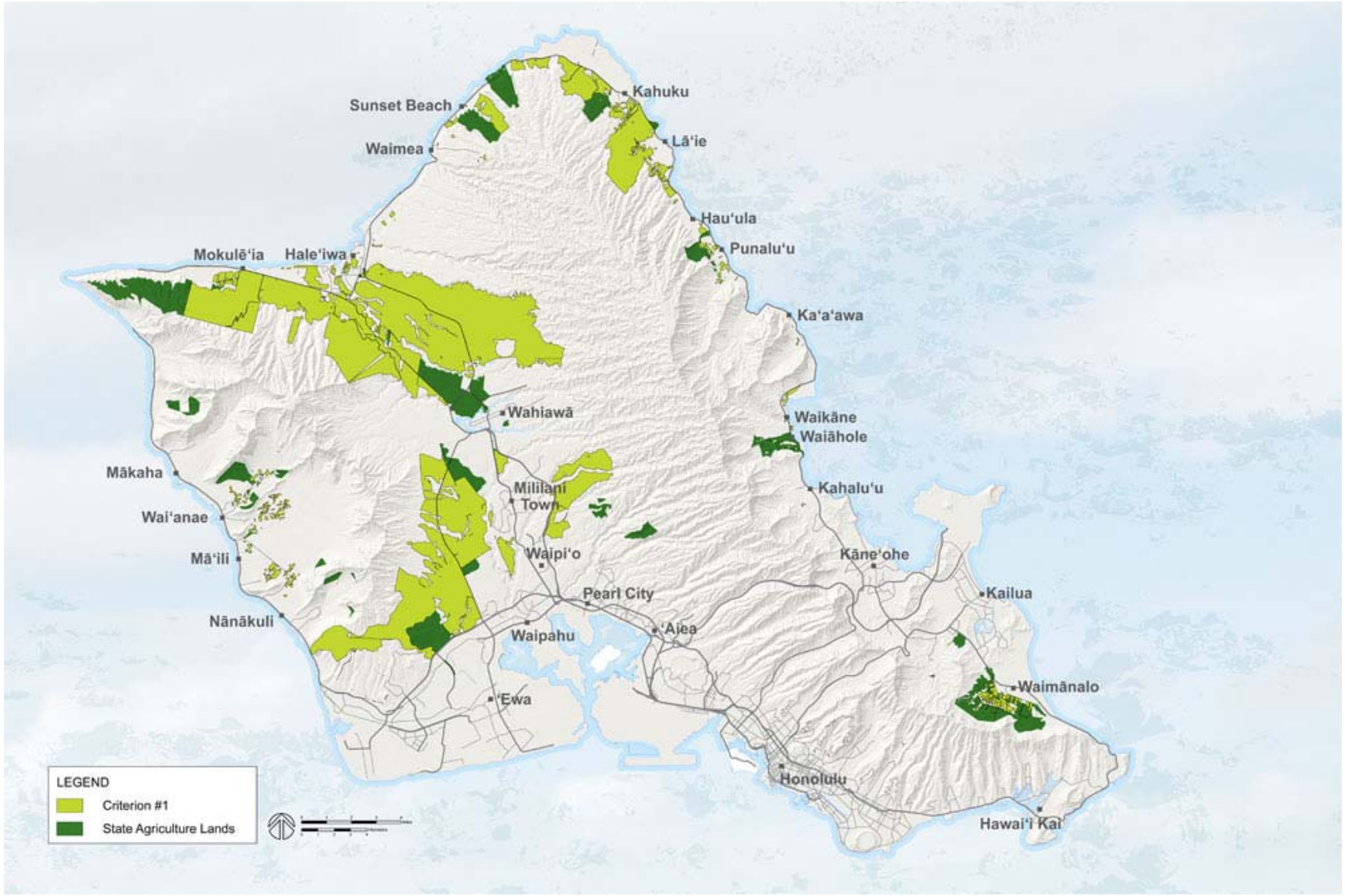
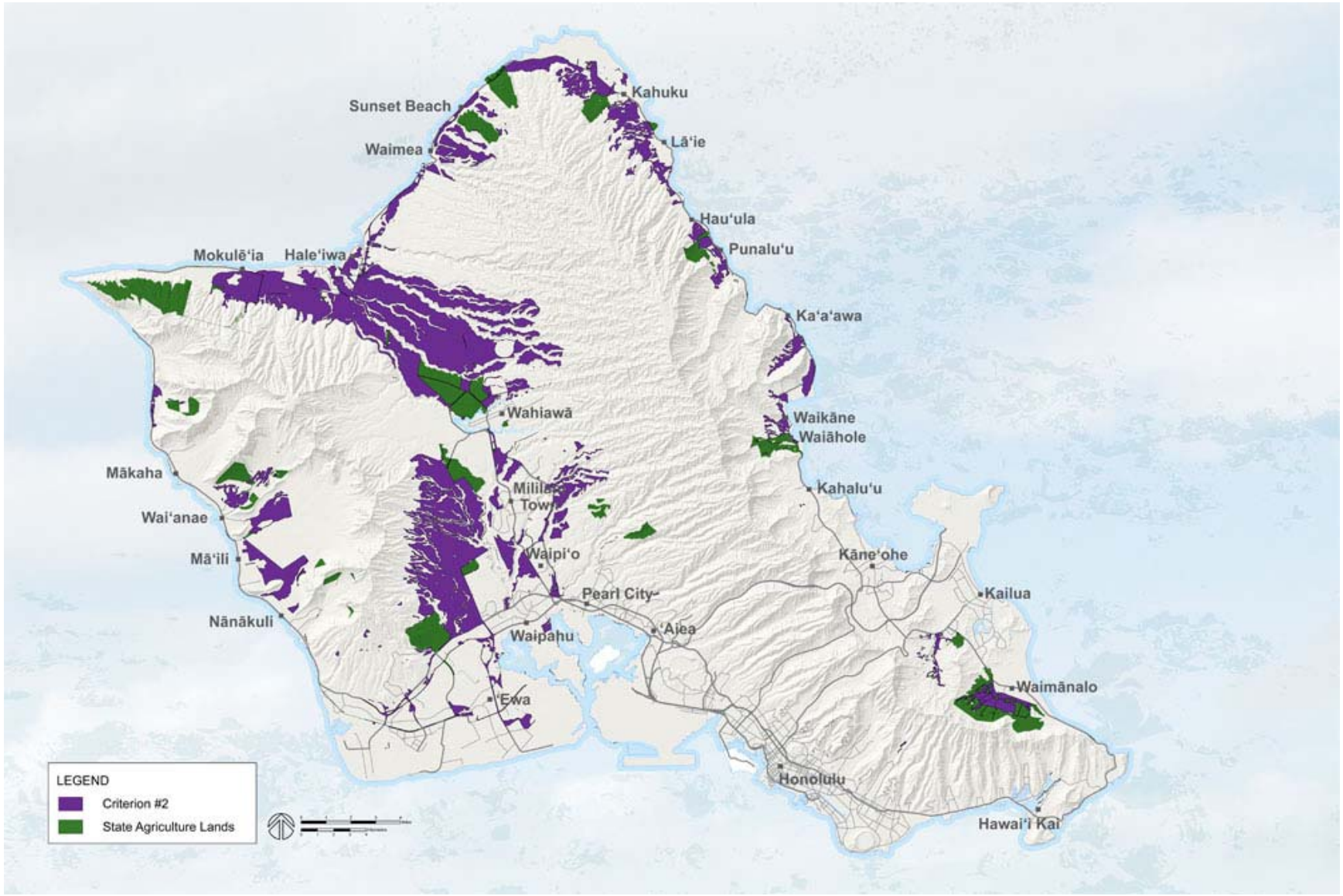
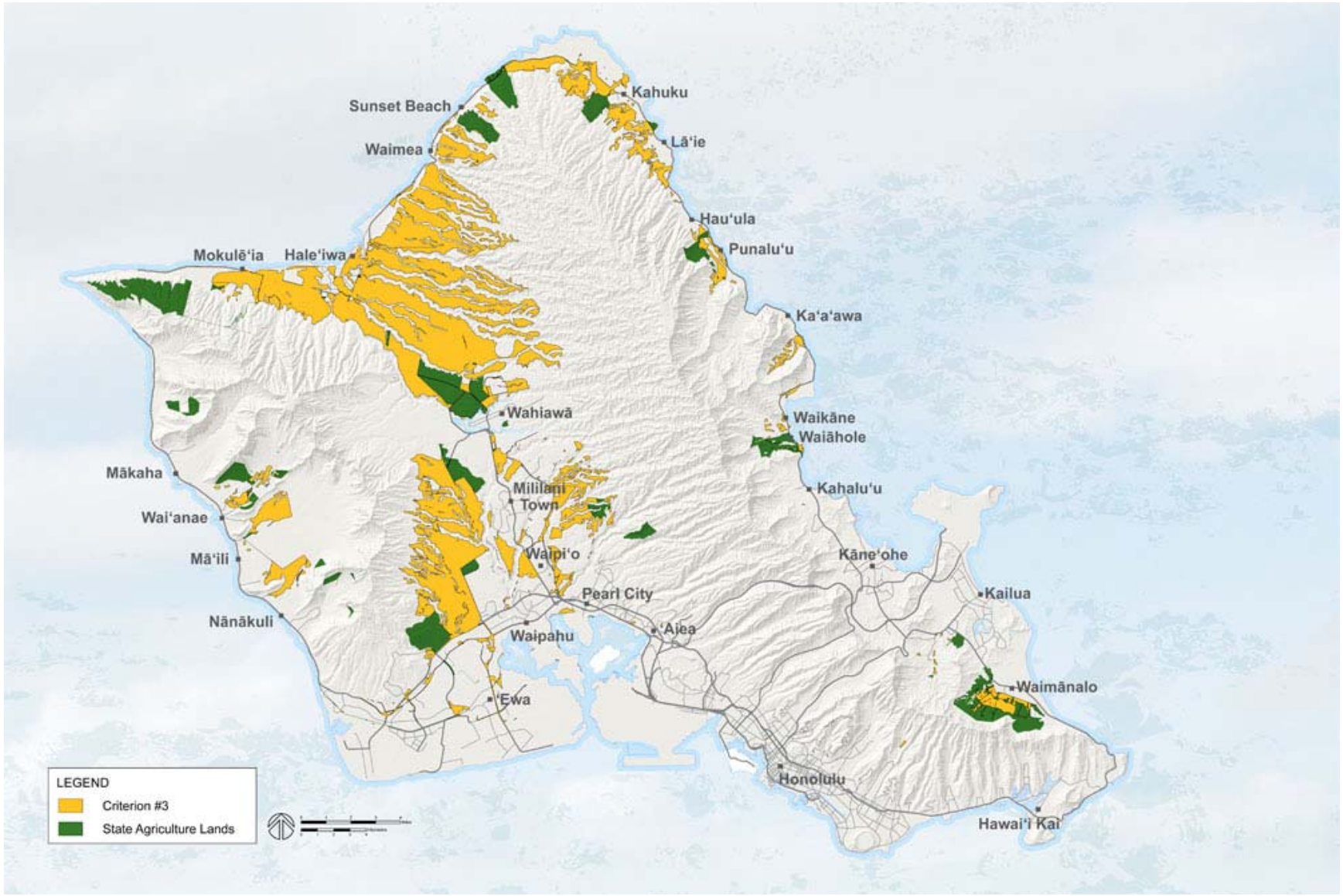


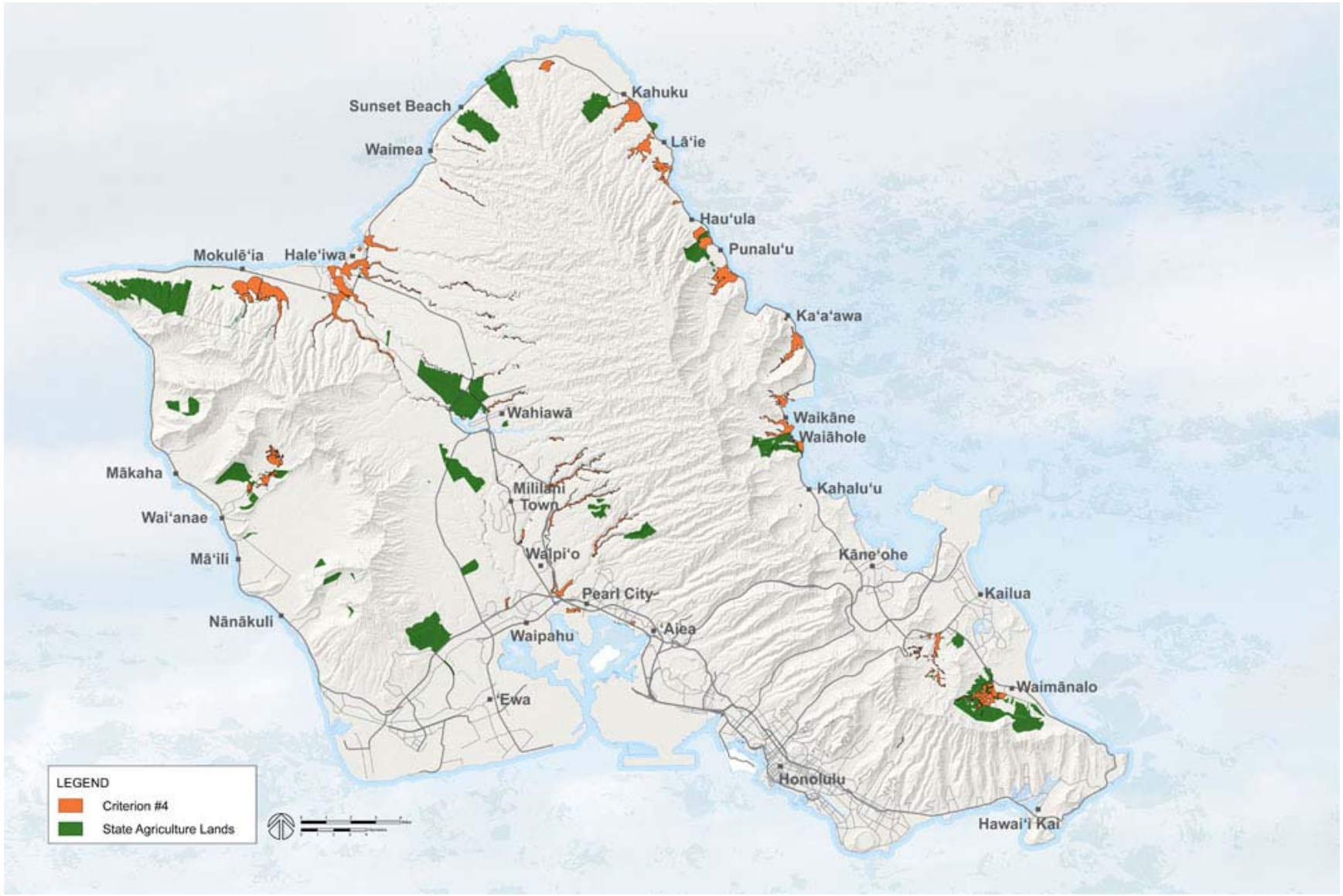
Criterion 1: Current Agricultural Production (December 2016)



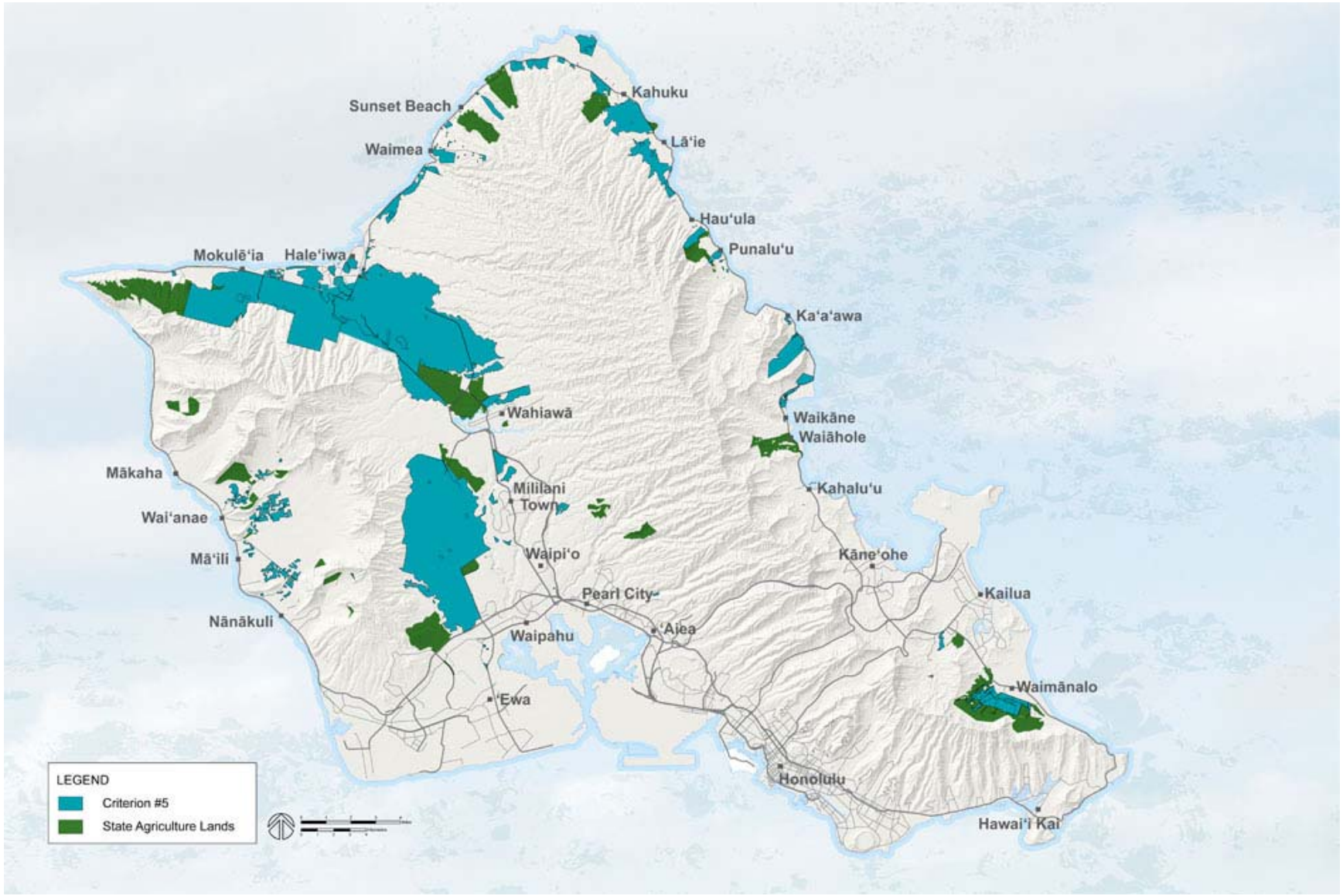
Criterion 2: Soil Qualities and Growing Conditions (December 2016)



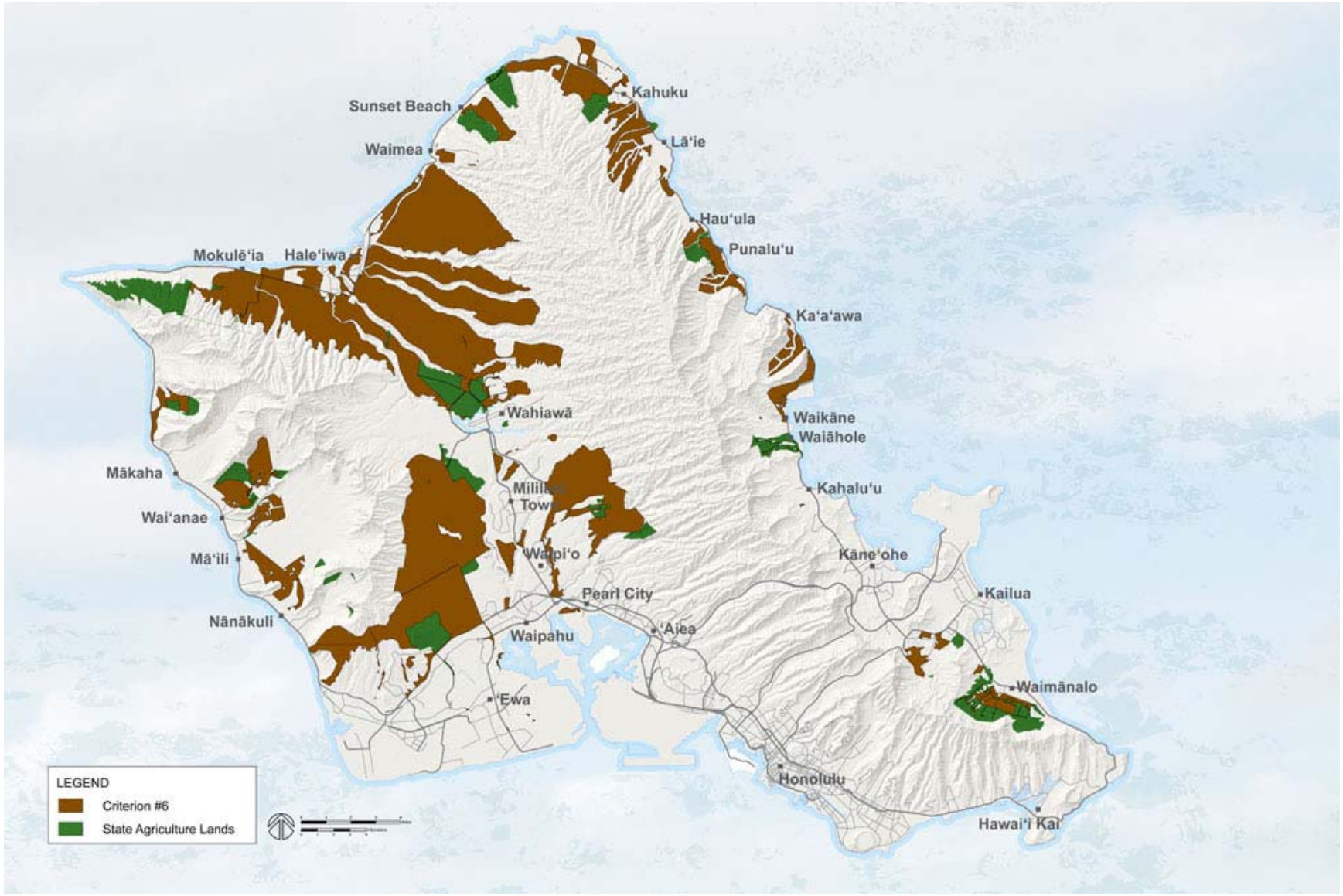
Criterion 3: Productivity Rating Systems (December 2016)



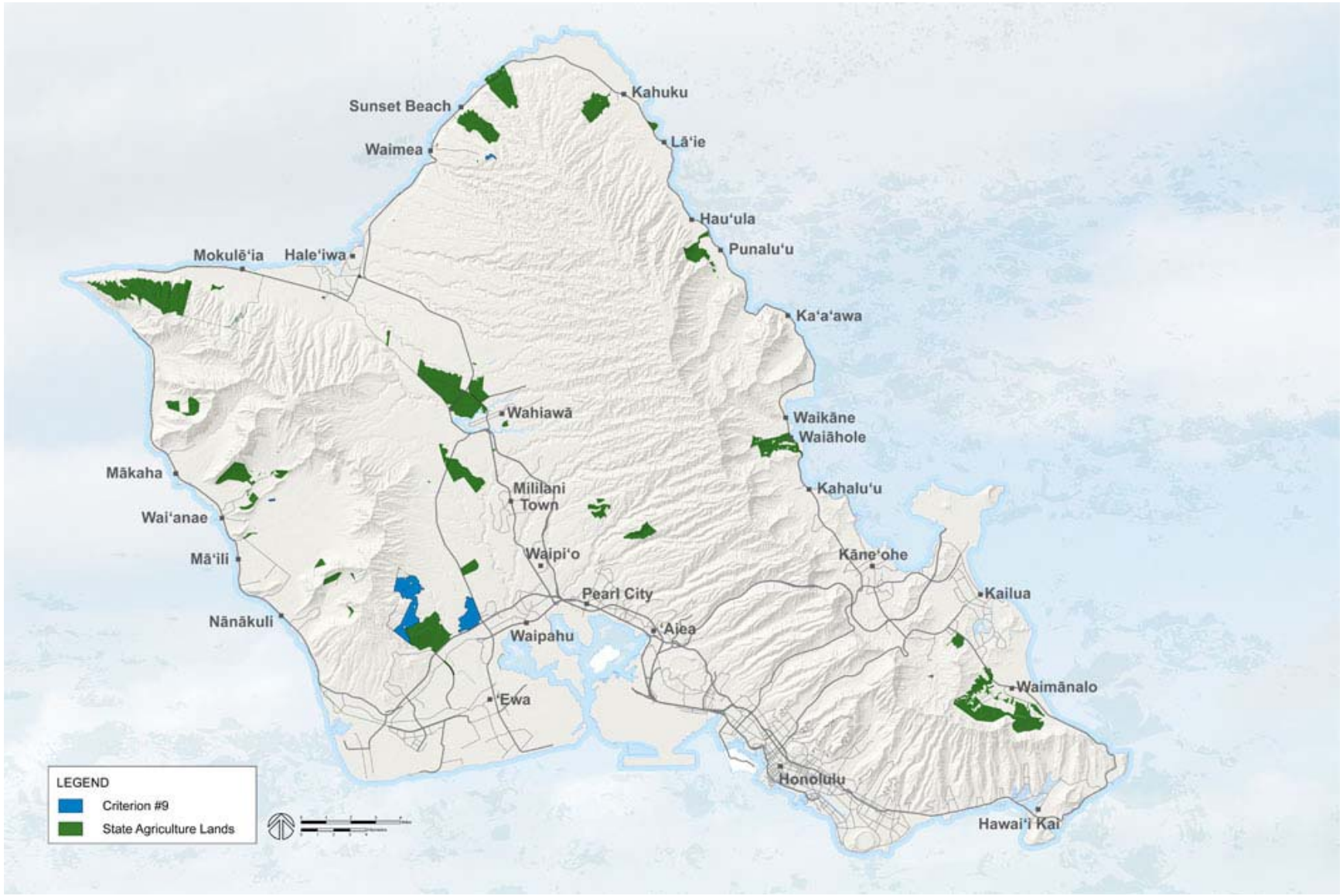
Criterion 4: Traditional Native Hawaiian Agricultural Uses or Unique Crops (December 2016)



Criterion 5: Sufficient Water to Support Viable Agricultural Production (December 2016)



Criterion 6: Consistent with County Plans (December 2016)



Criterion 9: Agricultural Easements (December 2016)

G

CRITERIA WEIGHTING METHODOLOGY

CRITERIA WEIGHTING METHODOLOGY

Chapter 205-44, HRS states that ***"the designation of important agricultural lands shall be made by weighing the standards and criteria with each other*** *[...]."* The purpose of weighting the standards and criteria is to establish the level of importance that each criterion carries in the evaluation process. Without provisions requiring that a specific methodology be used to weight the standards and criteria, each county has flexibility to choose and execute their own preferred approach to establish importance and prioritize the standards and criteria.

A description of the methodology to select the priority criteria used in the City's mapping process is described.

ASSIGN SCORES TO THE STANDARDS AND CRITERIA

The City used a simple point allocation rating method which scores the criteria and ranks them according to their given score.

Following the initial consultation with the Technical Advisory Committee (TAC) to specify the criteria and identify available GIS mapping resources, TAC members were asked to complete a scoring process to weight the criteria. Because the TAC members were directly involved in specifying the criteria definitions and the resource maps, their familiarity with the criteria and their agricultural expertise made them the natural sampling population for the scoring.

A criteria weighting ballot was circulated to all TAC members following the third TAC meeting (November 2012). Ballots were e-mailed to TAC members, allowing individuals sufficient time to study the criteria definitions and decide on their preferences. Of the 25 ballots that were distributed, 23 ballots were returned, representing a 92% participation rate. The results of the individual criteria scoring ballots were reported at the fourth TAC Meeting (April 2013).

A sample of the ballot that was used to identify personal preferences is presented in Figure 1. Using a 100-point scale, individuals were asked to identify their personal preferences by distributing the total 100 points across the criteria set. Points could be allocated in any manner, as long as all points were accounted for. For example, 100 points could be assigned to a single criterion, split equally between two criteria, or distributed among any combination of criteria.

Upon completion of the scoring process, ballots were recorded and all points assigned to the individual criteria sets were tallied, and the cumulative points were used to form a single score for each criterion and to calculate the average and median scores for each criterion. The value of the combined score was used to determine the larger group's combined preference; criteria with more cumulative points received a higher score and were considered to have a greater degree of importance. The median score for each criterion was used to rank the criteria and identify criteria groupings. Criteria with the highest values were identified as priority criteria based on the natural grouping of scores.

Table 1 lists the scoring results (i.e., point distribution) from the individual TAC members and a tally of the cumulative score for each criterion, including the average and median scores. Figure 2 presents a graphic illustration of the resulting median and average scores for the criteria. The distribution of the median scores reveals three distinct groupings: the first grouping comprised of criteria with 15 points each; the second grouping of criteria ranged from 10 to 8 points, and the third grouping received 5 points each.

Figure 1: Sample Criteria Weighting Ballot

Use this ballot to indicate your preference for ranking the IAL criteria. Start with a total of 100 points, then allocate the 100 points among the criteria in the way that best reflects your opinion about the criteria's importance. The number of points given to a criterion reflects its importance. (The more points given, the more important you consider the criteria to be. Less points means less important; a value of zero points means the criteria should not be considered).

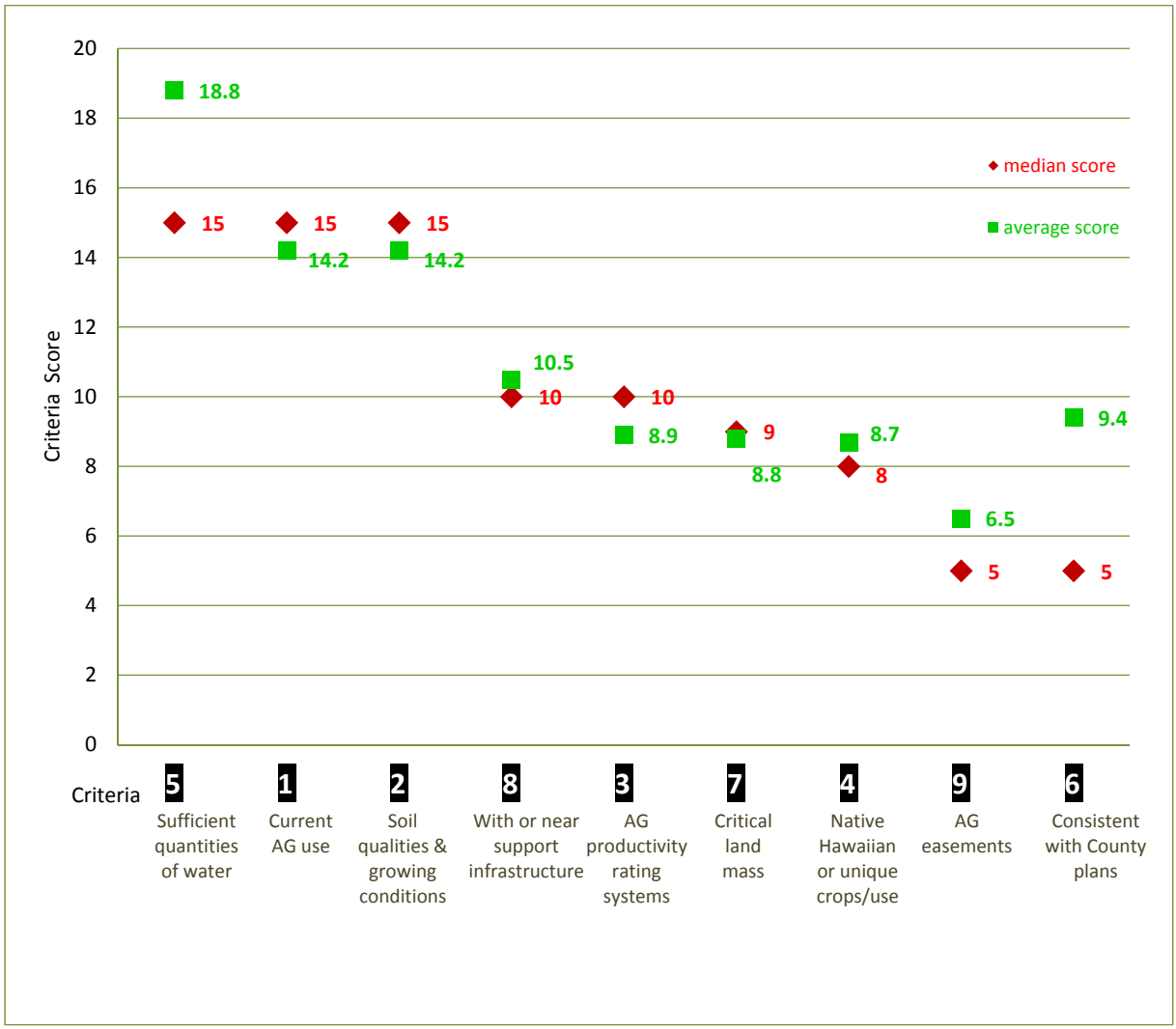
CRITERIA AND STANDARDS	POINTS
1. Land currently used for agricultural production	
2. Land with soil qualities and growing conditions that support agricultural production of food, fiber, or fuel- and energy-producing crops	
3. Land identified under agricultural productivity rating systems, such as the agricultural lands of importance to the State of Hawai'i (ALISH)	
4. Land types associated with traditional native Hawaiian agricultural uses, such as taro cultivation, or unique agricultural crops and uses, such as coffee, vineyards, aquaculture, and energy production	
5. Land with sufficient quantities of water to support viable agricultural production	
6. Land whose designation as IAL is consistent with general, development, and community plans of the county	
7. Land that contributes to maintaining a critical land mass important to agricultural operating productivity	
8. Land with or near support infrastructure conducive to agricultural productivity, such as transportation to markets, water, or power	
9. Government programs to protect AG lands in perpetuity that are recorded*	
TOTAL POINTS	**100**

**Criterion #9 is added as a result of discussion with the technical advisory committee.*

Table 1: Individual TAC Member Voting Results

	Individual TAC Member Ballots																							POINTS		
CRITERIA	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	TOTAL	AVERAGE	MEDIAN
Criteria #1: Currently used for agricultural production	10	25	20	10	15	10	10	15	5	7	15	0	15	20	15	20	0	15	30	0	40	15	15	**327**	**14.2**	**15**
Criteria #2: Soil qualities and growing conditions	5	0	35	15	5	20	5	13	25	9	15	25	25	10	10	20	20	10	0	0	20	20	20	**327**	**14.2**	**15**
Criteria #3: Agricultural productivity rating systems	5	0	10	15	5	15	10	10	10	7	15	0	10	10	10	10	0	10	30	0	8	5	10	**205**	**8.91**	**10**
Criteria #4: Native Hawaiian agricultural uses or unique agricultural crops and uses	5	0	5	8	15	5	5	10	15	15	5	10	15	5	10	4	0	10	10	0	7	20	20	**199**	**8.65**	**8**
Criteria #5: Sufficient quantities of water to support viable agricultural production	50	0	10	15	20	20	40	15	5	25	13	35	10	15	15	10	30	15	0	50	5	15	20	**433**	**18.8**	**15**
Criteria #6: Consistent with county general, development, and community plans	5	25	0	10	10	0	5	9	10	3	10	0	5	10	5	3	0	15	30	50	5	5	2	**217**	**9.43**	**5**
Criteria #7: Critical land mass important to agricultural operating productivity	5	0	10	10	5	10	5	8	15	9	10	5	10	15	15	15	30	5	0	0	5	10	5	**202**	**8.78**	**9**
Criteria #8: With or near support infrastructure	15	25	10	10	20	15	10	10	0	10	12	5	9	10	10	15	20	15	0	0	5	10	5	**241**	**10.5**	**10**
Criteria #9: Government programs to protect AG lands in perpetuity that are recorded	0	25	0	7	5	5	10	10	15	15	5	20	1	5	10	3	0	5	0	0	5	0	3	**149**	**6.48**	**5**
TOTAL = 100 points	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	**2300**	**100**	**100**

Figure 2: Comparison of Criteria Scores



The grouping with the highest scores, which was coincidentally identical to the top three criteria used in Kaua'i County's IAL mapping project, were as follows:

- Criterion 1: Current agricultural production
- Criterion 2: Soil qualities and growing conditions, and
- Criterion 5: Availability of water.

The second grouping consisted of four criteria, which had median scores of between 10 and 8 points each:

- Criterion 8: With or near support infrastructure
- Criterion 3: Agricultural productivity rating systems
- Criterion 7: Critical land mass, and
- Criterion 4: Native Hawaiian or unique crops and uses.

The last tier of criteria represented the lowest median scores of five points each:

- Criterion 9: Agricultural easements, and
- Criterion 6: Consistency with county plans.

The low ranking given to Criterion 9 is an indication that agricultural easements (which are land management tools to ensure the perpetual agricultural use of the land) are not as important to agricultural productivity as the land's physical characteristics and ability to support agricultural activity. While the intent of adding this criterion was to provide access to the IAL incentives, the results of the voting process indicate that this criterion is a low priority when compared to the other eight statutory criteria.

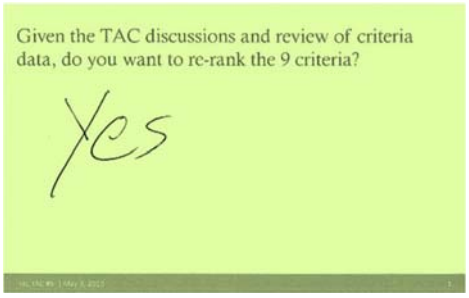
The low ranking for Criterion 6 is similarly an indication that the county's land use designation was not considered an important factor for agricultural productivity. The county's land use plans and policies are man-made, political constraints that have no bearing on the land's physical characteristics or the qualities that affect crop production.

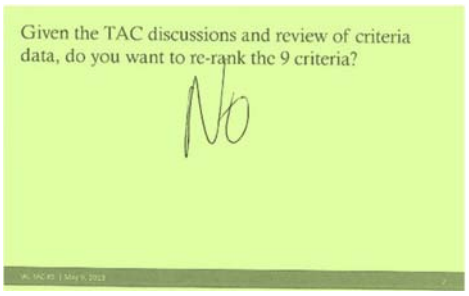
CONFIRM SCORING RESULTS

To confirm the overall satisfaction with the ranking of priority criteria that resulted from the initial scoring process, a second screening to assess the need for a comprehensive re-vote was conducted. Unlike the initial voting process that was conducted via e-mail and was open to all TAC members regardless of attendance at the meeting, the secondary screening was held as part of the TAC meeting, and only members in attendance at the meeting (TAC Meeting 5, May 2013), were allowed to participate.

The question on the written ballot read: "*Given the TAC discussions and review of criteria data, do you want to re-rank the nine criteria?"* If the majority voted NO against a re-vote and in favor of the existing criteria ranking, the

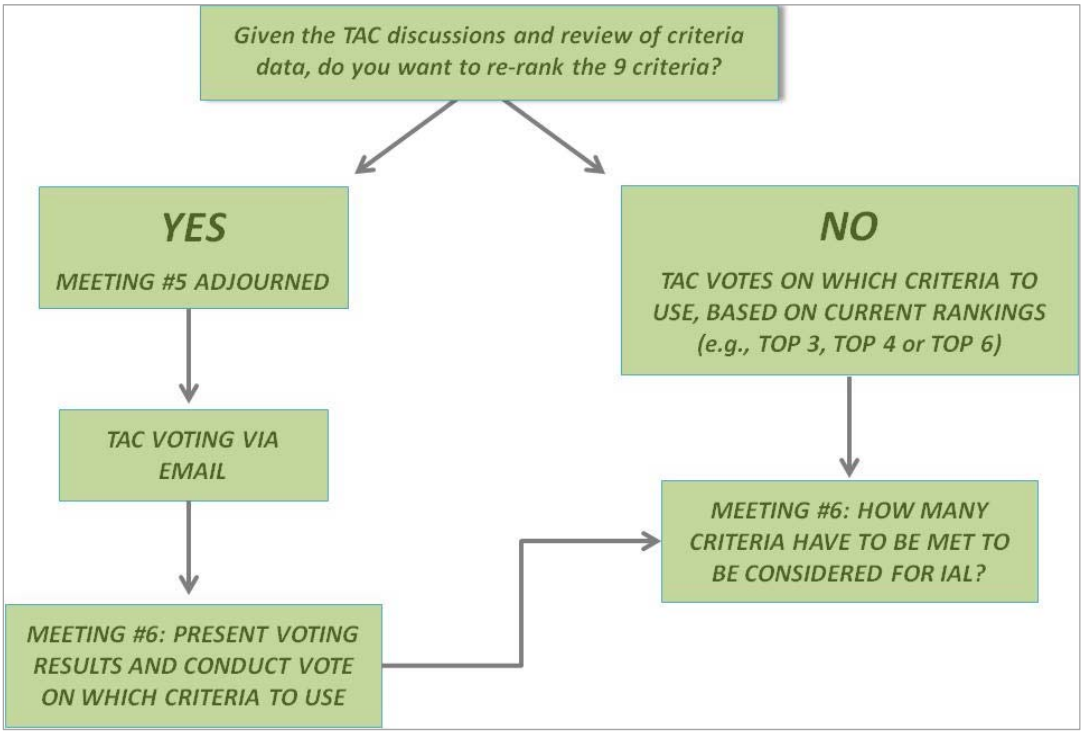
Sample responses





next balloting process to select the priority criteria for mapping evaluation would be conducted. Conversely, if the majority voted YES in favor of a re-vote, the meeting would have been adjourned and a second screening process would have been initiated to assign scores to the criteria again (i.e., new criteria scoring ballots would have been e-mailed to all TAC members to determine criteria scores, then the priority criteria section process would have been conducted). The decision-making process is presented in Figure 3.

Figure 3: Process to Confirm Scoring Results



A tally of the written ballots resulted in 10 NO VOTES indicating a preference for the current scoring and 1 YES VOTE in favor of a re-vote. Given that the majority (90%) of the votes indicated satisfaction with the current criteria scoring, the balloting process to select the priority criteria was then conducted.

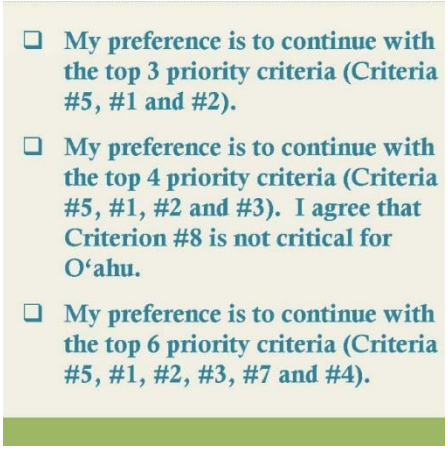
DETERMINE PRIORITY CRITERIA

A sample of the ballot that was used to identify preferences for the priority criteria is presented in Figure 4. The ballot circulated to TAC members during TAC Meeting 5 (May 2013) provided three choices for the priority criteria: use the three highest-ranked criteria; use the four highest-ranked criteria; or use the six highest-ranked criteria.

These combinations of criteria groupings reflected the clusters of median scores (see Figure 2). For example, the first choice—continue with the top three priority criteria—corresponded to the first tier of median scores. The second choice—continue with the top four priority criteria—was comprised of the first grouping of criteria and the criteria with median scores of at least 10 points. (Although Criterion 8 received a median score of 10 points, it was excluded from

consideration as a priority criterion. TAC members agreed to dismiss Criterion 8 from the screening because proximity to support infrastructure was less important for O'ahu markets than for other islands.) The third choice—continue with the top six priority criteria—consisted of the previous criteria and the next tier of criteria scores.

Figure 4: Priority Criteria



A tally of the recorded votes is as follows:

- 10 votes in favor of the three highest-ranked criteria (Criteria 5, 1 and 2) as the priority criteria
- 0 votes for continuing with the four highest-ranked criteria (Criteria 5, 1, 2 and 3) as the priority criteria
- 1 vote in favor of the six highest-ranked criteria (Criteria 5, 1, 2, 3, 7 and 4) as the priority criteria.

The voting results implied broad consensus that the three highest-ranked criteria were considered the most important in determining IAL. The three top-rated criteria consist of:

1) Criterion #5: Sufficient quantities of water
2) Criterion #1: Currently used for agricultural production, and
3) Criterion #2: Soil qualities and growing conditions.

Discussion with the TAC indicated no rational justification for adding additional criteria because: (1) the three highest-ranked criteria were tightly grouped together; and (2) there was a substantial difference between the first and second tiers of criteria groupings (e.g., 15 points for the first tier vs. 10 points for the second tier).

The City's use of these criteria are specific to the City's IAL designation and need not influence the LUC's review of voluntary landowner petitions for IAL designations (i.e., the same priority criteria need not be required when evaluating voluntary designation).

DETERMINE THE PREFERRED APPLICATION

Once the three highest-ranked criteria were selected as the priority criteria, the next step was to determine how the criteria would be used to identify lands that qualify for IAL designation. This step entailed preparing composite criteria maps that illustrated the various acreages resulting from the different combinations of criteria, and analyzing the maps to select the preferred combination for mapping.

The composite criteria maps were formed by overlaying the individual criterion maps onto a single map. Figure 5 is the composite map of the three highest-ranked criteria, and Figure 6 is the composite map of the four highest-ranked criteria. These maps were presented at TAC Meeting 4 (April 2013), and discussed during TAC Meeting 5 (May 2013) and TAC Meeting 6 (June 2013). The purpose of the composite maps was to support decision-making about how the criteria should be combined to qualify lands for IAL designation. In particular, because the three highest-ranked criteria were selected as the priority criteria for mapping, does that mean that all

three criteria have to be satisfied to qualify for IAL designation? Decision-making about the application of the criteria involved in-depth examination of the options: How many of the priority criteria should be required? Is there a minimum number of criteria that need to be met? Is there a certain combination of criteria that need to be used? For example, does meeting one of the criterion qualify for IAL? If meeting one criterion is enough, is it a certain criterion or is it any one of the priority criteria? If two (or three) criteria have to be present, which two are they, and in what combination?

Table 2 presents the varying acreages resulting from the different combinations of criteria shown in the composite criteria maps. The map of the three highest-ranked criteria (see Figure 5) identifies a maximum of 67,815 acres with the potential to be IAL (assuming land only has to meet one of the three criteria to be eligible for IAL), and a minimum of 20,105 acres (assuming all three of the criteria have to be present to be eligible for IAL). The map of the four highest-ranked criteria (see Figure 6) identifies a maximum of 68,755 acres with the potential to be IAL (assuming only one of the four criteria has to be met to be eligible for IAL) and a minimum of 18,905 acres (assuming all four of the criteria have to be present to be eligible for IAL).[1]

Table 2: Criteria Application Scenarios

COMPOSITE OF TOP 3 CRITERIA	*ACREAGE*
Lands that meet all 3 Criteria	20,340 ac
Lands that meet 2 of 3 Criteria	40,315 ac
Lands that meet 1 of 3 Criteria	68,450 ac

COMPOSITE OF TOP 4 CRITERIA	
Lands that meet all 4 Criteria	19,325 ac
Lands that meet 3 of 4 Criteria	33,460 ac
Lands that meet 2 of 4 Criteria	46,785 ac
Lands that meet 1 of 4 Criteria	69,307 ac

In developing the approach to identify lands that qualify for IAL designation, the criteria can be combined in a number of different ways to establish the conditions of eligibility, ranging from a minimum number of criteria or a certain combination of criteria that need to be present. Within the context of the preferred priority criteria, three basic scenarios are possible:

- Scenario A—Lands that meet any one of the three highest-ranked criteria
- Scenario B—Lands that meet at least two of the three highest-ranked criteria
- Scenario C—Lands that meet all three highest-ranked criteria

Scenario A consists of land that satisfies ANY ONE of the three highest-ranked criteria, meaning the land is identified as either Criterion 1, 2 or 5 (i.e., meets the condition for water, or currently used for agricultural production, or has soil qualities and growing conditions). Conversely, Scenario C consists of land that satisfies ALL THREE of the highest-ranked criteria, meaning the land is identified as Criterion 1, 2 and 5 (i.e., meets the condition for water, currently used for agricultural production, and has soil qualities and growing conditions).

Scenario B consists of land that satisfies a COMBINATION OF TWO of the three highest-ranked criteria. However, unlike the conditions for Scenario A and Scenario C which are fixed to a single variation, the conditions for Scenario B can be varied depending on which combination of criteria are selected. For example, the scenario definition could contain: (I) two specific criteria

[1] The maps and corresponding acreages were prepared in 2015, and reflect conditions that were current at that time.

in a defined combination; (II) any two criteria in any combination; or (III) one specific criterion combined with any of the other two. The seven different possible combinations for Scenario B are presented in Table 3.

Table 3: Possible Criteria Combinations for Scenario B

COMBINATION		Criterion 1: Currently used for agricultural production	Criterion 2: Soil qualities and growing conditions	Criterion 5: Water
I. Two specific criteria in a defined combination				
There are three different combinations for this scenario, depending on the agronomic conditions that are selected as important.	Combination 1			
	Combination 2			
	Combination 3			
II. Any two criteria in any combination				
This scenario is more fluid and flexible than Scenario 1. This is an additive approach that combines Combinations 1, 2 and 3 above into a single alternative.	Combination 4			
III. One specific criterion combined with any of the other two				
There are three different combinations for this scenario, depending on the particular criterion selected as essential for consideration. For example—as shown in Combination 7—if WATER (Criterion 5) is deemed essential for IAL, WATER (Criterion 5) must be present in combination with either one of the other criteria, SOILS (Criterion 2) OR AG PRODUCTION (Criterion 1).	Combination 5			
	Combination 6			
	Combination 7			

After considering the implications of the different ways to apply the criteria, the TAC affirmed the use of the three highest-ranked criteria to identify IAL, and recommended an inclusive approach that allowed for a larger acreage of land to qualify for IAL designation. (Consistent with the objective to be as inclusive as possible, the TAC did not intend for all three of the highest-rated criteria to be satisfied in the IAL designation process.)

Based on the TAC's recommendation for inclusivity, the City's ultimate decision was to proceed with Scenario A, where land that satisfies ANY ONE of the three highest-ranked criteria qualifies for designation as IAL. This approach was presented at the first community meeting (March-April 2015), and carried through to the final map of recommendations.