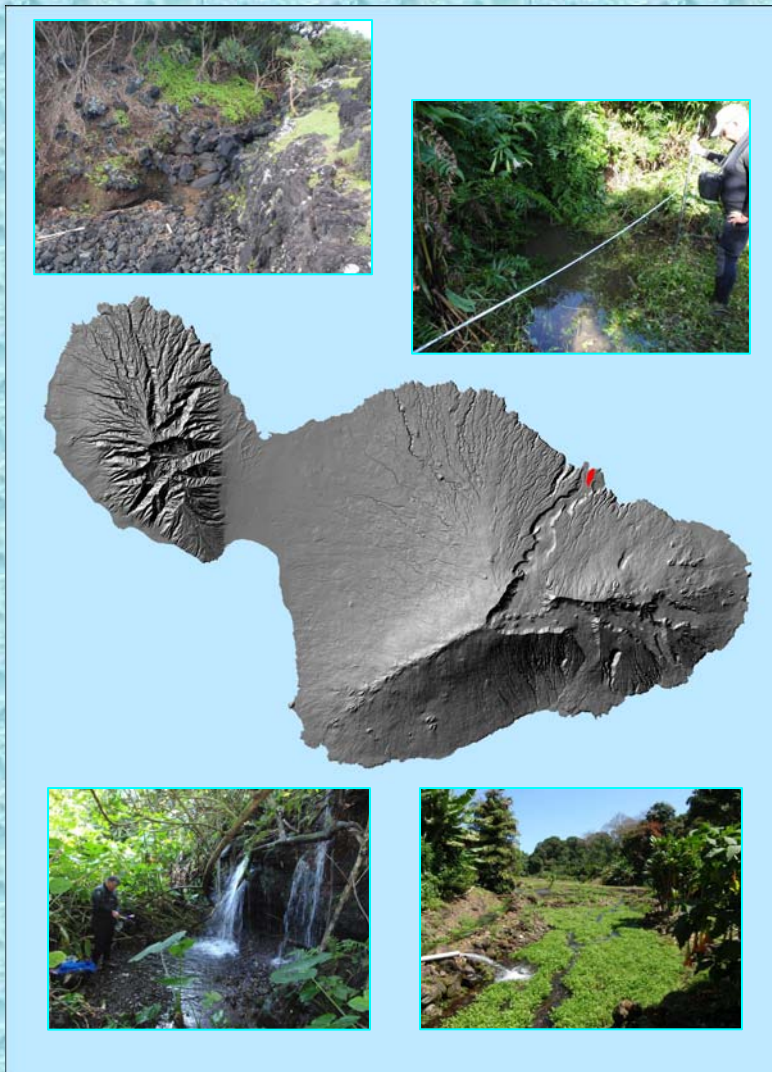


Report on 'Ōhi'a Stream Maui, Hawaii



August 2009

State of Hawai'i
Department of Land and Natural Resources
Division of Aquatic Resources

and

Bishop Museum





Funded in part by the Commission on
Water Resource Management, DLNR
and



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Report on ‘Ōhi‘a Stream Maui, Hawai‘i

August 2009

Prepared for
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawai‘i

Prepared by
Division of Aquatic Resources¹
Department of Land and Natural Resources
State of Hawai‘i
and
Bishop Museum²

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Section 1: Introduction

Overview

On May 24, 2001, the Native Hawaiian Legal Corporation (NHLC) filed a Petition to Amend the Interim Instream Flow Standard (IIFS) for 27 streams in east Maui on behalf of resident taro farmers. Since the acceptance of the petitions in July 2001, the Commission on Water Resource Management (CWRM) has been focused on gathering information for the 27 petitioned streams. Shortly thereafter, NHLC and CWRM staff reached an agreement that efforts would focus on 8 of the 27 petitioned streams: Honopou, Hanehoi, Huelo, Waiokamilo, Kualani, Pi‘ina‘au, Palauhulu, and Wailua Nui Streams. Currently, the CWRM is collaborating with the State’s Division of Aquatic Resources and the U.S. Geological Survey (USGS) for assistance in collecting biological and hydrologic data to determine measurable interim IFS. CWRM has also requested biological data on the remaining 19 petitioned streams which is the main purpose of this report.

This report is an accounting of the aquatic resources that have been observed in ‘Ōhi‘a Stream, Maui from year 2000 to present. The focus of this report is on the animals and insects that live in the stream and the data collected during surveys. The report covers four main sections, including:

- Introduction
- Watershed Atlas Report
- DAR Point Quadrat Survey Report
- Photographs of stream taken during stream surveys

The introduction provides the overview for the purpose of this report, a summary of the findings on the stream and its animals, and a discussion of the importance of the findings and how stream conditions influence native species populations. The Watershed Atlas Report provides a description of the watershed and its aquatic resources from Division of Aquatic Resources (DAR) and other published/unpublished surveys, including a rating of the condition of the stream compared to other streams on Maui as well as statewide. The DAR Point Quadrat Survey Report describes the distribution, habitats, and species observed during the standardized DAR stream surveys. Finally, the photographs provide context to the conditions that the stream surveyors encountered in the stream.

This overview reports on the highlights of these findings and provides a discussion of the importance of the information presented. We hope that this format provides the reader with a simplified, general discussion and understanding of the conditions of ‘Ōhi‘a Stream while also providing substantial evidence to support the conclusions presented.

Findings for ‘Ōhi‘a Stream, Maui:

‘Ōhi‘a is a very small (0.2 sq miles). It is mostly zoned for agriculture (98%) and a little conservation (2%). The land cover is mostly evergreen forest (42%), grassland (37%), scrub (11%) and bare land (5%). A few stream surveys of 2 types have been completed in ‘Ōhi‘a Stream in 2003 and 2009. This watershed rates in the middle in comparison to other watersheds

in Maui and statewide. It has a total watershed rating of 4 out of 10, a total biological rating of 5 out of 10, and a combined overall rating of 5 out of 10.

Native species observed in the stream include the following categories and species:

Fish - *Lentipes concolor*

Crustaceans - *Atyoida bisulcata*

Mollusks - *Neritina granosa*

Introduced species observed in this stream includes the following categories and species:

Crustaceans - *Macrobrachium lar*

Fish - *Poecilia reticulata*

Discussion

‘Ōhi‘a stream is a small, spring-fed stream originating in the general area above the Hāna highway and was accessed through private property with permission by land owners, Pahukoa and Redo Families.

No estuary surveys were conducted.

Point quadrat surveys were performed on ‘Ōhi‘a Stream from the mouth to the middle reach that ended just below Hāna highway. There was no flow from the stream mouth to the boulder beach which is possibly due to underground flow. Access to sections of the lower reach of the stream was limited due to thick vegetation and barbed wire fencing. The first four survey sites in the lower reach had no water and were overgrown with hau, *Hibiscus tiliaceus*. Flow measurements were taken at survey site 5 where water was first observed. From site 6, substrate consisted mainly of gravel and cobble. Surveys were aborted after survey site 8 due to overgrowth of *H. tiliaceus* and barbed wire fencing.

The middle reach of ‘Ōhi‘a Stream provided ideal conditions for stream animal habitat. Water temperature averaged 18.3° C with moderate flow. The lower reach averaged a water temperature of 18.7° C, although it may not be as suitable for stream animal habitat due to thick vegetation and less flow. No diversions or tributaries were encountered during surveys.

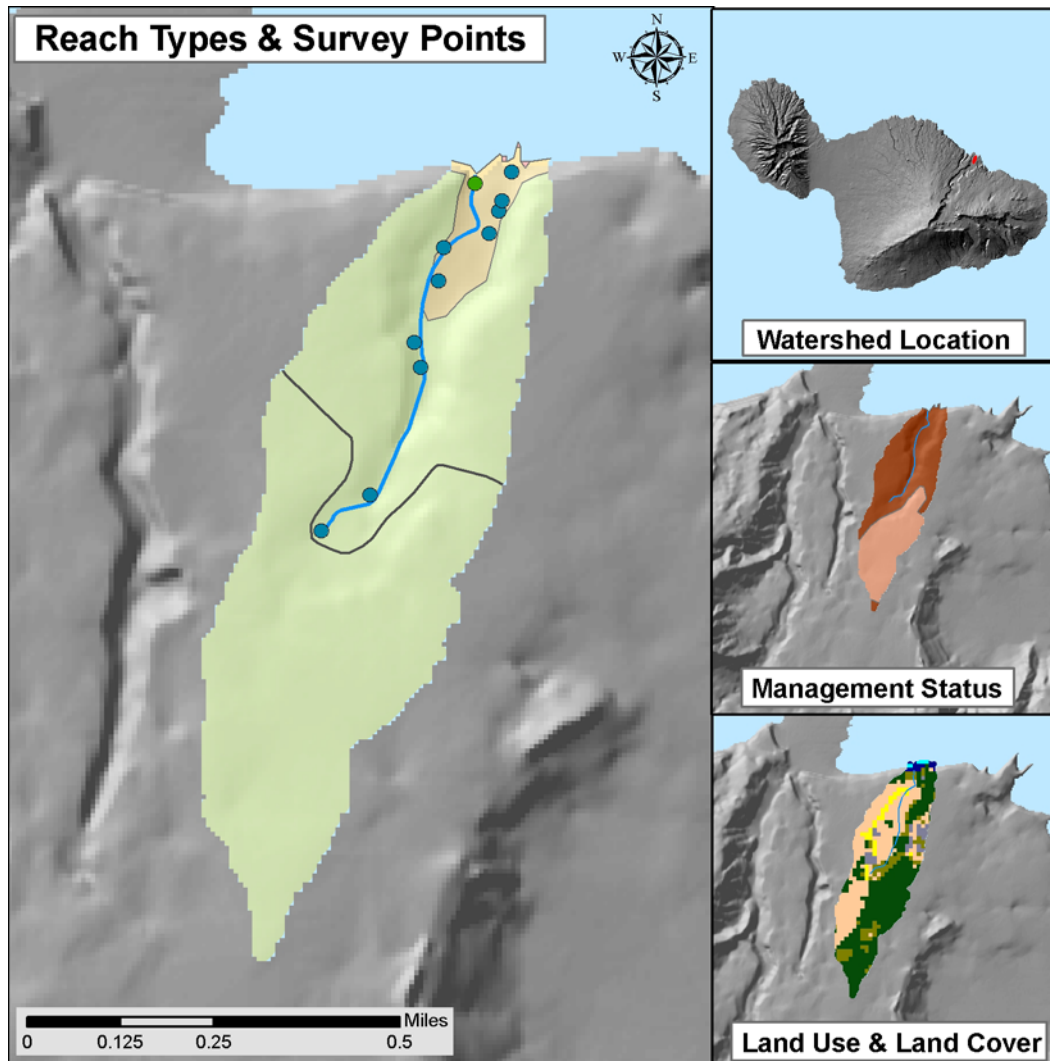
River prawn, *Macrobrachium lar* were observed in the lower reach, while adult and juvenile **‘o‘opu alamo‘o**, *Lentipes concolor*, **‘ōpae ‘kala‘ole**, *Atyoida bisulcata* and **guppies**, *Poecilia reticulata* were observed in the middle reach. Another species observed was a subspecies of **koi**, *Cyprinus carpio* outside of survey sites in a modified fishpond.

Overall, ‘Ōhi‘a Stream had excellent instream habitat with decent stream flow near the spring below Hāna Highway. Adult *L. concolor* were only found in the upper stream reach which suggests both long-term suitable conditions to support adult animals and short term suitable conditions allowing for the recruitment and migration of juveniles animals to this stream reach. The removal or clearing of heavy vegetation including hau, may help restore stream flow and improve habitat and passage for stream animals. Restoration of continuous stream flow to the ocean should allow continued use of this stream by native amphidromous animals for both upstream and downstream passage, increase habitat, and further enhance the overall productivity of ‘Ōhi‘a Stream.

Section 2: Watershed Atlas

DAR Watershed Code: 64012

‘Ōhi‘a, Maui



Watershed Features

‘Ōhi‘a watershed occurs on the island of Maui. The Hawaiian meaning of the name is ‘ōhi‘a tree. The area of the watershed is 0.2 square mi (0.6 square km), with maximum elevation of 436 ft (133 m). The watershed's DAR cluster code is not yet determined. The percent of the watershed in the different land use districts is as follows: 97.9% agricultural, 2.1% conservation, 0% rural, and 0% urban.

Land Stewardship: Percentage of the land in the watershed managed or controlled by the corresponding agency or entity. Note that this is not necessarily ownership.

<u>Military</u>	<u>Federal</u>	<u>State</u>	<u>OHA</u>	<u>County</u>	<u>Nature Conservancy</u>	<u>Other Private</u>
0.0	0.0	40.3	0.0	0.0	0.0	59.7

Land Management Status: Percentage of the watershed in the categories of biodiversity protection and management created by the Hawaii GAP program.

Permanent Biodiversity <u>Protection</u>	Managed for Multiple <u>Uses</u>	Protected but <u>Unmanaged</u>	<u>Unprotected</u>
0.0	40.3	0.0	59.7

Land Use: Areas of the various categories of land use. These data are based on NOAA C-CAP remote sensing project.

	<u>Percent</u>	<u>Square mi</u>	<u>Square km</u>
High Intensity Developed	0.0	0.00	0.00
Low Intensity Developed	3.6	0.01	0.02
Cultivated	0.0	0.00	0.00
Grassland	37.3	0.09	0.23
Scrub/Shrub	11.2	0.03	0.07
Evergreen Forest	41.7	0.10	0.26
Palustrine Forested	0.0	0.00	0.00
Palustrine Scrub/Shrub	0.0	0.00	0.00
Palustrine Emergent	0.0	0.00	0.00
Estuarine Forested	0.0	0.00	0.00
Bare Land	4.7	0.01	0.03
Unconsolidated Shoreline	0.4	0.00	0.00
Water	1.0	0.00	0.01
Unclassified	0.0	0.00	0.00

Stream Features

‘Ōhi‘a is a perennial stream. Total stream length is 0.6 mi (0.9 km). The terminal stream order is 1.

Reach Type Percentages: The percentage of the stream's channel length in each of the reach type categories.

<u>Estuary</u>	<u>Lower</u>	<u>Middle</u>	<u>Upper</u>	<u>Headwaters</u>
0.0	29.9	70.1	0.0	0.0

The following stream(s) occur in the watershed:

‘Ōhi‘a

Biotic Sampling Effort

Biotic samples were gathered in the following year(s):

2003 2009

Distribution of Biotic Sampling: The number of survey locations that were sampled in the various reach types.

<u>Survey type</u>	<u>Estuary</u>	<u>Lower</u>	<u>Middle</u>	<u>Upper</u>	<u>Headwaters</u>
DAR Point Quadrat	0	7	5	0	0
Published Report	0	1	0	0	0

Biotic Information

Species List

Native Species

Crustaceans *Atyoida bisulcata*

Fish *Lentipes concolor*

Mollusks *Neritina granosa*

Introduced Species

Crustaceans *Macrobrachium lar*

Fish *Poecilia reticulata*

Species Size Data: Species size (inches) observed in DAR Point Quadrat Surveys.

<u>Scientific Name</u>	<u>Status</u>	<u>Minimum Size</u>	<u>Maximum Size</u>	<u>Average Size</u>
<i>Atyoida bisulcata</i>	Endemic	1	1.5	1.2
<i>Macrobrachium lar</i>	Introduced	5	5	5.0
<i>Lentipes concolor</i>	Endemic	2	3	2.4
<i>Poecilia reticulata</i>	Introduced	0.75	1	0.9

Average Density: The densities (#/square yard) for species observed in DAR Point Quadrat Surveys averaged over all sample dates in each reach type.

<u>Scientific Name</u>	<u>Status</u>	<u>Estuary</u>	<u>Lower</u>	<u>Middle</u>	<u>Upper</u>	<u>Headwaters</u>
<i>Atyoida bisulcata</i>	Endemic			8.84		
<i>Lentipes concolor</i>	Endemic			2.53		
<i>Macrobrachium lar</i>	Introduced		0.31			
<i>Poecilia reticulata</i>	Introduced			2.53		

Species Distributions: Presence (P) of species in different stream reaches.

<u>Scientific Name</u>	<u>Status</u>	<u>Estuary</u>	<u>Lower</u>	<u>Middle</u>	<u>Upper</u>	<u>Headwaters</u>
<i>Atyoida bisulcata</i>	Endemic			P		
<i>Lentipes concolor</i>	Endemic			P		
<i>Neritina granosa</i>	Endemic		P			
<i>Macrobrachium lar</i>	Introduced		P			
<i>Poecilia reticulata</i>	Introduced			P		

Historic Rankings

Historic Rankings: These are rankings of streams from historical studies. "Yes" means the stream was considered worthy of protection by that method. Some methods include non-biotic data in their determination. See Atlas Key for details.

Multi-Attribute Prioritization of Streams - Potential Heritage Streams (1998): No

Hawaii Stream Assessment Rank (1990): not ranked

U.S. Fish and Wildlife Service High Quality Stream (1988): No

The Nature Conservancy- Priority Aquatic Sites (1985): No

National Park Service - Nationwide Rivers Inventory (1982): No

Current DAR Decision Rule Status: The following criteria are used by DAR to consider the biotic importance of streams. "Yes" means that watershed has that quality.

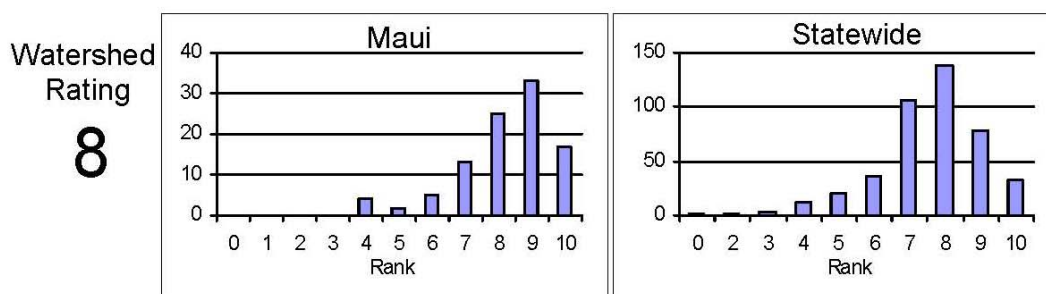
Native Insect Diversity <u>> 19 spp.</u>	Native Macrofauna <u>Diversity > 5 spp.</u>	Absence of Priority 1 <u>Introduced</u>
No	No	No
Abundance of Any <u>Native Species</u>	Presence of Candidate <u>Endangered Species</u>	Endangered Newcomb's <u>Snail Habitat</u>
No	No	No

CURRENT WATERSHED AND STREAM RATINGS

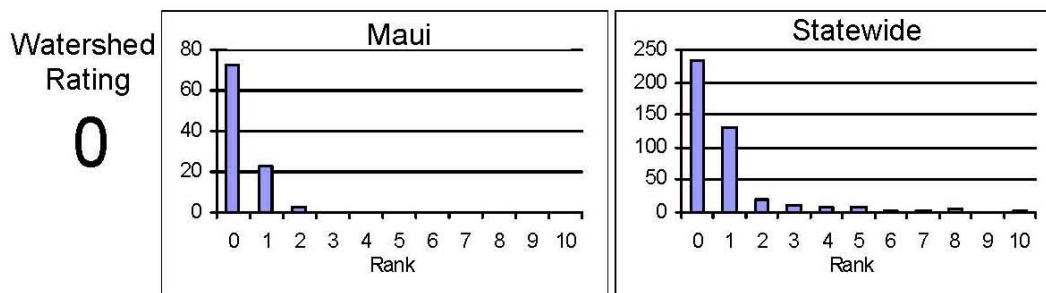
The current watershed and stream ratings are based on the data contained in the DAR Aquatic Surveys Database. The ratings provide the score for the individual watershed or stream, the distribution of ratings for that island, and the distribution of ratings statewide. This allows a better understanding of the meaning of a particular ranking and how it compares to other streams. The ratings are standardized to range from 0 to 10 (0 is lowest and 10 is highest rating) for each variable and the totals are also standardized so that the rating is not the average of each component rating. These ratings are subject to change as more data are entered into the DAR Aquatic Surveys Database and can be automatically recalculated as the data improve. In addition to the ratings, we have also provided an estimate of the confidence level of the ratings. This is called rating strength. The higher the rating strength the more likely the data and rankings represent the actual condition of the watershed, stream, and aquatic biota.

WATERSHED RATING: ‘Ōhi‘a, Maui

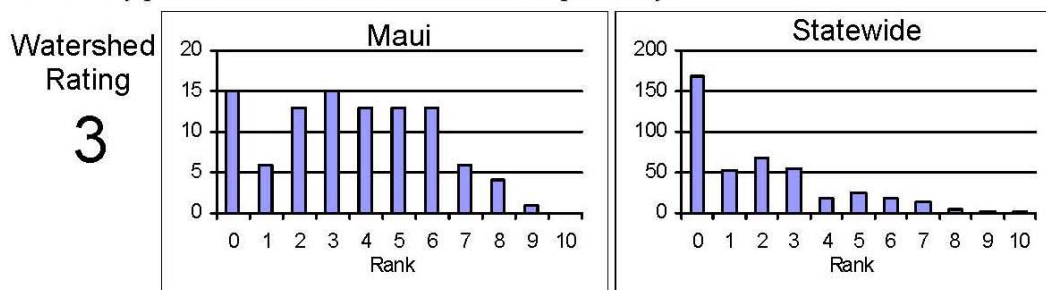
Land Cover Rating: Rating is based on a scoring system where in general forested lands score positively and developed lands score negatively.



Shallow Waters Rating: Rating is based on a combination of the extent of estuarine and shallow marine areas associated with the watershed and stream.



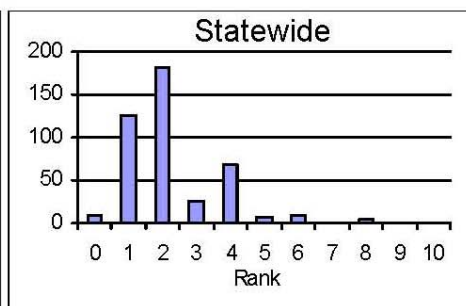
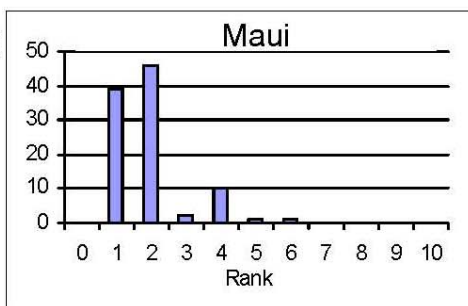
Stewardship Rating: Rating is based on a scoring system where higher levels of land and biodiversity protection within the watershed score positively.



WATERSHED RATING (Cont): ‘Ōhi’a, Maui

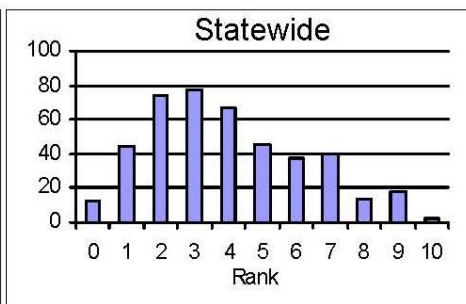
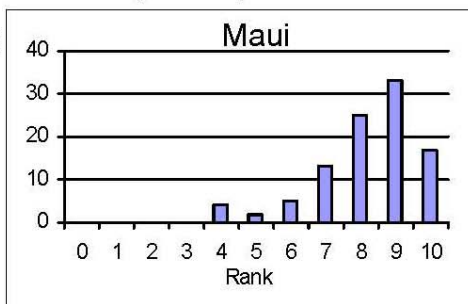
Size Rating: Rating is based on the watershed area and total stream length. Larger watersheds and streams score more positively.

Watershed
Rating
1



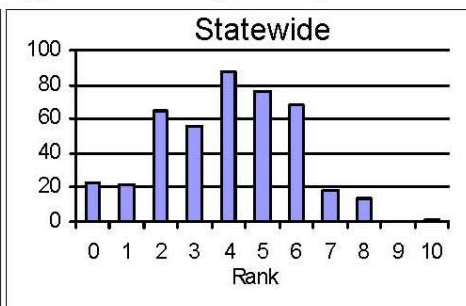
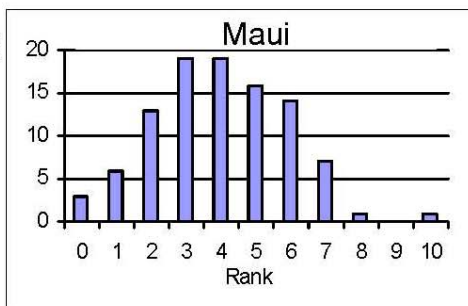
Wetness Rating: Rating is based on the average annual rainfall within the watershed. Higher rainfall totals score more positively.

Watershed
Rating
6



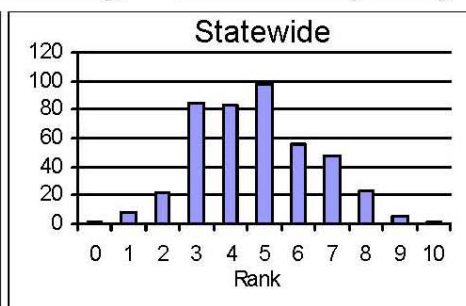
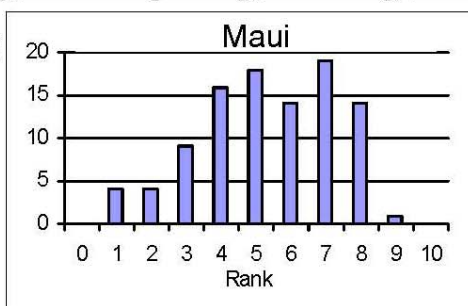
Reach Diversity Rating: Rating is based on the types and amounts of different stream reaches available in the watershed. More area in different reach types score more positively.

Watershed
Rating
0



Total Watershed Rating: Rating is based on combination of Land Cover Rating, Shallow Waters Rating, Stewardship Rating, Size Rating, Wetness Rating, and Reach Diversity Rating.

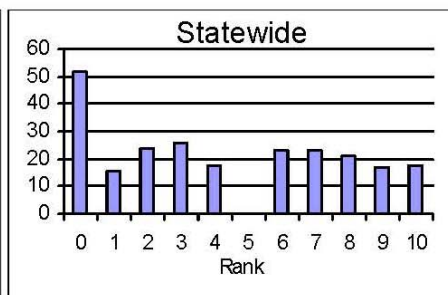
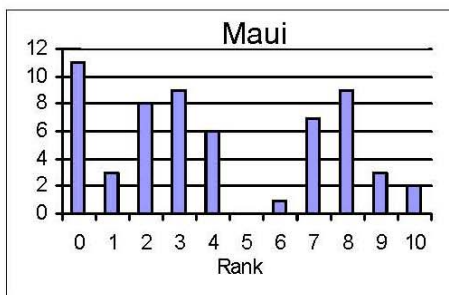
Watershed
Rating
4



BIOLOGICAL RATING: ‘Ōhi‘a, Maui

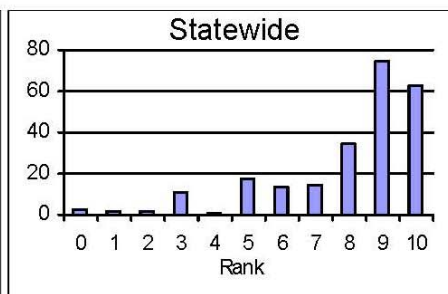
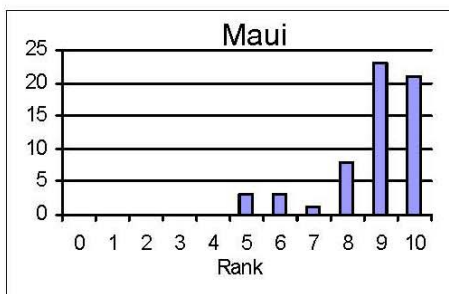
Native Species Rating: Rating is based on the number of native species observed in the watershed.

Stream
Rating
3



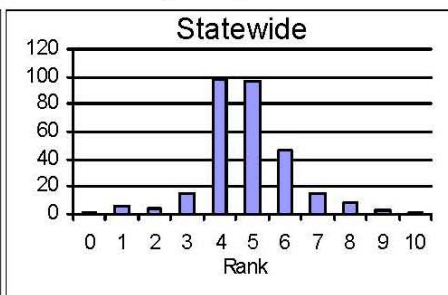
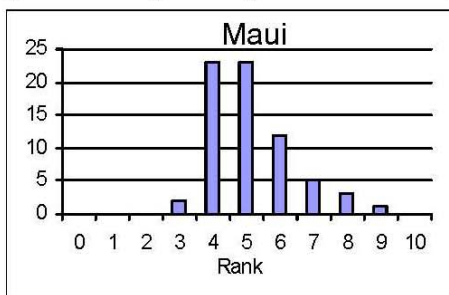
Introduced Genera Rating: Rating is based on the number of introduced genera observed in the watershed.

Stream
Rating
9



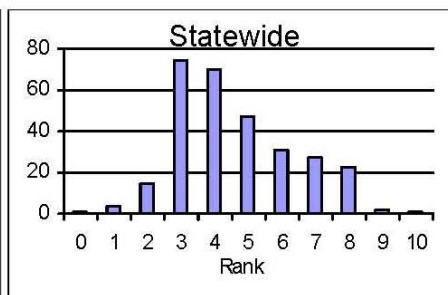
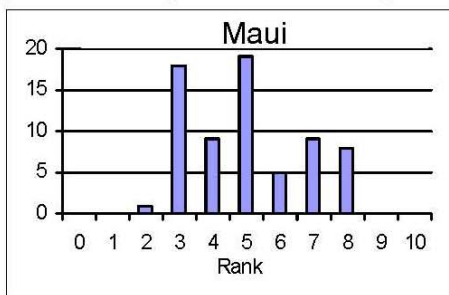
All Species' Score Rating: Rating is based on the Hawaii Stream Assessment scoring system where native species score positively and introduced species score negatively.

Stream
Rating
5



Total Biological Rating: Rating is the combination of the **Native Species Rating**, **Introduced Genera Rating**, and the **All Species' Score Rating**.

Stream
Rating
5

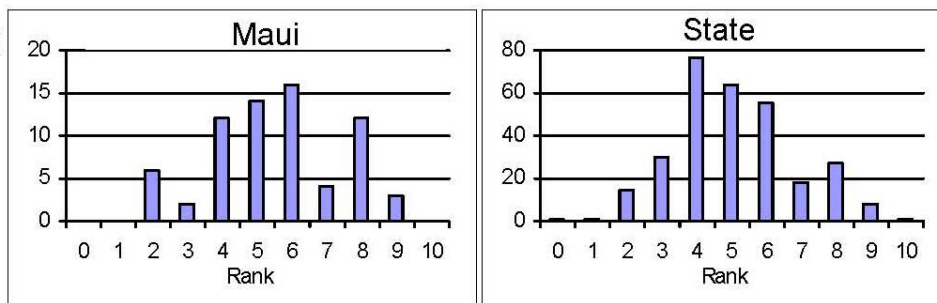


OVERALL RATING: ‘Ōhi‘a, Maui

Overall Rating: Rating is a combination of the Total Watershed Rating and the Total Biological Rating.

Watershed
Rating

5

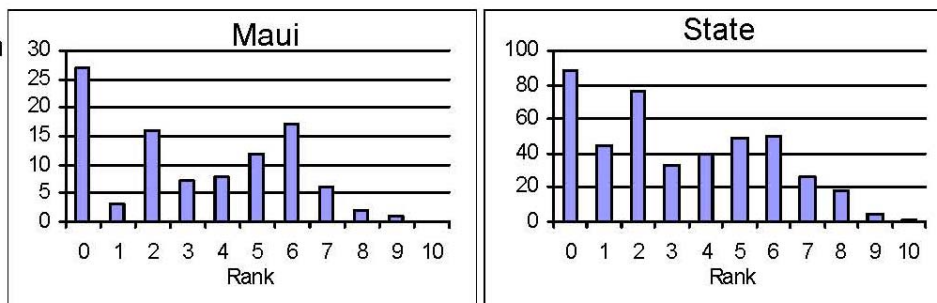


RATING STRENGTH: ‘Ōhi‘a, Maui

Rating Strength: Represents an estimate of the overall study effort in the stream and is a combination of the number of studies, number of different reaches surveyed, and the number of different survey types.

Information
Rating

4



REFERENCES

- 2005. Gingerich, S.B. and R.H. Wolff. Effects of Surface-Water Diversions on Habitat Availability for Native Macrofauna, Northeast Maui, Hawai‘i.
- 2008. Hawai‘i Division of Aquatic Resources. DAR Point Quadrat Survey Data from the DAR Aquatic Surveys Database.

Section 3: DAR Point Quadrat Report

For Surveys from 3/11/2009 to 3/11/2009

Introduction

This is a report of the Hawai‘i Division of Aquatic Resources stream surveys using the Point Quadrat Methodology. Trained biologists and technicians survey a series of randomly located points in a stream to generate an assessment of the species and habitat in the stream. The Point Quadrat Methodology is one of several techniques that could be chosen for the surveys and is used to develop a statistically comparable stream survey. This methodology is a standardized visual survey technique involving snorkeling, and it is well suited for the physical and ecological characteristics of Hawai‘i streams. The small, steep, dynamic nature of Hawaiian streams with their unique aquatic species is easily observed with this methodology. The in-stream distribution by elevation, behavior, and amphidromous life cycles are easily observed using this technique.

Methods

The point quadrat methodology requires underwater observation. Sampling was conducted using a dive mask, snorkel and two-piece wet suit with hood and glove. Spiked felt-soled wading boots or Japanese spiked **tabis** are also necessary for easy climbing on the wet, algae-covered rocks. After the initial survey site is chosen all the survey sites upstream are selected randomly to prevent any bias in habitat type selection (e.g., pools and runs) and to obtain a representative sample of all habitat types in the stream. At each site, fish and invertebrate observations are recorded and data is collected on the species present, number, size, and sex. Habitat and substrate type, depth and site dimension data are also collected. Other site observations recorded at each station include GPS coordinates and the following water quality parameters using a Hydrolab Quanta: temperature (° C), salinity (PSS), dissolved oxygen (mg/L), pH, conductivity (mS/cm) and turbidity (NTU). Stream flow measurements are collected using a Marsh McBirney Flo-Mate 2000 at the beginning and ending of each survey as well as at tributaries and diversions.

The watersheds (and watershed ID), region, and island surveyed in this report are:

‘Ōhi‘a (ID: 64012), Ke‘anae, Maui

Surveys were conducted by these personnel:

Hau, Skippy

Kuamo‘o, Darrell

Sakihara, Troy

Results

Table 3-1. The distribution of sites by reach during this survey effort.

Reach	Total number of surveys
Estuary	0
Lower	7
Middle	5
Upper	0
Headwaters	0
Unknown	0

Lower Reach

Table 3-2. Number of Habitat Types surveyed in the lower stream reach.

Reach	Total Habitats Surveyed	Plunge Pool	Cascade	Riffle	Run	Pool	Side Pool	No Water	Dirty Water	Unknown
Lower	7	1	0	0	0	1	0	5	0	0

Table 3-3. Observed Substrates (%) in point quadrat samples in the lower stream reach.

Reach	Detritus	Sediment	Sand	Gravel	Cobble	Boulder	Bedrock
Lower	54	10	0	14	6	13	4

Table 3-4. Observed Water Quality in point quadrat samples in the lower stream reach.

Reach	Temp (° C)	sCond (mS/cm)	DO (mg/L)	pH
Lower	18.67	0.139	6.345	7.4

Table 3-5. Summary of species observed in the lower reach of the watershed.

<u>Category</u>	<u>Status</u>	<u>Scientific Name</u>
Crustacean	Introduced	<i>Macrobrachium lar</i>

Middle Reach

Table 3-6. Number of Habitat Types surveyed in the middle stream reach.

Reach	Total Habitats Surveyed	Plunge Pool	Cascade	Riffle	Run	Pool	Side Pool	No Water	Dirty Water	Unknown
Middle	4	0	0	1	3	0	0	0	0	0

Table 3-7. Observed Substrates (%) in point quadrat samples in the middle stream reach.

Reach	Detritus	Sediment	Sand	Gravel	Cobble	Boulder	Bedrock
Middle	20	28	2	15	15	12	8

Table 3-8. Observed Water Quality in point quadrat samples in the middle stream reach.

Reach	Temp (° C)	sCond (mS/cm)	DO (mg/L)	pH
Middle	18.314	0.115	8.15	7.566

Table 3-9. Summary of species observed in the middle reach of the watershed.

<u>Category</u>	<u>Status</u>	<u>Scientific Name</u>
Crustacean	Endemic	<i>Atyoida bisulcata</i>
Fish	Introduced	<i>Poecilia reticulata</i>
Fish	Endemic	<i>Lentipes concolor</i>

Table 3-10. Flow data taken during point quadrat surveys in the lower and middle reaches.

Reach	Latitude	Longitude	Total CFS	MGD
Lower	20.85652	-156.13951	0.01	0
Middle	20.85172	-156.14113	3.94	2.49

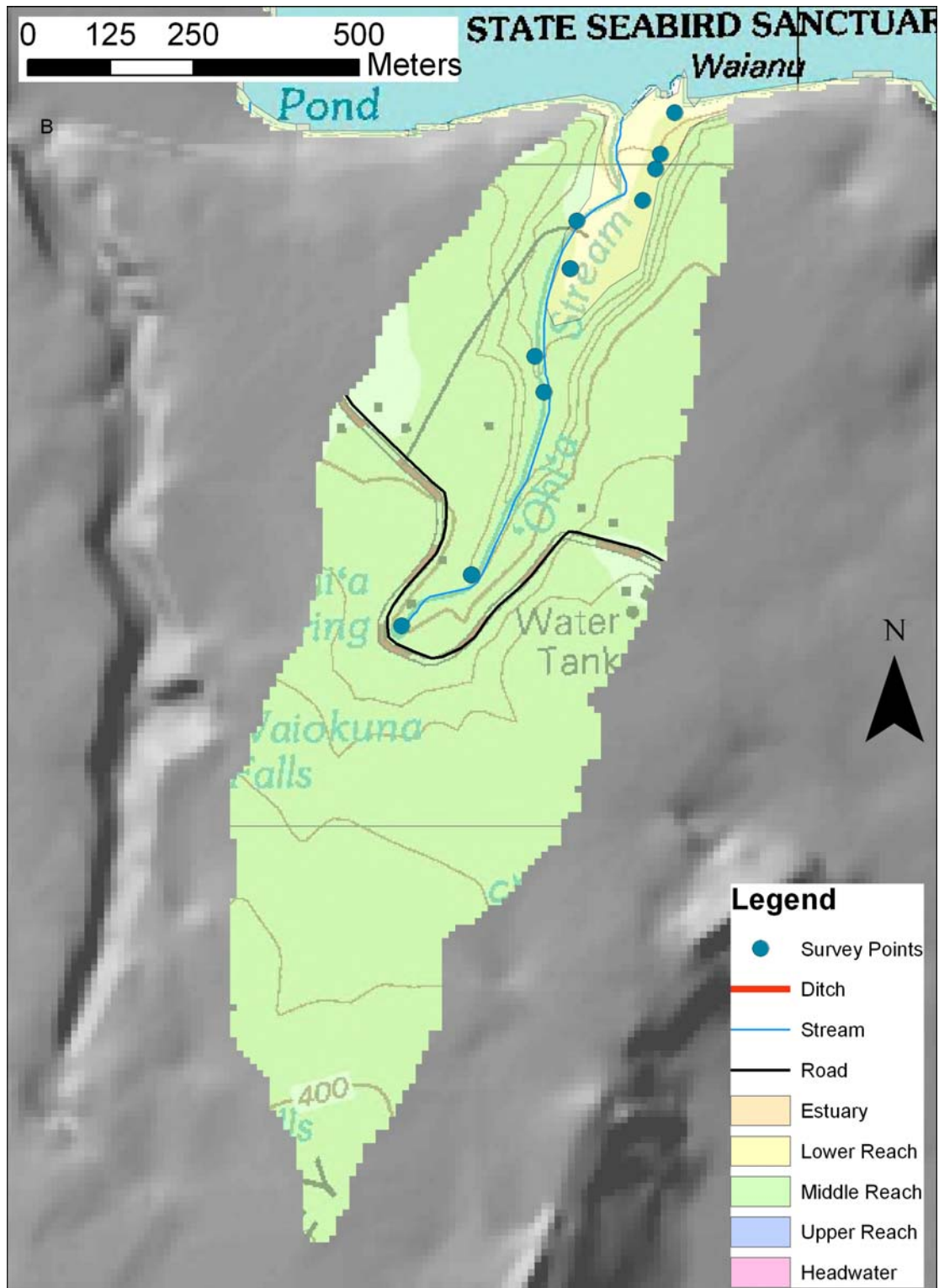


Figure 3-1. Locations of point quadrat surveys conducted in ‘Ōhi‘a Stream.

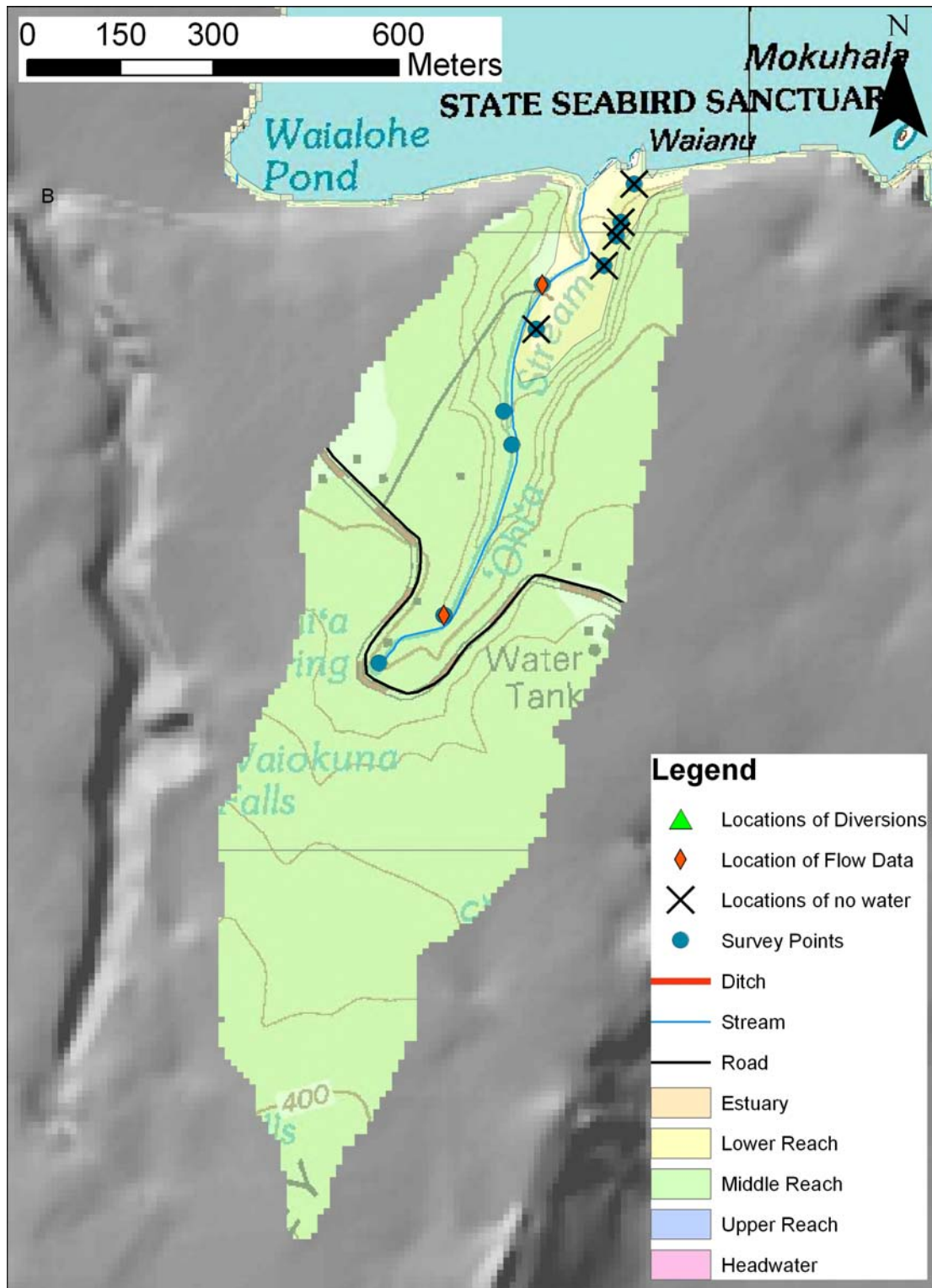


Figure 3-2. Locations of diversion, flow data and no flow conditions found in ‘Ōhi‘a Stream.

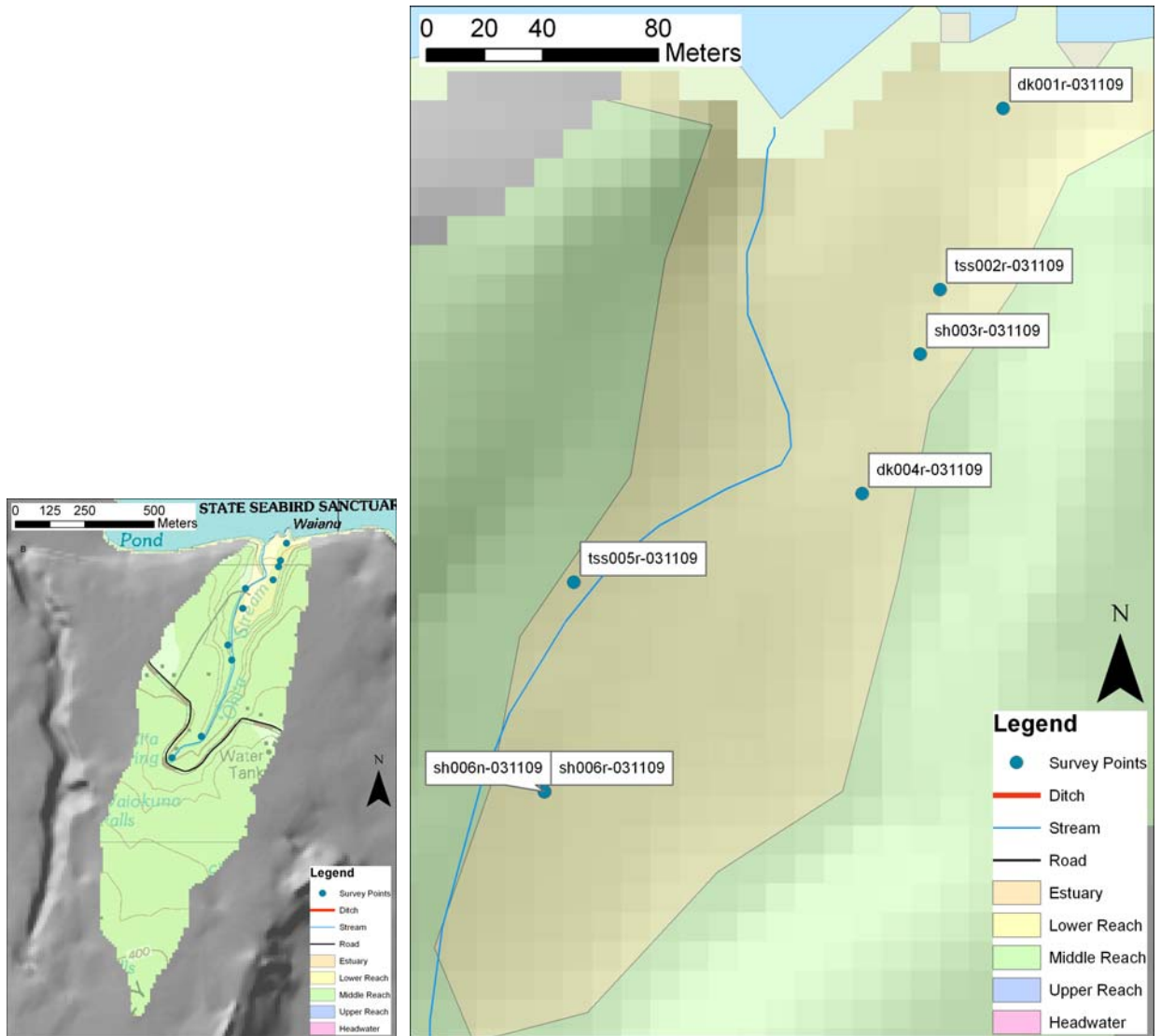


Figure 3-3. Point quadrat survey locations in the lower reach of ‘Ōhi‘a Stream.

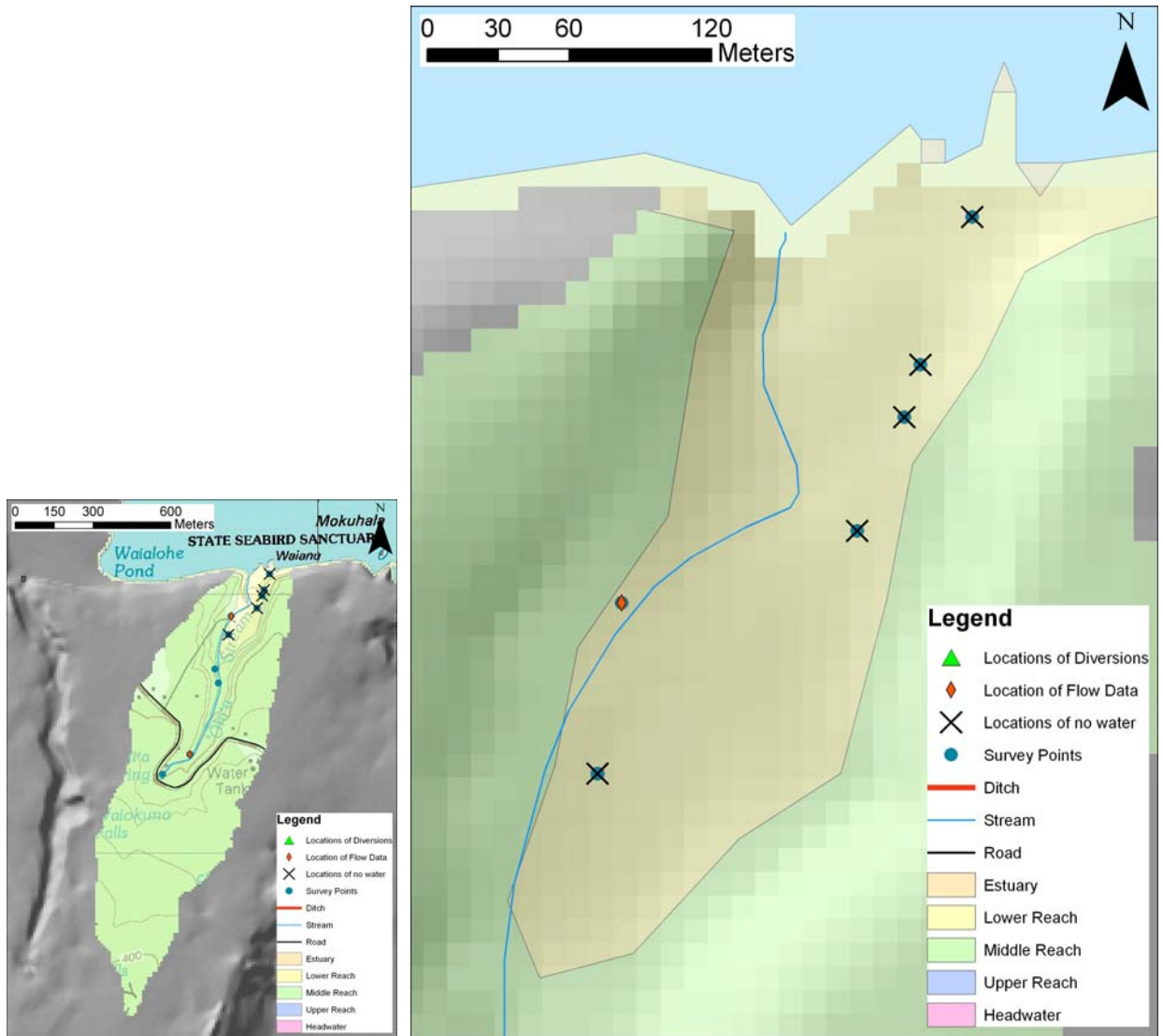


Figure 3-4. Locations of flow measurements and no flow conditions found in the lower reach of ‘Ōhi‘a Stream.

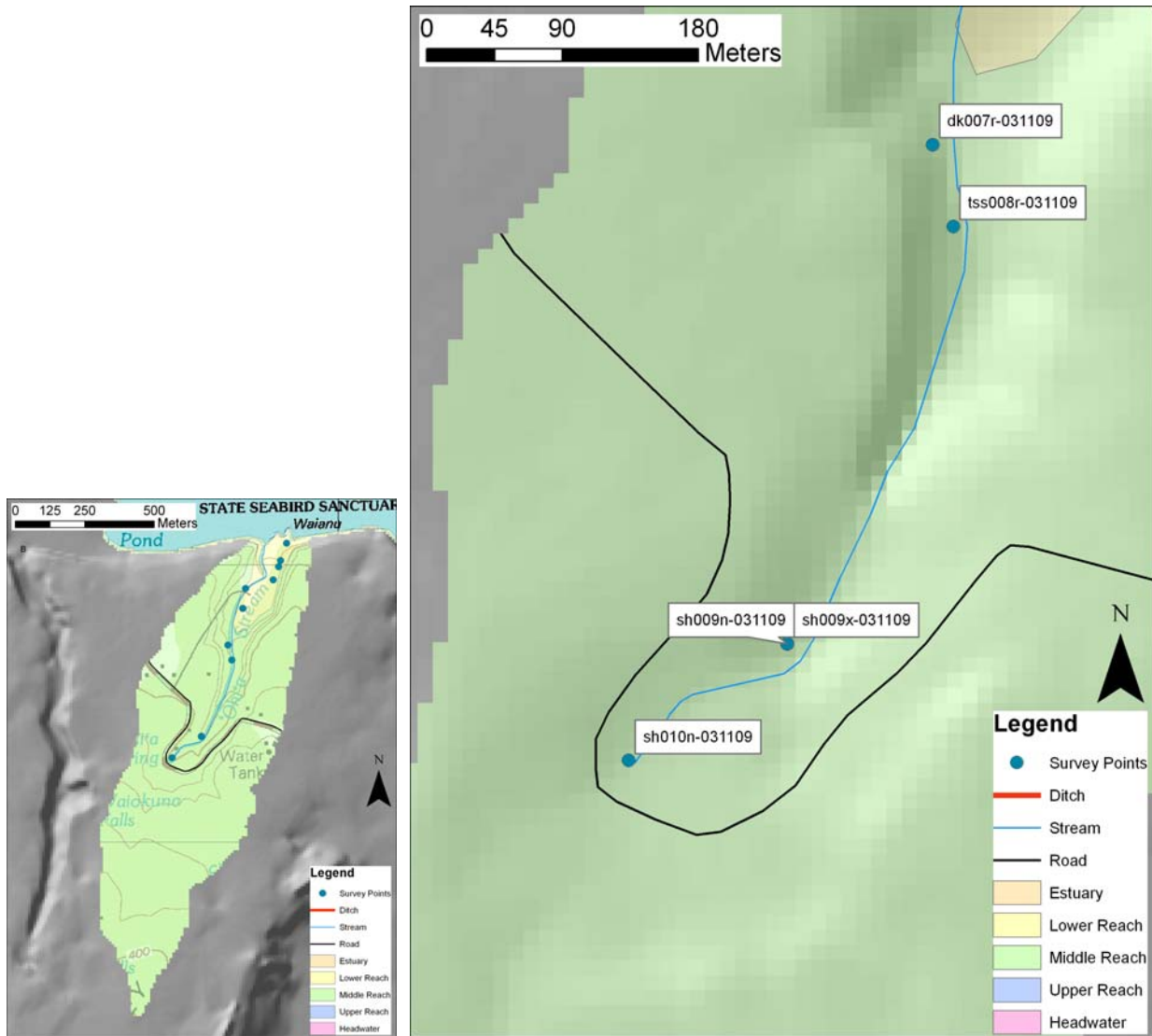


Figure 3-5. Point quadrat survey locations in the middle reach of ‘Ōhi‘a Stream.

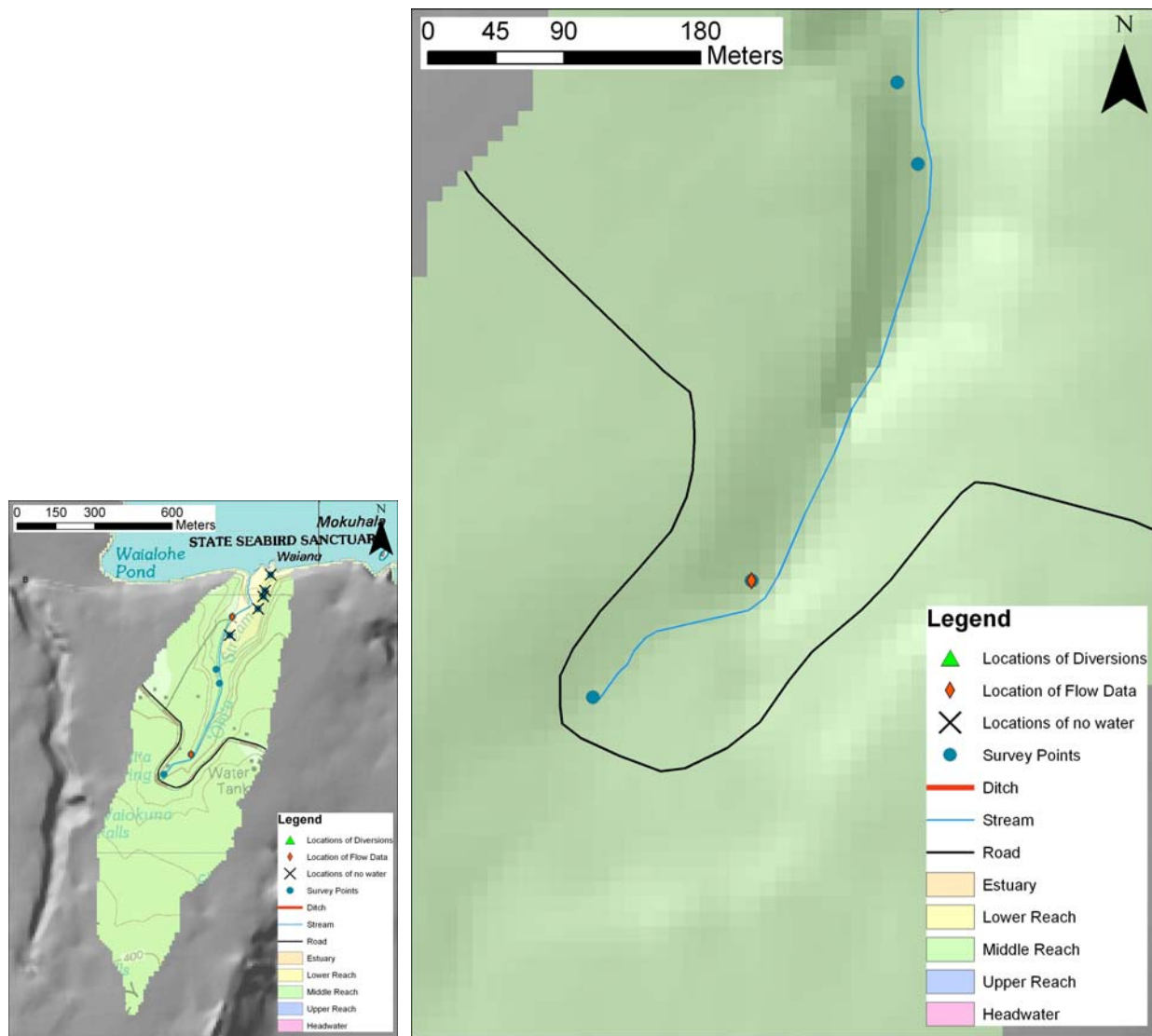


Figure 3-6. Locations of flow measurements taken in the middle reach of ‘Ōhi‘a Stream.

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Section 4: Photographs Taken During Stream Surveys

Lower Reach

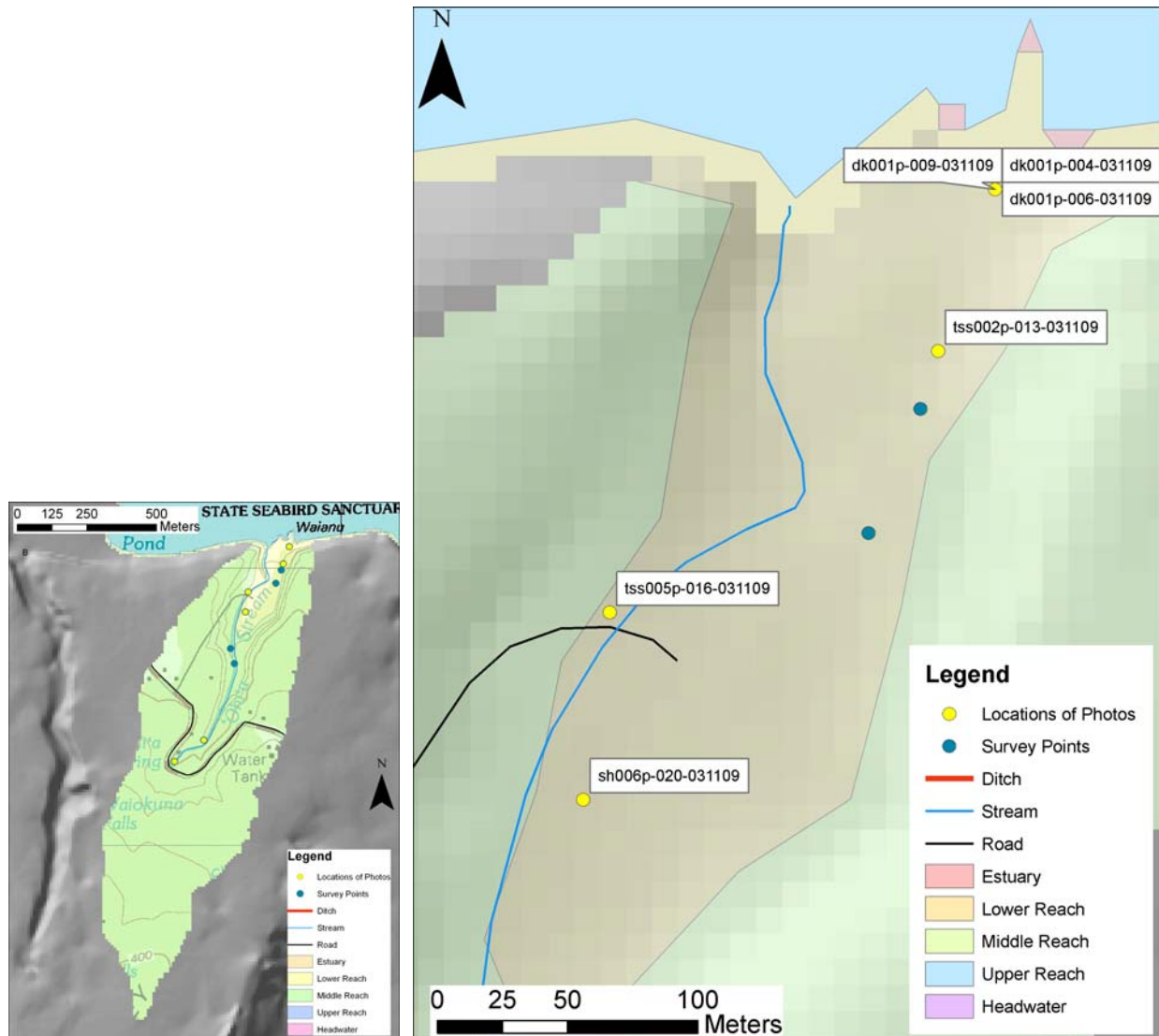


Figure 4-1. Photo locations in the lower reach of 'Ōhi'a Stream.



Figure 4-2. Photo shows the beach at the mouth of the stream. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: dk001p-004-031109; Surveyor: Kuamo‘o, D.; Habitat type: No Water; SBN: dk001r-031109; Lat. (DD): 20.85797, Long. (DD): -156.13806).



Figure 4-3. Photo of survey site 1, showing short drop to the cobble beach from stream mouth. Photo is taken in an upstream direction. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: dk001p-006-031109; Surveyor: Kuamo‘o, D.; Habitat type: No Water; SBN: dk001r-031109; Lat. (DD): 20.85797, Long. (DD): -156.13806).



Figure 4-4. Photo from survey site 1 looking down at the cobble beach and ocean. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: dk001p-009-031109; Surveyor: Kuamo‘o, D.; Habitat type: No Water; SBN: dk001r-031109; Lat. (DD): 20.85797, Long. (DD): -156.13806).



Figure 4-5. DAR staff surveying site 2 with no water. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: tss002p-013-031109; Surveyor: Sakihara, T.; Habitat type: No Water; SBN: tss002r-031109; Lat. (DD): 20.85741, Long. (DD): -156.13828).



Figure 4-6. Photo of DAR staff conducting flow measurements near survey site 5. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: tss005p-016-031109; Surveyor: Sakihara, T.; SBN: 92; Lat. (DD): 20.85652, Long. (DD): -156.13951).



Figure 4-7. Photo of DAR staff surveying stream under a waterfall at survey site 6. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh006p-020-031109; Surveyor: Hau, S.; Habitat type: Plunge Pool; SBN: sh006n-031109; Lat. (DD): 20.85587, Long. (DD): -156.13962).

Middle Reach

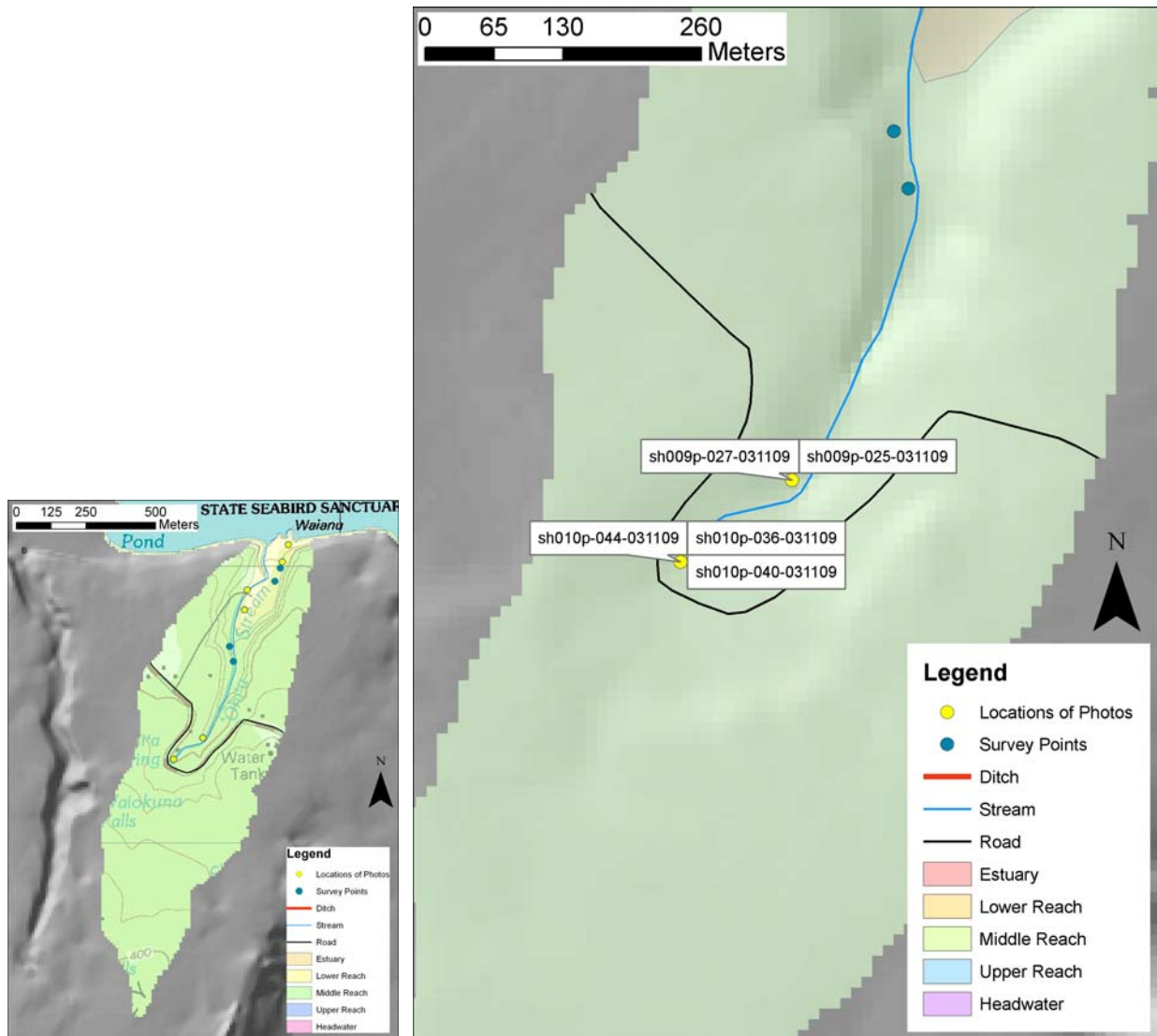


Figure 4-8. Photo locations in the upper reach of ‘Ōhi‘a Stream.



Figure 4-9. Photo of survey site 9. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh009p-025-031109; Surveyor: Hau, S.; Habitat type: Run; SBN: sh009n-031109; Lat. (DD): 20.85172, Long. (DD): -156.14113).



Figure 4-10. Photo showing DAR staff taking flow measurements near survey site 9. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh009p-027-031109; Surveyor: Hau, S.; Habitat type: Run; SBN: 91; Lat. (DD): 20.85172, Long. (DD): -156.14113).



Figure 4-11. Photo showing the spring above the ponds near survey site 10. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh010p-044-031109; Surveyor: Hau, S.; Habitat type: Riffle; SBN: sh010n-031109; Lat. (DD): 20.85104, Long. (DD): -156.14215).



Figure 4-12. Photo of ponds below the springs near survey site 10. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh010p-040-031109; Surveyor: Hau, S.; Habitat type: Riffle; SBN: sh010n-031109; Lat. (DD): 20.85104, Long. (DD): -156.14215).



Figure 4-13. Photo shows survey site 10 which is located upstream of the ponds and below the springs. (3/11/2009; Tributary name: ‘Ōhi‘a (64012001); PBN: sh010p-036-031109; Surveyor: Hau, S.; Habitat type: Riffle; SBN: sh010n-031109; Lat. (DD): 20.85104, Long. (DD): -156.14215).

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Appendix: Survey Sites Latitude and Longitude

Tributary	Stream	Survey Book #	Site	Surveyor	Date	Latitude	Longitude
64012001	‘Ōhi‘a	dk001r-031109	1	Kuamo‘o, Darrell	3/11/2009	20.85797	-156.13806
64012001	‘Ōhi‘a	tss002r-031109	2	Sakihara, Troy	3/11/2009	20.85741	-156.13828
64012001	‘Ōhi‘a	sh003r-031109	3	Hau, Skippy	3/11/2009	20.85721	-156.13835
64012001	‘Ōhi‘a	dk004r-031109	4	Kuamo‘o, Darrell	3/11/2009	20.85678	-156.13855
64012001	‘Ōhi‘a	tss005r-031109	5	Sakihara, Troy	3/11/2009	20.85652	-156.13951
64012001	‘Ōhi‘a	sh006r-031109	6	Hau, Skippy	3/11/2009	20.85587	-156.13962
64012001	‘Ōhi‘a	sh006n-031109	6	Hau, Skippy	3/11/2009	20.85587	-156.13962
64012001	‘Ōhi‘a	dk007r-031109	7	Kuamo‘o, Darrell	3/11/2009	20.85468	-156.14015
64012001	‘Ōhi‘a	tss008r-031109	8	Sakihara, Troy	3/11/2009	20.85419	-156.14003
64012001	‘Ōhi‘a	sh009x-031109	9	Hau, Skippy	3/11/2009	20.85172	-156.14113
64012001	‘Ōhi‘a	sh009n-031109	9	Hau, Skippy	3/11/2009	20.85172	-156.14113
64012001	‘Ōhi‘a	sh010n-031109	10	Hau, Skippy	3/11/2009	20.85104	-156.14215

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