

A VEGETATIVE SURVEY OF
MAUI COUNTY'S OFFSHORE ISLETS

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Introduction

Offshore islets in Hawaii present unique opportunities for the study of native coastal ecosystems. These offshore ecosystems remain largely intact on the many islets throughout the State. In this respect they stand in sharp contrast to onshore areas that have been altered by various influences and activities. They have remained free of dogs, cats, rats and mongooses which are serious predators on nesting seabirds, and they have also remained free of the several herbivorous ungulates that have so altered our onshore vegetation. Furthermore, their isolated locations, rugged topography and protected status have combined to ensure that human visitation is minimal. Introduced weed species are thus usually minor components of the vegetative cover. On these islets we can still catch a glimpse of a diverse and interesting coastal flora that once extended throughout our entire archipelago.

Maui County has thirty offshore islets on which biological surveys are being made. This includes surveys of seabirds as well as vegetative surveys. Fifteen of these are located along the north and east shores of Maui, eight are located along the north and east shores of Molokai, five are on the west and south shores of Lanai, one is on the south coast of Kahoolawe and one, Molokini, lies in the Alalakeiki Channel midway between Maui and Kahoolawe.

These islets range in size from Molokini which is 22.4 acres and in height from Okala which rises about 425 feet above the sea to low islets only a fraction of an acre in size. Many other small rocks lie along these coasts, but they are so small and low that they are awash in high surf and support no vegetation or suitable habitat for seabird nesting. These have been excluded from consideration here.

Geologically speaking, 26 of the 30 offshore islets fall into the category of sea stacks, rocky remnants of the original island coastline that have been separated by erosion over time.

These islets are extremely steep and rocky with limited amounts of soil on the summits and on ledges. They are all located along coastlines facing the open ocean

where storm wave action has been greatest. The remaining four islets were created by separate late stage volcanics. Molokini, Mokuhooniki and Kanaha are tuff cone remnants while Alau Islet near Hana is an old cinder cone. These formations generally lie further offshore than sea stacks. They form greater quantities of loose soil but this soil is usually rather sterile and quick to dry out during the dry seasons.

Rainfall on these islets varies from about 175 inches/year on the north coast of east Maui to about 12 inches/year on Lanai, Kahoolawe and Molokini. Islet floras correspondingly vary from lush perennially green representations to examples with xeric floras that respond to winter rains with quick growth that rapidly matures and dries up during the summer months leaving the islets very barren in appearance.

Results and Discussion

Plant species encountered included a few of nearly universal occurrence, some that were characteristic of either wet or dry climates and several small isolated populations of very rare species. Collections made have allowed reevaluation of these rare taxa. New determinations appear to be in order for some. At least one distinct new species was discovered as well as perhaps three or four new varieties or forms.

Portulaca oleracea and Sonchus oleraceus were the two plant species found in nearly every situation. Their occurrence seems to depend on seabird activity as they are always found growing in excavated or disturbed soil within seabird colonies. The one islet on which these two species do not occur, Moku Huki, also has no seabird activity.

Scaevola taccada, Sesuvium portulacastrum and Fimbristylis pycnocephala are typical of wet islets where they make up a significant portion of the vegetation. None of them, however, occur on the dry islets. Conversely, Sida fallax, Boerhavia tetrandra and Jacquemontia sandwicensis are typical of dry islets but do not occur on wet islets. Within the range of climates one can find most of Hawaii's halophytic plant species.

Some of the interesting things that have been found during the course of this work are as follows:

Scaevola coriacea was found on two islets, Moku Hooniki and Mokeehia. This extends its present known range from Maui island where it has only been known from during the past three decades.

Lipochaeta integrifolia var. argentea was also found on Moku Hooniki near the summit where it makes a silvery colored patch among the rocks. Panicum torridum and Panicum nubigenum were found on Molokini, Moku Hooniki, Kiei and Poopoo. These are all new islet records.

Panicum xerophilum was found on PooPoo and Puu Pehe off the island of Lanai where it forms dense stands during the spring. Panicum pellitoides was found on Molokini where it forms a dense patch along the east crest. This rare grass is known only from Molokini and Hawaii.

Several interesting Portulacas have come to light which further complicate the understanding of the local species. On Puu Koaie and Molokini an apparent relative of P. lutea is being studied. It differs from standard P. lutea in growth habit, foliage, inflorescence and seeds. Dr. Derral Herbst is presently evaluating its status. A Portulaca that appears like P. villosa grows on PooPoo islet but it has a thick sclereous capsular operculum like P. sclerocarpa. Another anomalous Portulaca grows on Alau islet. It too resembles P. villosa except that its leaves are extremely wide. These and other Hawaiian Portulacas are presently being grown in a greenhouse situation and studied with the intent of eventually sorting out the situations.

Argemone glauca var. inermis was found on Puu Koaie islet. It had not been seen since Forbes collected it somewhere on Kahoolawe in 1913. It has utterly glabrous stems and petioles with spines only on the tips of the leaf lobes.

Several Sesbania plants were also found on Puu koaie. It is a prostrate silvery plant with red flowers. Winona Char has indicated that it is best placed with S. hawaiiensis.

Puu koae yielded two species of Eragrostis. One was a xeric form of E. variabilis and the other was a diminutive plant with narrow appressed spikes that is apparently a new species. It is being studied by Dr. Derral Herbst but it has not been described yet.

Peucedanum sandwicense var. hiroi was found on Keopuka high on inaccessible cliffs. This rare plant has only been collected a few times on Maui and only several decades ago.

Conclusion

To date 19 islets have been visited. Due to the sheer cliffs surrounding many of them, however, not all have been accessible. Eleven of them were accessible and for these, vegetation checklists have been made. These are not included but are available upon request. A general information sheet is attached with a variety of facts about each islet.

These surveys will continue until all of Maui County's offshore islets have been completed. The vegetation information will be combined with seabird information currently being gathered by the U. S. Fish and Wildlife Service and State wildlife biologists to give us a more complete biological overview. The knowledge gained will allow us to better understand these tiny ecosystems and to better protect them in the future.

Literature Cited

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Table I. MAUI COUNTY'S OFFSHORE ISLETS
GENERAL INFORMATION

<u>Island</u>	<u>Islet</u>	<u>Acreage **</u>	<u>Height (feet)</u>	<u>Geologic Formation</u>	<u>Vegetation Density</u>	<u>Average Annual Rainfall</u>	<u>USGS Map Reference</u>
Maui	Alau	5.0	148	Cinder cone	Dense	50"	Hana quadrangle
	Pu'u ku	1.5	72	Sea stack	Moderate	50"	Hana quadrangle
	Moku Pipi	0.9	50*	Sea stack	Moderate	120"	Hana quadrangle
	Moku Huki	0.3	55*	Sea stack	Dense	175"	Nahiku quadrangle
	Makoloaka	0.3	85*	Sea stack	Moderate	160"	Keanae quadrangle
	Moku Mana	1.4	65*	Sea stack	Moderate	100"	Keanae quadrangle
	Moku Hala	0.3	75*	Sea stack	Sparse	100"	Keanae quadrangle
	Keopuka	2.2	125*	Sea stack	Dense	100"	Keanae quadrangle
	Papanui o Kane	2.3	10*	Sea stack	None	65"	Haiku quadrangle
	Hulu	1.5	100*	Sea stack	Moderate	30"	Kahakuloa quadrangle
	A'awanui	0.5	30*	Sea stack	None	30"	Kahakuloa quadrangle
	A'awaiki	0.5	50*	Sea stack	None	30"	Kahakuloa quadrangle
	Kaemi	2.5	125*	Sea stack	Sparse	30"	Kahakuloa quadrangle
	Mokeehia	8.5	165*	Sea stack	Dense	30"	Kahakuloa quadrangle
	Mahinanui	1.5	40*	Sea stack	None	30"	Kahakuloa quadrangle
Molokai	Moku Hooniki	14.1	203	Tuff cone	Moderate	25"	Halawa quadrangle
	Kanaha	2.0	110*	Tuff cone	Moderate	25"	Halawa quadrangle
	Moku Papapa	0.6	10*	Sea stack	None	30"	Halawa quadrangle
	Moku Manu	2.3	175*	Sea stack	Sparse	50"	Kamalo quadrangle
	Pauonuakea	0.5	75*	Sea stack	Moderate	60"	Kamalo quadrangle
	Huelo	2.4	220*	Sea stack	Dense	50"	Kamalo quadrangle
	Okala	7.4	425*	Sea stack	Dense	50"	Kamalo quadrangle
	Mokapu	11.7	360	Sea stack	Dense	40"	Kamalo quadrangle
Lanai	Nanahoa	0.4	128	Sea stack	Moderate	18"	Lanai Island
	Kiei	1.0	40*	Sea stack	Sparse	17"	Lanai Island
	Moku Nalo	0.1	30*	Sea stack	None	12"	Lanai Island
	Poopoo	2.1	65*	Sea stack	Dense	12"	Lanai Island
	Puu Pehe	1.6	101	Sea stack	Moderate	12"	Lanai Island
Kahoolawe	Puu Koa	17.0	378	Sea stack	Sparse	12"	Kahoolawe Island
Molokini	Molokini	22.4	160*	Tuff cone	Dense	15"	Maui Island and Kahoolawe Island

** Acreage calculated by averaging 50 counts using a 256 dots per square inch dot grid

* Height approximates from USGS Quadrant maps and personal observations