Bw2 - 25 to 48 inches: clay
BC - 48 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 5 percent
Landform: Mountain slopes, alluvial fans

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Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Linear, convex, concave
Hydric soil rating: No

lcB—lao clay, 3 to 7 percent slopes, MLRA 163

Map Unit Setting

National map unit symbol: 2yys0
Elevation: 100 to 500 feet
Mean annual precipitation: 23 to 36 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

lao and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of lao

Setting

Landform: Alluvial fans, mountain slopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Concave, convex
Parent material: Weathered alluvium derived from basalt

Typical profile

Ap - 0 to 15 inches: clay
Bw1 - 15 to 25 inches: clay
Bw2 - 25 to 48 inches: clay
BC - 48 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e

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Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 10 percent
Landform: Alluvial fans, mountain slopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Linear, concave, convex
Hydric soil rating: No

Wailuku

Percent of map unit: 3 percent
Landform: Alluvial fans, mountain slopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Concave, convex
Hydric soil rating: No

Paia

Percent of map unit: 2 percent
Landform: Alluvial fans, mountain slopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Lower third of mountainflank, rise
Down-slope shape: Linear
Across-slope shape: Concave, convex
Hydric soil rating: No

PZUE—Puuone sand, 7 to 30 percent slopes

Map Unit Setting

National map unit symbol: hqb7
Elevation: 50 to 350 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 73 to 75 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Puuone and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puuone

Setting

Landform position (two-dimensional): Backslope

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Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Coral seashells

Typical profile

H1 - 0 to 20 inches: sand

H2 - 20 to 40 inches: cemented material

Properties and qualities

Slope: 7 to 30 percent

Depth to restrictive feature: 20 to 40 inches to cemented horizon

Drainage class: Somewhat excessively drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 100 percent

Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A

Hydric soil rating: No

WvB—Wailuku silty clay, 3 to 7 percent slopes, MLRA 163

Map Unit Setting

National map unit symbol: 2yysg

Elevation: 50 to 1,000 feet

Mean annual precipitation: 20 to 40 inches

Mean annual air temperature: 72 to 73 degrees F

Frost-free period: 365 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Wailuku and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wailuku

Setting

Landform: Alluvial fans

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope, rise

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Alluvium derived from basalt

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Typical profile

Ap1 - 0 to 4 inches: silty clay
Ap2 - 4 to 12 inches: silty clay
Bw1 - 12 to 26 inches: silty clay
Bw2 - 26 to 35 inches: silty clay
BC - 35 to 60 inches: silty clay

Properties and qualities

Slope: 3 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Hydric soil rating: No

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Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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KE KAI
PLANNING

US DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS FISH AND WILDLIFE OFFICE



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawai'i 96850



In Reply Refer To:
01EPIF00-2022-TA-0045

October 27, 2021

Dawn Hegger-Nordblom
Ke Kai Planning, LLC
P.O. Box 1175
Lahaina Hawai'i 9667

Subject: Technical Assistance for the Proposed Community Garden by the Waiehu Kou 3
Community Association in Waiehu, Maui

Thank you for your recent correspondence requesting technical assistance on species biology, habitat, or life requisite requirements. The Pacific Islands Fish and Wildlife Office (PIFWO) of the U.S. Fish and Wildlife Service (Service) appreciates your efforts to avoid or minimize effects to protected species associated with your proposed actions. We provide the following information for your consideration under the authorities of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 *et seq.*), as amended.

Due to significant workload constraints, PIFWO is currently unable to specifically address your information request. The table below lists the protected species most likely to be encountered by projects implemented within the Hawaiian Islands. Based on your project location and description, we have noted the species most likely to occur within the vicinity of the project area, in the '**Occurs In or Near Project Area**' column. Please note this list is not comprehensive and should only be used for general guidance. We have added to the PIFWO website, located at <https://www.fws.gov/pacificislands/promo.cfm?id=177175840> recommended conservation measures intended to avoid or minimize adverse effects to these federally protected species and best management practices to minimize and avoid sedimentation and erosion impacts to water quality. If your project occurs on the island of Hawai'i, we have also enclosed our biosecurity protocol for activities in or near natural areas.

If you are representing a federal action agency, please request an official species list following the instructions at our PIFWO <https://www.fws.gov/pacificislands/articles.cfm?id=149489558>. You can find out if your project occurs in or near designated critical habitat here: <https://ecos.fws.gov/ipac/>.

INTERIOR REGION 9 COLUMBIA-PACIFIC NORTHWEST

IDAHO, MONTANA*, OREGON*, WASHINGTON
*PARTIAL

INTERIOR REGION 12 PACIFIC ISLANDS

AMERICAN SĀMOA, GUAM, HAWAI'I, NORTHERN
MARIANA ISLANDS

Under section 7 of the ESA, it is the Federal agency's (or their non-Federal designee) responsibility to make the determination of whether or not the proposed project "may affect" federally listed species or designated critical habitat. A "may affect, not likely to adversely affect" determination is appropriate when effects to federally listed species are expected to be discountable (i.e., unlikely to occur), insignificant (minimal in size), or completely beneficial. This conclusion requires written concurrence from the Service. If a "may affect, likely to adversely affect" determination is made, then the Federal agency must initiate formal consultation with the Service. Projects that are determined to have "no effect" on federally listed species and/or critical habitat do not require additional coordination or consultation.

Implementing the avoidance, minimization, or conservation measures for the species that may occur in your project area will normally enable you to make a “may affect, not likely to adversely affect” determination for your project. If it is determined that the proposed project may affect federally listed species, we recommend you contact our office early in the planning process so that we may assist you with the ESA compliance. If the proposed project is funded, authorized, or permitted by a Federal agency, then that agency should consult with us pursuant to section 7(a)(2) of the ESA. If no Federal agency is involved with the proposed project but take of listed species cannot be fully avoided, the project should begin development of a Habitat Conservation Plan in order to obtain an Incidental Take Permit under section 10(a)(1)(B) of the ESA.

We appreciate your efforts to conserve endangered species. We regret that we cannot provide you with more specific protected species information for your project site. If you have questions that are not answered by the information on our website, you can contact PIFWO at (808) 792-9400 and ask to speak to the lead biologist for the island where your project is located.

Sincerely,

Acting Island Team Manager
Pacific Islands Fish and Wildlife Office

[illegible]

The table below lists the protected species most likely to be encountered by projects implemented within the Hawaiian Islands. For your guidance, we have marked species that may occur in the vicinity of your project, this list is not comprehensive and should only be used for general guidance.

Enclosure 1. Federal Status of Animal Species

<u>Scientific Name</u>	<u>Common Name / Hawaiian Name</u>	<u>Federal Status</u>	<u>May Occur In Project Area</u>
Mammals			
<i>Lasiurus cinereus semotus</i>	Hawaiian hoary bat/‘ōpe‘ape‘a	E	☒
Reptiles			
<i>Chelonia mydas</i>	green sea turtle/honu - Central North Pacific distinct population segment (DPS)	T	☐
<i>Eretmochelys imbricata</i>	hawksbill sea turtle/ honu ‘ea or ‘ea	E	☐
Birds			
<i>Anas wyvilliana</i>	Hawaiian duck/koloa	E	☒
<i>Branta sandvicensis</i>	Hawaiian goose/nēnē	T	☒
<i>Fulica alai</i>	Hawaiian coot/‘alae ke‘oke‘o	E	☒
<i>Gallinula galeata sandvicensis</i>	Hawaiian gallinule/‘alae ‘ula	E	☐
<i>Himantopus mexicanus knudseni</i>	Hawaiian stilt/ae‘o	E	☒
<i>Oceanodroma castro</i>	band-rumped storm-petrel Hawai‘i DPS/‘akē‘akē	E	☒
<i>Pterodroma sandwichensis</i>	Hawaiian petrel/‘ua‘u	E	☒
<i>Puffinus auricularis newelli</i>	Newell’s shearwater/‘a‘o	T	☒
<i>Ardena pacificus</i>	wedge-tailed shearwater/‘ua‘u kani	MBTA	☐
<i>Buteo solitarius</i>	Hawaiian hawk/‘io	MBTA	☐
<i>Gygis alba</i>	white tern/manu-o-kū	MBTA	☐
Arthropods			
<i>Hylaeus anthracinus</i>	anthracinan yellow-faced bee	E	☐
<i>Manduca blackburni</i>	Blackburn’s sphinx moth	E	☒
<i>Megalagrion pacificum</i>	Pacific Hawaiian damselfly	E	☐
<i>Megalagrion xanthomelas</i>	orangeblack Hawaiian damselfly	E	☐
<i>Megalagrion nigrohamatum nigrolineatum</i>	blackline Hawaiian damselfly	E	☐
<i>Procaris hawaiana</i>	anchialine pool shrimp	E	☐
<i>Vetericaris chaceorum</i>	anchialine pool shrimp	E	☐

Enclosure 2. Federal Status of Plant Species

Plants				
<u>Scientific Name</u>	<u>Common Name or Hawaiian Name</u>	<u>Federal Status</u>	<u>Locations</u>	<u>May Occur In Project Area</u>
<i>Abutilon menziesii</i>	ko‘olua‘ula	E	O, L, M, H	☐
<i>Achyranthes splendens</i> var. <i>rotundata</i>	‘ewa hinahina	E	O	☐
<i>Bonamia menziesii</i>	no common name	E	K, O, L, M, H	☐
<i>Canavalia pubescens</i>	‘āwikiwiki	E	Ni, K, L, M	☐
<i>Colubrina oppositifolia</i>	kauila	E	O, M, H	☐
<i>Cyperus trachysanthos</i>	pu‘uka‘a	E	K, O	☐
<i>Gouania hillebrandii</i>	no common name	E	Mo, M	☐
<i>Hibiscus brackenridgei</i>	ma‘o hau hele	E	O, Mo, L, M, H	☐
<i>Ischaemum byrone</i>	Hilo ischaemum	E	K, O, Mo, M, H	☐
<i>Isodendron pyriformis</i>	wahine noho kula	E	O, H	☐
<i>Marsilea villosa</i>	‘ihi‘ihi	E	Ni, O, Mo	☐
<i>Mezoneuron kavaense</i>	uhiuhi	E	O, H	☐
<i>Nothoecstrum breviflorum</i>	‘aiea	E	H	☐
<i>Panicum fauriei</i> var. <i>carteri</i>	Carter’s panicgrass	E	Molokini Islet (O), Mo	☐
<i>Panicum niahauense</i>	lau‘ehu	E	K	☐
<i>Peucedanum sandwicense</i>	makou	E	K, O, Mo, M	☐
<i>Pleomele (Chrysodracon) hawaiiensis</i>	halapepe	E	H	☐
<i>Portulaca sclerocarpa</i>	‘ihi	E	L, H	☐
<i>Portulaca villosa</i>	‘ihi	E	Le, Ka, Ni, O, Mo, M, L, H, Nihoa	☐
<i>Pritchardia affinis (maideniana)</i>	loulu	E	H	☐
<i>Pseudognaphalium sandwicense</i> var. <i>molokaiense</i>	‘ena‘ena	E	Mo, M	☐
<i>Scaevola coriacea</i>	dwarf naupaka	E	Mo, M	☒
<i>Schenkia (Centaurium) sebaeoides</i>	‘āwiwi	E	K, O, Mo, L, M	☐
<i>Sesbania tomentosa</i>	‘ōhai	E	Ni, Ka, K, O, Mo, M, L, H, Necker, Nihoa	☐
<i>Tetramolopium rockii</i>	no common name	T	Mo	☐
<i>Vigna o-wahuensis</i>	no common name	E	Mo, M, L, H, Ka	☐

Location key: O=O‘ahu, K=Kaua‘i, M=Maui, H=island of Hawai‘i, L=Lāna‘i, Mo=Moloka‘i, Ka=Kaho‘olawe, Ni=Ni‘ihau, Le=Lehua

KE KAI
PLANNING

MAKAMAE NATIVES BOTANICAL REPORT

**ETHNOBOTANICAL AND AGRICULTURE SUGGESTIONS
FOR THE HOMESTEAD COMMUNITY
OF WAIEHU KOU 3**



Ke Kai Planning 2022

Prepared for
Ke Kai Planning LLC

Prepared by
Makamae Natives LLC
2022

**ETHNOBOTANICAL AND AGRICULTURE SUGGESTIONS
FOR THE HOMESTEAD COMMUNITY
OF WAIEHU KOU 3**

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SOIL TYPE MAP



Legend

232012005_soils_clip

MUNAME

- lao clay, 3 to 7 percent slopes
- lao silty clay, 0 to 3 percent slopes
- Puuone sand, 7 to 30 percent slopes

232026051_soils_clip

MUNAME

- lao clay, 3 to 7 percent slopes
- lao silty clay, 0 to 3 percent slopes
- Walluku silty clay, 3 to 7 percent slopes



USDA-NRCS 2022

ETHNOBOTANICAL AND AGRICULTURE SUGGESTIONS
FOR THE HOMESTEAD COMMUNITY
OF WAIERU KOU 3

Makamae Natives LLC is a small naturalist business that provides botanical and wildlife survey for land use and restoration planning, agricultural pest management, and naturalist guiding experiences. Makamae Natives LCC was started by owner-operator Martha Kawasaki after completing her master's degree in Tropical Conservation Biology and Environmental Science from the University of Hawaii at Hilo. Ms. Kawasaki has 15 years of ecological field survey experience and a combined 5 years of naturalist guiding, pest management control and wildlife monitoring experience. Makamae Natives LLC mission is to connect communities to native and natural systems, promoting conservation in planning and management of natural resources.

BIOLOGICAL RECOMMENDATIONS OBJECTIVES

1. Create recommendations of Hawaiian plant species (non-agricultural and non-medicinal) that considers xeriscaping and restoration of native plant community.
2. Create recommendations of native ethnobotanical species for project area.
3. Create recommendations of agricultural sustainable plants that consider xeriscaping (landscape an area in a style which requires little or no irrigation), soil types and limited nutrient introductions.

METHOD

Inspect existing agriculture and Hawaiian plant community at Waiehu Kou 3 project site and University of Maui Kaulawehu Garden for research of local plant communities. Interview community members and local botanical experts on likelihood of collaboration on community garden projects. Literary research of ethnobotanical text to aid in the creation of recommendations of native, ethnobotanical, and agricultural plants for consideration.

RESULTS

On 18 February 2022, a site visit occurred at the Waiehu Kou 3 project site and University of Maui Kaulawehu Garden. The Waiehu Kou 3 project site was inspected to view current agriculture and reintroduction of native plants. Several natives and ethnobotanical plants were seen including Kalo, Aalii, Koa'ai, and Pua kala. In addition non-native agriculture were noted including Avocado, Citrus tree species, Eggplant, Mango, Macademia nut and Tomato. The University of Maui Kaulawehu Garden was within a similar elevation as well as similar soil types that occur at the project site. It is with the assumptions similar elevation, soil types, and the collaboration with the ethnobotanical garden and other ethnobotanical and native plant sources that the following list of plants in this report are offered for consideration.

RECOMMENDATIONS

Recommendations are arranged in three tables:

Table 1 List of Hawaiian native plants for restoration considerations

Table 2 List of Hawaiian ethnobotanical plants for consideration

Table 3 List of Agricultural crops for consideration

Photos of the recommended native plants are provided in the Appendix and are arranged alphabetically by Hawaiian name. It is illegal to introduce threaten and endangered plants from

seed or cutting from wild/natural collections. The USFWS requires threaten and endangered plant species used in landscaping or restoration come from an approved greenhouse or grower and be from a cultivated origin, collected and grown within a greenhouse environment. If recommended threaten or endangered plants chosen for planting an endangered plant nursery/greenhouse facility will need to be sought.

All plant names are arranged alphabetically by scientific name. Taxonomy and nomenclature of flowering plants are in accordance with Wagner et al. (1999).

HAWAIIAN NATIVE PLANTS FOR RESTORATION

The recommended native plants represent a natural ecosystem for the area of Waiehu Kou 3's soil types. Most of the plants can be used to restore the Puuone sand area of the project area (see Soil Map), as this is the least desirable area for agriculture crops. Native plants are adaptive to the high drainage soil, limited nutrients, and slope. The ground cover natives: Hinahina, 'Ilima papa, Dwarf naupaka, Naupaka kahakai, Ohai, and Pohinahina could be useful in reducing slope collapse into the agriculture cultivated areas, erosion control and reducing moisture from leaving the soils. Shrub species: 'Aalii, Akia, Koaia, Kokio ula, Kooloa 'ula, and Mau hau hele should be planted interspersed between the groundcovers. These shrub species can also act as erosion control, provide seasonal flower blooms, and shade for groundcover. Tree species Kou, Naio, and Ohia Lehua are excellent shade trees and do not require much water after establishment. The moisture held in to the sandy Puuone soil by the ground cover and shrubs will nurture these trees once they have taken to the soil.

For each species, the following is provided:

1. Scientific name.
2. Hawaiian name.
3. Bio-geographical status. The following symbols are used:

Least Concern= Not a focus of conservationists because they don't appear to be facing any imminent threats.

Threaten= Plants that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range. If selected for the Waiehu Kou 3 project area a native plant nursery/ greenhouse will need to be contacted for plant availability or cultivation.

Endangered= plants that have become so rare they are in danger of becoming extinct. If selected for the Waiehu Kou 3 project area a native plant nursery/ greenhouse will need to be contacted for plant availability or cultivation.

Table 1
Listing of Hawaiian native plants for restoration considerations

SCIENTIFIC NAME	HAWAIIAN NAME	STATUS
<i>Abutilon menziesii</i>	Kooloa 'ula	Threaten
<i>Acacia koaia</i>	Koaia	Least Concern
<i>Cordia subcordata</i>	Kou	Least Concern
<i>Dodoneae viscosa</i>	Aalii	Least Concern
<i>Hibiscus brackenridgei</i>	Mau hau mele	Endangered
<i>Hibiscus clayi</i>	Kokio ula	Endangered
<i>Heliotropium anomalum</i>	Hinahina	Least Concern
<i>Metrosideros spp.</i>	'Ohi'a lehua	Threaten
<i>Myoporum sandwicense</i>	Naio	Least Concern
<i>Scaevola coriacea</i>	Dwarf naupaka	Threaten
<i>Scaevola taccada</i>	Naupaka kahakai	Least Concern
<i>Sesbania tomentosa</i>	Ohai	Endangered
<i>Sida fallax</i>	'Ilima papa	Least Concern
<i>Vitex rotundifolia</i>	Pōhinahina	Least Concern
<i>Wikstromia uva-ursi</i>	Akia	Least Concern

HAWAIIAN ETHNOBOTANICAL PLANT RECOMMENDATIONS

Recommended ethnobotanical plants can be integrated into the agricultural plan of the Waiehu Kou 3 project area. Ethnobotanical plants such as 'Awa, Kalo (dependent on variety used), Mai'a (dependent on variety used), Makamki, Olena, and Ulu (dependent on variety used) will need to be within proximity to a water source. Root crops: 'Uala and Uhi may be planted between orchard rows of the established Macadamia nut trees in the lao clay soil, it is recommended that turning of the soil occur before 'Uala and Uhi are planted, possibly with a pig tractor. All other Ethnobotanical crops do not have soil or irrigation restrictions.

The medicinal ethnobotanical plants can be used externally or internally to treat many common illness: 'Awa (for the treatment of muscle pain, as a sedative, sore throat, and rheumatism), Kukui (for the treatment of constipation, wounds, infections, eczema, sore throat, and arthritis), Mamaki (for the treatment of thrush, healing sores, constipation, and stress), Noni (for the treatment of boils, constipation, head lice, kidney problems, high blood pressure, diabetes, kidney and bowel problems), Olena (for the treatment of muscle pains, ear aches, nasal congestion, and mouth ulcers), and Pua kala (for the treatment of tooth aches, ulcers and as a topical anesthetic).

For each species, the following is provided:

1. Scientific name.
2. Hawaiian and Common name.
3. Use. The following symbols are used:
Medicinal= Plant was used to treat a medical ailment
Food crop= Plant was consumed as food

Fiber= Plant was used for fiber or cordage
Dye= Plant was used to stain fiber

Table 2
List of Hawaiian ethnobotanical plants for consideration

SCIENTIFIC NAME	COMMON NAME	USE
<i>Aleurites moluccana</i>	Kukui	Medicinal
<i>Argemone glauca</i>	Pua kala	Medicinal
<i>Artocarpus altilis</i>	Ulu, Breadfruit	Food crop
<i>Broussonetia papyrifera</i>	Wauke	Fiber, Bark cloth
<i>Colocasia esculenta</i>	Kalo, Taro	Food crop
<i>Cordyline fruticosa</i>	Ki, Ti	Fiber
<i>Curcuma longa</i>	Olena, Turmeric	Medicinal, Dye
<i>Dioscorea alata</i>	Uhi, Yam	Food Crop
<i>Eugenia malaccensis</i>	'Ohi'a 'ai, Mountain apple	Food crop
<i>Ipomea batatas</i>	'Uala, Sweet Potato	Food crop
<i>Morinda citrifolia</i>	Noni	Medicinal, Food crop
<i>Musa acuminata var.</i>	Mai'a, Banana	Food crop
<i>Piper methysticum</i>	'Awa, Kava	Medicinal
<i>Pipturus spp.</i>	Mamaki	Medicinal
<i>Saccharum officinarum</i>	Ko, Sugarcane	Food crop

RECOMMENDED AGRICULTURAL FLORA

The recommended agricultural plants with irrigation may be cultivated in all clay type soil from the soil report. It is recommended that herb crops (chives, cilantro, green onion, lemon grass, oregano, parsley, rosemary, sage, and thyme) be planted in the proposed raised garden area. Row crops (beets, cabbage, carrots, eggplants, garden peas, kale, lettuce, pole beans, squash, and tomato) should be planted within 50% shaded areas of the agriculture plan, or within raised gardens. Recommended row crops could include into a rotational crop system enhancing the soil's nutrients and microbe community, for example nitrogen fixing crops such as pole beans or garden pea (*Leguminosae*) in a rotational crop system after 1 year can be cut as cover crop for the planting of Brassica species such as kale or cabbage.

Tree recommendation can be planted on edges or in rows within the sustainable agriculture plots, as soil moisture retention and shade for row crops. Large trees create a canopy that reduces water loss from surface watering. The lao clay with the 0-3 slope seems to be the best at water absorption, it is recommended that tree crops be planted mostly within this area of the sustainable agriculture landscape plan. More dry condition tolerant plants (avocado, citrus tree species, dragon fruit, kalamansi, mango and papaya).

Regarding the introduction of a pig tractor, mobile pig pen system, within the area of the established macadamia nut grove; This system would be beneficial using the natural rooting behavior of pigs to till the soil and their leaving to fertilize for future planting. A similar system

could use chickens in the raise garden beds. It is recommended that pig tractoring be tested in the first 5 rows of cleared macadamia nut rows before expanding the operation to the rest of the grove. Beginning in a small area of know tree count and area size will allow the Waiehu Kou 3 community to gauge the ability of the pig tractor system to clear under the macadamia grove for planting of crops.

For each species, the following is provided:

1. Scientific name.
2. Common name.

Table 3
Listing of Agricultural Flora for consideration

SCIENTIFIC NAME	COMMON NAME
<i>Allium fistulosum</i>	Green onion
<i>Allium schoenoprasum</i>	Chives
<i>Annona muricata</i>	Soursop
<i>Beta vulgaris</i>	Beet
<i>Brassica sp.</i>	Cabbage, Kale, Lettuce
<i>Carica papaya</i>	Papaya
<i>Citrofortunella microcarpa</i>	Kalamansi
<i>Citrus sp.</i>	Citrus tree species
<i>Coriandrum sativum</i>	Cilantro
<i>Cucurbita sp.</i>	Squash
<i>Cymbopogon citratus</i>	Lemon grass
<i>Daucus carota subsp. sativus</i>	Carrot
<i>Hylocereus undatus</i>	Dragon fruit, Pitahaya
<i>Laurus nobilis</i>	Bay Leaf
<i>Mangifera idica</i>	Mango
<i>Mentha sp.</i>	Mint
<i>Ocimum sp.</i>	Basil
<i>Origanum sp.</i>	Oregano
<i>Persea americana</i>	Avocado
<i>Petroselinum crispum</i>	Parsley
<i>Phaseolus sp.</i>	Pole beans
<i>Pisum sativum</i>	Garden pea
<i>Rosmarinus officinalis</i>	Rosemary
<i>Salvia officinalis</i>	Sage
<i>Solanum lycopersicum</i>	Tomato
<i>Solanum melongena</i>	Eggplant
<i>Thymus vulgaris</i>	Thyme

APPENDIX
RECOMMENDED NATIVE RESTORATION FLORA

Aalii (*Dodonaea viscosa*) - Sapindaceae- Shrub



Photo: Forest & Kim Starr

Akia (*Wikstroemia uva-ursi*) - Thymelaeaceae- Shrub



Photo: Forest & Kim Starr

Hinahina (*Heliotropium anomalum*) - Helitropiaceae - Groundcover



Photo: Jupiter Nielsen

‘Ilima papa (*Sida fallax*) - Malvaceae - Groundcover



Photo: Forest & Kim Starr



Koaia (*Acacia koaia*) - Fabaceae- Tree

Photo: Native Plants Hawai'i



Kokio ula (*Hibiscus clayi*) - Malvaceae- Shrub

Photo: Forest & Kim Starr



Kooloa ula (*Abutilon menziesii*) - Malvaceae- Shrub

Photo: Forest & Kim Starr



Kou (*Cordia subcordata*) - Cordiaceae- Tree

Photo: Forest & Kim Starr



Mau hau mele (*Hibiscus brackenridgei*) -Malvaceae - Shrub

Photo: Forest & Kim Starr



Naio (*Myoporum sandwicense*) -Myoporaceae- Tree

Photo: Forest & Kim Starr



Dwarf naupaka (*Scaevola coriacea*) -Goodeniaceae- Groundcover/Shrub

Photo: Forest & Kim Starr



Naupaka kahakai (*Scaevola taccada*) - Goodeniaceae – Shrub

Photo: Forest & Kim Starr



Photo: Forest & Kim Starr

Ohia (*Sesbania tomentosa*) -Fabaceae- Groundcover



Photo: DLNR

Ohia lehua (*Metrosideros* sp.) -Myrtaceae- Tree



Photo: Forest & Kim Starr

Pōhinahina (*Vitex rotundifolia*) -Laminaceae- Groundcover

RECOMMENDED ETHNOBOTANICAL PLANTS



Photo: Polynesian Cultural Society

'Awa, Kava (*Piper methysticum*) – Piperaceae-
Groundcover/Vine



Photo: Hui Ko'olaupoko

Kalo (*Colocasia esculenta*) -Araceae- Grass



Photo: Forest & Kim Starr

Ki, Ti (*Cordyline fruticosa*) -Asparagaceae -Shrub



Photo: Forest & Kim Starr

Ko, Sugarcane (*Saccharum officinarum*) – Poaceae-
Grass



Photo: Wikipedia

Kukui (*Aleurites moluccana*) – Euphorbiaceae- Tree



Photo: Forest and Kim Starr

Mai'a, Banana (*Musa acuminata* var.) – Musaceae- Tree



Photo: Forest & Kim Starr

Mamaki (*Pipturus albidus*) -Urticaceae-Tree



Photo: Forest & Kim Starr

Noni (*Morinda citrifolia*) -Rubiaceae-Tree



Photo: Foster's Botanical Garden

Ohi'a 'ai, Mountain apple (*Eugenia malaccensis*)-
Myrtaceae-Tree



Photo: Forest & Kim Starr

Olena, Turmeric (*Curcuma longa*) – Zingiberaceae-
Grass



Photo: Forest & Kim Starr

Pua kala (*Argemone glauca*) -Papaveraceae-
Groundcover



Photo: OK Farms

'Uala, Sweet potato (*Ipomoea batatas*) -
Convolvulaceae- Groundcover



Photo: Forest & Kim Starr

Uhi, Yams (*Dioscorea alata*) -Dioscoreaceae-
Groundcover



Photo: Foster's Botanical Garden

Ulu, Breadfruit (*Artocarpus altilis*) - Moraceae-Tree



Photo: Amy Greenwell Garden

Wauke (*Broussonetia papyrifera*) -Moraceae- Tree

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