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LAND USE COMMISSION

CARLSMITH BALL LLP

A LIMITED LIABILITY LAW PARTNERSHIP

121 WAIANUENUE AVENUE
P.O. BOX 686
HILO, HAWAII 96721-0686
TELEPHONE 808.935.6644 FAX 808.935.7975
WWW.CARLSMITH.COM

DIRECT DIAL NO.
808.969.8403

KGARSON@CARLSMITH.COM

OUR REFERENCE NO.
056930-2

March 14, 2025

VIA REGULAR MAIL AND E-MAIL: DBEDT.LUC.WEB@HAWAII.GOV

Daniel E. Orodenker
Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawai'i 96804

Re: **2017 to 2025 Annual Progress Report**
State Land Use Commission Docket No. A93-701
Original Petitioner: Kaupulehu Developments
Successor Petitioner: KD Acquisition, LLLP (fka WB KD Acquisition, LLC), as to Increment 1 of Lot 4-A, and KD Acquisition II, LP (fka KD Acquisition II, LLLP, as to Increment 2 of Lot 4-A
Tax Map Key Nos.: (3) 7-2-010: 022 (por.) to 027, and 031, (3) 7-2-031:001, 004, 006 to 011, 013, 015 to 023, 025 to 033, 034 (Road Lot), 035, 036, and 037, and (3) 7-2-032:001, 003, 005, 007, 009, 010, 011 (Road Lot), 012 (Road Lot), 014, 016 to 034, 036 to 049, 049, 051 to 054 (Formerly (3) 7-2-003: Portion of 001) (collectively **"Lot 4-A"**)

Dear Mr. Orodenker:

This will serve as a response to your letter dated December 23, 2024, addressed to Mr. Steven S.C. Lim of Carlsmith Ball, LLP, which informed that the annual progress reports required for submittal to the State Land Use Commission ("**Commission**") pursuant to Condition 27[1] of the Findings of Fact, Conclusions of Law, and Decision and Order under Docket No. A93-701 ("**Docket No. A93-701**") were delinquent. The failure to submit these required annual

[1]As indicated in prior Annual Progress Reports to the Commission, Hualalai Investors, LLC ("**HILLC**") the successor-in-interest to former Petitioner Kaupulehu Makai Venture, will file separate annual progress reports with the Commission for Lot 4-B.

progress reports were inadvertent and future annual reports will be filed in a timely fashion going forward.

As discussed in prior annual reports to the Commission, the area reclassified by Docket No. A93-701 was divided into two (2) distinct development areas, now identified as the "**Lot 4-A**" development area and the "**Lot 4-B**" development area. Lot 4-A was then further divided into an Increment 1 and Increment 2 development area, and these development areas are now controlled by separate but related entities. The Lot 4-B development area is presently controlled by Hualalai Investors, LLC.

On behalf of our current clients, KD Acquisition, LLLP[2] and KD Acquisition II, LP (collectively hereinafter referred to as "**KD**"[3]), the successors in interest to Kaupulehu Developments, the original Petitioner in Docket No. A93-701, as to a portion of the lands covered by Docket No. A93-701, we are hereby submitting on KD's behalf a combined comprehensive 2017 to 2025 Annual Progress Report for Lot 4-A for consideration.

Since the filing of the 2016 Annual Progress Report on September 21, 2016, and as discussed in more detail below, the *Revised Long-Term Preservation Plan for Kalaemanō Cultural Reserve Kaʻūpūlehu Ahupuaʻa, Kona District, Hawaiʻi Island TMK: (3) 7-2-010:022 por.* (Dye and Sholin, February 2014) was accepted by the State Historic Preservation Division of the State of Hawaiʻi Department of Land and Natural Resources on January 7, 2019, and public access improvements have been completed, and opened in accordance with the Kaʻūpūlehu Lot 4-A Comprehensive Public Access Plan. A Declaration of Coastal Planning Area and a Declaration of Covenants, Conditions and Restrictions Regarding Restricted Parcels has been recorded by the State of Hawaiʻi Bureau of Conveyances restricting the uses of those areas.

In addition to the above, since the 2016 Annual Progress Report, KD has processed numerous subdivision and consolidation actions within the development in compliance and consistent with the representations made in Docket No. A93-701, as well as in compliance with the underlying County Project District zoning and the Special Management Area Use Permit for the area. The County of Hawaiʻi also approved of a 20-year extension of the overall development period under the Project District zoning for Lot 4-A and Lot 4-B in 2019.

The following sections are intended to provide a summary of the history of the entitlements on Lot 4-A (Section I), and report on KD's development activities since the adoption of Docket No. A93-701 (Section II), the development plans for beyond 2025 (Section III).

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[2]An entitlement summary was included in the 2008 to 2015 Annual Progress Report to the Commission dated February 18, 2015. Referenced in that report was WB KD Acquisition, LLC's conversion to KD Acquisition, LLLP (which occurred on June 9, 2014).

[3] KD Acquisition, LLLP is developing Increment 1 of Lot 4-A, and KD Acquisition II, LP was created to develop Increment 2 of Lot 4-A.

Attached as "**Exhibit A**" is a chart with the conditions contained in the Findings of Fact, Conclusions of Law, and Decision and Order dated October 18, 2001 in Docket No. A93-701.

I. ENTITLEMENTS HISTORY FOR LOT 4-A

A. State Land Use Urban District reclassification.

The original Petitioner under Docket No. A93-701, Kaupulehu Developments, proposed to develop a residential community consisting of 530 single-family homes and 500 low-rise multiple-family units to complement the adjacent resort development, 36 holes of golf, a golf clubhouse, an 11-acre neighborhood commercial center with 45,000 sq. ft. of leasable space, a 3-acre residents/members recreation club, and a 70-acre area abutting the north boundary of Lot 4-A for public shoreline access facilities, other recreational uses, and cultural activities. The original Findings of Fact, Conclusions of Law, and Decision and Order entered on June 17, 1996 was revised on October 18, 2001, after the Supreme Court in *Ka Pa'akai O Ka 'Āina v. Land Use Comm'n*, 94 Hawai'i 31, 46, 7 P.3d 1068, 1083 (2000), vacated the Commission's Decision and Order and remanded the case for the limited purpose of entering specific findings and conclusions regarding the rights of native Hawaiians and valued native Hawaiian resources.

On October 18, 2001, the Commission issued Docket No. A93-701, which amended the district classification for a majority of Lot 4-A[4] and all of Lot 4-B from the "Conservation District" to the "Urban District"[5].

B. Special Management Area.

On December 4, 1998, the County Planning Commission voted to approve Special Management Area Use Permit No. 389 ("**SMA 389**") to allow the development of a resort residential community within Lot 4-A and Lot 4-B, to include a resident's beach club, golf course and clubhouse, a Hawaiian interpretive center, and other related facilities. SMA 389 was ratified and reaffirmed on December 30, 1999.

C. Project District Re-Zoning.

On April 10, 1999, the County of Hawai'i adopted Project District Ordinance No. 99-42 ("**PDO 99-42**"), which changed the zoning classification for Lot 4-A and Lot 4-B from the "Open" zone to "Project District". PDO 99-42 permitted the

[4] Approximately 37.064 acres within portions of TMK: (3) 7-2-010:022 and 023 at Ka'ūpūlehu were left in the Conservation District, as this area comprises an existing archaeological preserve.

[5] A portion of Ka'ūpūlehu Lot 4-A was previously reclassified from Conservation to Urban in Docket No. A81-524.

development of the same number of dwellings/units and elements allowed under Docket No. A93-701.

The Kaʻūpūlehu Project District established by PDO 99-042 imposed a 20-year development period (Condition B) by which the proposed development activities within the Kaʻūpūlehu Project District would need to be completed by April 10, 2019. On February 20, 2019, the County of Hawaiʻi determined that it was warranted that the development period be extended another 20 years or until February 20, 2039, to complete its remaining development in the Kaʻūpūlehu Project District through the adoption of an amendment to PDO 99-042, which is now Project District Ordinance No. 19-12 ("**PDO 19-12**")(See "**Exhibit B**").

D. Bulk Lot Subdivision Creating Lot 4-A and Lot 4-B.

The County Planning Department approved a 2-lot subdivision under Subdivision No. SUB-7571-Revised on September 18, 2002, which subdivided the development area covered by the subject entitlements discussed above into bulk Lot 4-A (Kaʻūpūlehu) comprised of 876.553 acres and Lot 4-B (portion of Hualālai Resort) comprised of 238.609 acres, respectively, as mentioned earlier.

HILLC became the successor applicant for those lands comprising Lot 4-B on June 1, 2006. KD became the successor applicant for those lands comprising Lot 4-A on June 9, 2014, when WB KD Acquisition, LLC[6] was converted to KD Acquisition LLLP, as was mentioned in our September 21, 2016 Annual Progress Report submitted to the Commission.

II. DEVELOPMENT SUMMARY FOR LOT 4-A

A. Lot 4-A Development Areas.

As mentioned earlier, KD is developing Lot 4-A in two increments, namely "Increment 1" and "Increment 2". In addition to completing the main spine infrastructure servicing the development area, the Interpretive Center, and the opening of the public access areas along the coastline of the Kaʻūpūlehu project, KD's development activities to date have focused on the Increment 1 lands comprising the developable makai oceanfront lands within Lot 4-A.

KD developed Increment 1 in two phases, specifically "Increment 1, Phase 1" and "Increment 1, Phase 2" based on the Project District Site Plan approval issued by the Planning Department on July 2, 2003, which allowed the development of a total of 80 residential lots and implementation of KD's Utility Master Plan.

[6] WB KD Acquisition LLC acquired Lot 4-A from the original applicant, Kaupulehu Developments, a memorandum of which sale was recorded in the Bureau of Conveyances of the State of Hawaiʻi as Document No. 2004-031731. KD is the lessee under that certain Lease No. 29,250 dated May 27, 2000 with Kamehameha Schools.

The vacant Increment 2 lands are located immediately mauka of Increment 1, within TMK Nos.: (3) 7-2-010:023, 024 and a portion of 025. KD plans to develop Increment 2 in one or more phases.

Following the subdivisions of "Increment 1, Phase 1" and "Increment 1, Phase 2", the Planning Department approved 4 additional subdivisions[7] and 15 consolidations[8], which results in a present total of 71 single-family residential lots developed within Lot 4-A, as of the date of this report. We understand that 23 total single-family residences have been built on the single family lots created in Lot 4-A.

The following sections will further describe the other elements developed within Lot 4-A to date.

1. *Increment 1, Phase 1 Development (SUB-7891)*

The Planning Department approved the Increment 1, Phase 1 subdivision on December 30, 2004 under Final Subdivision Approval No. SUB-7891-Revised and this phase consisted of 38 single-family residential lots and 11 bulk lots. The Increment 1, Phase 1 subdivision improvements were completed in 2008. For those single-family lots that have been sold to private owners, the construction of single-family dwellings by these lot owners are expected to continue into the future.

SUB 7891-Revised also created the lot for the Kaupulehu Beach Club, which is located on TMK No. (3) 7-2-031:031. The 3,274 sq. ft. Kaupulehu Beach Club received Final Plan Approval from the Planning Department on August 20, 2007 and the County issued a final inspection for the completed structure on January 20, 2009. KD also completed 5 public access parking stalls located at the Beach Club to facilitate public access to the shoreline. The Beach Club is currently open and available for use by Kaupulehu Beach Club members and their guests.

The above subdivision also included roadway improvements to facilitate access to the future site of the Interpretive Center. The Interpretive Center is a private learning center intended as a place to allow for the sharing of

[7] SUB-14-001448-Revised approved on September 17, 2015 and SUB-13-001254- Revised approved on September 17, 2015; PL-SUB-2022-000062 approved on July 26, 2022, and PL-SUB-2024-000243-Revised approved on October 30, 2024.

[8] SUB-06-000049 approved on July 10, 2006; SUB-06-000068 approved on December 13, 2006; SUB-06-000335 approved on August 24, 2006; CON-12-000223 approved on November 7, 2012; CON-13-000257 approved on January 2, 2014; CON-15-000289 approved on April 13, 2015; CON-15-000294 approved on May 11, 2015; CON-15-000295 approved on May 11, 2015; CON-15-000308 approved on September 16, 2015; and CON-15-000311 approved on October 7, 2015, CON-18-000373 approved on April 25, 2018, CON-18-000388 approved on December 24, 2018, CON-20-000438 approved on January 11, 2021, PL-CON-2022-000016 approved on May 31, 2022, and PL-CON-2022-000014 approved on June 9, 2022.

educational information on the sensitive cultural, natural, and shoreline resources found within the Kalaemanō Cultural Preserve, which comprises a majority of the oceanfront area along the northwestern portion of TMK No. (3) 7-2-010:022.

KD constructed a 900 sq. ft. Interpretive Center within Parcel 22, which also included demonstration lawn, public men's and women's restrooms, as well as 33 public parking stalls, 2 ADA accessible stalls, and 2 bus-parking stalls, which was completed on February 7, 2008. (See "**Exhibit C**" - Interpretive Center Photo).

In 2013, KD also constructed a 530 sq. ft covered trellis to provide another shaded area for the Interpretive Center visitors. (*Ref*. "Exhibit C" - Interpretive Center photo; See "**Exhibit D**" - Trellis Signage photo).

The lineal descendants from Kaʻūpūlehu requested that KD relocate the Star Compass[9] from TMK No. (3) 7-2-012:008 within the Hualalai Resort to the Interpretive Center, in addition to constructing a Hālau Waʻa (canoe hale) adjacent thereto. The Hālau Waʻa and Star Compass are accessible through a path extending from the existing public parking lot area. These improvements were completed in 2018. (See "**Exhibit E**" - Hālau Waʻa and Star Compass photos). While the Interpretive Center and all of the related public access improvements have been completed for some time, and access was provided to cultural practitioners and the area's lineal descendants, the public access improvements were opened to the general public in an unrestricted basis on February 20, 2020 in compliance with the requirements of PDO 19-12 and the Kaʻūpūlehu Lot 4-A Comprehensive Public Access Plan, based on available parking (as noted below, a total of about 77 stalls are available)[10]. (See "**Exhibit F**" - Public Access Signage photos).

Although the Interpretive Center is a private facility, it is open for guided tours and is regularly visited by schools and other groups by appointment only. The guided tours for the schools usually consist of visits to the Interpretive Center to allow for lessons on celestial navigation and tours to the various cultural sites within the Kalaemanō Cultural Preserves, such as

[9] A star compass charts the rising and setting of stars used traditionally to navigate ocean voyages.

[10] On January 7, 2019, the SHPD approved the "*Revised Long-term Preservation Plan for Kalaemanō Cultural Reserve Kaʻūpūlehu Ahupuaʻa, Kona District, Hawaii Island TMK: (3) 7-2-010:022 por*." prepared by Dye and Sholin, dated February 2014. With this approval, KD commenced with the implementation of the preservation measures approved by this report, which was a necessary component to allowing the opening the completed public access improvements within Lot 4-A. The approval of the report allowed KD to implement required mitigative measures, such as the preservation site buffers, and the installation of path improvements with interpretive and directional signage to facilitate public access from the Interpretive Center through the rocky Kalaemanō Cultural Preserve to the shoreline.

the salt pans, with the objective to provide students with an opportunity to learn about cultural practices from old Hawai‘i. The completion of the Hālau Wa‘a served to further enhance the cultural and educational experience for the Interpretive Center user and the Ka‘ūpūlehu lineal descendants.

Under normal operations, through the direction of the area kūpuna and lineal descendants, all public access users are welcomed at the existing Greeter Station and provided with a parking pass, an informal orientation on the Kalaemanō Cultural Preserve and use of the shoreline area, and a self-guided walking tour brochure that serves to enhance the visitor experience. Since there are vast amounts of preservation sites and areas currently being utilized for cultural practices within Lot 4-A, the informal orientation and self-guided walking tour brochure are intended to educate the public on the proper use of the identified public access areas to minimize impacts to the sensitive sites. KD's greeters are also using the orientation to educate the public about navigating the very rugged shoreline terrain and often hazardous sea cliffs. Coupled with the Ka‘ūpūlehu Marine Reserve, which the State established on July 29, 2016 to prohibit the taking or possession of any aquatic life within the preserve boundary for 10 years, KD anticipates that the typical public access user will consist of those individuals interested in learning about the Kalaemanō Cultural Preserve or those that plan to hike the rugged shoreline.

The shoreline area is almost entirely devoid of any ocean-accessible sandy beach areas, which is not conducive for typical ocean activities such as swimming.

When the parking lot at the Interpretive Center public parking lot reaches max capacity, the general public is directed to 2 other public access parking lots located at the: (1) South Public Parking Lot #1, located adjacent to the Hualalai Resort/Kukio Resort boundary consisting of 59 standard paved stalls and 8 graveled stalls, and North Public Parking Lot #2, located adjacent to the Hualalai Resort/Kona Village Resort boundary consisting of 10 paved stalls, for a total of 77 public access stalls available for public use. To read more about the Kalaemanō Cultural Reserve see http://www.kalaemano.com/.

2. *Increment 1, Phase 2 (SUB-05-000066-Revised)*

The Planning Department approved the Increment 1, Phase 2 subdivision on November 22, 2006, consisting of 42 single-family residential lots. The Increment 1, Phase 2 subdivision improvements were completed in

2016 and construction of single-family dwellings continues and is expected extend into the near future.

III. DEVELOPMENT PLANS FOR LOT 4-A (INCREMENT 2) AND BEYOND 2025

Although faced with a challenging real estate market and impacts from the recent COVID pandemic, KD has completed its initial phases and has invested in the development of the required infrastructure; roads, water supply, sewage treatment, power supply, and grading and excavation; all of which will meet the needs of the community. These investments required a substantial infusion of funds for infrastructure improvements, consultant fees, and labor costs toward the goal of realizing the full development of the Property.

KD, as the master developer of the Kaʻūpūlehu Project District, is actively seeking partners to continue the development under Docket No. A93-701, however, finding such partners has been challenging. While KD has achieved much success in implementing its initial increment in a way that is harmonious with the historical and cultural foundations of the area, having to navigate multiple economic recessions, in addition to other significant events, such as the lingering impacts of the pandemic, its impact of the global economy, escalating interest rates and rising construction costs, the diminished local supply of labor, and ultimately unfavorable real estate market conditions, these factors have ultimately affected KD's ability to find venture partners.

Despite these significant issues that have faced the development, KD has completed a majority of the community benefit and public access elements required for the Kaʻūpūlehu Project District, such as the Interpretive Center with the public restrooms and public parking stalls, facilitating public access to the shoreline and cultural features in the area, which the public currently enjoys.

KD has also consulted with the Kaʻūpūlehu Development Monitoring Committee ("**KDMC**") and the lineal descendants from the area to develop an appropriate management plan to ensure the protection of all archaeological, cultural and natural resources along the shoreline.

Regarding affordable housing, by letter dated April 9, 2008, the County of Hawaiʻi Planning Department confirmed that KD satisfied its affordable housing obligations for Increment 1 consisting of 80 single-family lots, and that any further development within Increment 2 would require compliance with the current affordable housing requirements of Hawaiʻi County Code Chapter 11, which is currently 20% of the market units for the remainder of the development ("**Exhibit G**").

In response to the Commission's request for updated contact information for the ownership[11] of the properties, please note the following:

KD Acquisition, LLLP / KD Acquisition II, LLP
P.O. Box 5349
Kailua-Kona, Hawai'i 96720
Attn: Kevin Allen
E-mail: kallen@kukio.com
Telephone No.: (602) 403-7469

Trustees of the Estate of Bernice Pauahi Bishop
Kamehameha Schools
567 South King Street
Honolulu, Hawai'i 96813
Attn: Tee Suntharo
E-mail: tesuntha@ksbe.edu
Telephone No.: (808) 534-6200

We thank the Commission for allowing us to provide this combined 2017 to 2025 Annual Progress Report. If you have any questions regarding this request or if you require additional information, please feel free to contact me or my paralegal Jason Knable at 935-6644 at any time. Thank you.

Sincerely,

Katherine A. Garson

KAG/jkk1

Enclosures

cc: KD Acquisition, LLLP
KD Acquisition II, LP
County of Hawaii Planning Department
State of Hawaii Office of Planning and Sustainable Development

[11] Note that although lots within Lot 4-A to third parties, KD Acquisition, LLP and KD Acquisition II, LLP remain the developers of Lot 4-A.

KD Acquisition, LLLP and KD Acquisition II, LP (fka WB KD Acquisition, LLC and KD Acquisition II, LLLP)
(collectively the "Successor Petitioner")
State Land Use Commission Docket Nos.: A93-701
Effective Date: October 18, 2001
2017 to 2025 Annual Report

State Land Use Commission Docket No.: A93-701 ("SLUC A93-701") - Compliance with Conditions of Approval

The Successor Petitioner is processing the development of Lot 4-A in two (2) increments, which are noted as follows:

1) The "Increment 1 Development" shall refer to the development area comprised of the Interpretive Center located on TMK: (3) 7-2-010: Portion of 022, the Members' Beach Club located on TMK: (3) 7-2-031:031, and the single-family residential lots developed into two (2) phases; Phase 1 (originally 38 residential lots)(File Plan 2393) now; and Phase 2 (originally 42 residential lots)(File Plan 2438).

2) The "Increment 2 Development" shall refer to the development area intended to be comprised of approximately 391 residential units, outdoor recreational facilities, and the related infrastructure located within TMK Nos.: (3) 7-2-010:023 and portions of 024, and 025.

The Successor Petitioner's compliance with the conditions of approval for each increment are either addressed collectively as the "Kaupulehu Project" or noted separately by increment, as applicable.

No.	Condition	Status	Comments
1a.	Petitioner shall initially establish and annually provide reasonable operating and capital expenditure costs through revenues from the Project and assessments, a Kaupulehu Development Monitoring Committee (KDMC) composed of: (1) person of native Hawaiian ancestry who is knowledgeable regarding the type of cultural resources and practices within the Petition Area, as selected by the LUC from a list of three names submitted by each of the parties based on review of their resumes and a formal interview process; and (2) a management member knowledgeable regarding the type of cultural resources and practices within the Petition Area, as selected by Petitioner and landowner. The individuals making up the KDMC shall operate on an equal vote basis. In the event that the individuals making up the KDMC cannot agree on specific decision, they shall jointly select a third person to break the tie.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. Hannah Kihalani Springer was selected to be the native Hawaiian representative on the KDMC pursuant to the D&O Approval Selection of Native Hawaiian Committee Member to the KDMC dated 05/13/02. Leina`ala Keakealani Lightner was selected as the Successor Petitioner's appointee to the KDMC. Pursuant to the KDMC Operational Plan, each KDMC member shall serve a 5-year term. The first 5-year term for Ms. Springer and Ms. Lightner expired on 04/09/07. Although the terms for Ms. Springer and Ms. Lightner were extended for an additional 5 years ending in 04/07/12, they continue to serve the KDMC in their original capacity. <u>REFERENCE</u>: 1) KDMC term extension letter (April/May 2007) 2) KDMC Letter (05/07/2012) 3) KDMC Letter (02/25/2025)
1b.	The KDMC shall be established by Petitioner no later than six months from the issuance of this decision and order. Upon establishment of the KDMC, Petitioner shall provide a written report to the Land Use Commission, the Office of Planning, and the County	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The KDMC was established and commenced operations on 04/25/02. The KDMC Operational Plan was submitted to the Commission on 03/08/02.

	of Hawaii with details as to its composition, structure, operating costs and compensation for members and staff, procedures, and plan of action to be approved by the Land Use Commission.		<u>REFERENCE:</u> 1) KDMC Operational Plan
1c.	The KDMC shall jointly decide on an equal vote basis monitoring and dispute resolution decisions related to the protection of native Hawaiian practitioner's exercise of customary and traditional practices and rights as described above; the availability of natural and cultural resources for present and future generations; and appropriate access in the subject areas to the extent that these rights are protected by PASH vs. Hawaii County Planning Commission, 79 Haw. 425, (1995), in perpetuity. In the event that the two person KDMC cannot agree on a specific decision, they shall jointly select a third person to break the tie. A certified description of any action requiring section of a third member of the KDMC shall be filed with the Land Use Commission.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The KDMC Operational Plan outlines monitoring and dispute resolution decisions. Pursuant to the charter of duties established in the KDMC Operational Plan, the KDMC members continue to monitor and make recommendations relating to the maintenance and or preservation of traditional and customary native Hawaiian practices and cultural resources. <u>REFERENCE:</u> 1) KDMC Operational Plan
1d.	The KDMC shall monitor the quality of the salt gathering resource and the effectiveness of the Petitioner's actions to provide access to and/or preserve and maintain traditional and customary native Hawaiian practices and cultural resources. The KDMC shall provide recommendations consistent with this decision and order to the Land Use Commission with respect to maintenance and/or preservation of those traditional and customary native Hawaiian practices and cultural resources.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The KDMC members continue to monitor the salt gathering and the Successor Petitioner's actions to allow to adequate traditional and customary native Hawaiian access. "Salt Pans and Quality of Salt from Kalaemano, Lot 4 Project Site" (March 2008, Environmental Assessment, LLC) was reviewed and approved by the KDMC and submitted to the County of Hawaii Planning Department ("PD"), LUC, DLNR and DOH Clean Water Branch on 02/10/09. <u>REFERENCE:</u> 1) The "Salt Pan Monitoring Plan" (Marine Research Consultants, 5/23/00) 2) DOH approval (01/11/05) - "Proposed Water Quality/Salt Pan/Marine Life Monitoring Program for Kaupulehu Lot 4-A" (Environmental Assessment, LLC, 4/26/04) 3) Reviewed and approved by the KDMC; and submitted to the PD, LUC, DLNR, and DOH Clean Water Branch (02/10/09) - "Salt Pans and Quality of Salt from Kalaemano, Lot 4 Project Site" (Environmental Assessment, LLC, March 2008)
1e.	The KDMC shall provide reports on an annual basis describing items and issues covered in their deliberations and any other findings and recommendations.	On-going	The Successor Petitioner shall work with the KDMC members to comply with this condition for the Kaupulehu Project. As noted in the KDMC Operational Plan, the level of KDMC activities will vary with respect to different phases of project development. Because the Pre-construction Phase and Construction Phase (construction of major project

			components, other than private home construction on single-family lots) have been completed for the Increment 1 development of Lot 4-A, the KDMC has been focused on monitoring the site and the Interpretive Center., REFERENCE: KDMC Letter (02/25/2025)
2a.	Petitioner shall establish a 235-acre resource management area to maintain, protect, and preserve the exercise of traditional and customary practices and cultural resources within the Petition Area consistent with this decision and order. Petitioner shall establish an annual budget for maintaining the resource management area including the costs for administration, infrastructure, capital costs, security and educational personnel to be approved by the KDMC. Excluding the approx. 37.064-acre archaeological preserve, which will be retained in the Conservation District, the resource management area shall encompass approx. 198 acres.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. Pursuant to the provisions of the "Kaupulehu Integrated Resources Management Plan" ("IRMP") (Belt Collins Hawaii, Ltd., 6/17/98), a 235-acre resource management area, designated as "coastal planning areas", was established and recorded under the Declaration of Coastal Planning Area on 11/10/04 (Document No.: 2004-228042 (duplicate recorded 11/16/2004 as Document No. 2004-230820). REFERENCE: 1) Declaration of Coastal Planning Area (11/10/04) (BOC Document No.: 2004-228042) The Successor Petitioner funds the annual budget for the maintenance of the resource management area. The KDMC will review and approve the annual budget upon turnover by the Developer. The resource management area encompasses 203.5 acres, as the Successor Application has excluded the 37.064-acre archaeological preserve (Subzone C) from this area. The following is a breakdown of the various subzones within the resource management area: Subzone A: 104.221; Subzone B1 = 31.961 acres; Subzone B2 = 19.660 acres; Subzone B3 = 47.656 acres.
2b.	The resource management area shall contain five subzones. The delineation of the five subzones shall be based upon the resources and activities within each respective subzone and the management and preservation measures to be employed with regard to those resources as set forth in the decision and order. All five subzones will be linked by public access way consisting of portions of the historic coastal trail and new pedestrian paths. Petitioner shall provide metes and bounds map and description of boundaries of each of the subzones to the Land Use Commission within six months of the issuance of this decision and order.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The metes and bounds map and description of the boundaries of each of the five (5) subzones was submitted to the SLUC on 11/14/02, and recorded with the State Bureau of Conveyances on 11/10/04 by way of Declaration of Coastal Planning Area (Document No.: 2004-228042). REFERENCE: 1) Declaration of Coastal Planning Area (11/10/04) (BOC Document No.: 2004-228042).
2c.	Subzone A shall be designated for preservation of salt gathering, the coastal trail, coastal views, and archaeological sites. Petitioner shall prohibit any ground-disturbing activity within the subzone except for pedestrian paths or other public access improvements that may be required by the State of County. Public access will be provided to	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The provisions for restricted activity and public access within Subzone A are addressed in the following documents on file with the Commission.

	and within this subzone over the shoreline, historic coastal trail, and other onsite pedestrian pathways.		REFERENCE: 1) Kaupulehu Lot 4-A Comprehensive Public Access Plan ("CPAP") September 2004). 2) Declaration of CC&Rs' regarding Restricted Parcels (Recorded on 12/23/05; Document No.: 2005-262407), as amended by instrument dated September 26, 2007, recorded as Document No. 2007-170884, and dated February 11, 2016, recorded as Document Nos A-58910413A through A-58910413B. 3) Declaration of Coastal Planning Area (Recorded on 11/10/04; Document No.: 2004-228042) [A = 104.221 acres]
2d.	Subzone B shall be divided into three components, B1, B2, and B3. Subzone B1 shall include approximately 30 acres, and will be designated as an activity-oriented area for public access parking. Subzone B2 shall include approximately 15 acres and traverse the coastal edge of the 1800-1801 lava flow over a distance of approximately 3,900 feet along the coast and at least 100 feet inland from the certified shoreline, and in some instances 300 feet. It will preserve the coastal trail and the shoreline resources. Subzone B3 shall include approximately 49 acres surrounding Kona Village Resort, and will provide a buffer to reduce visual and other impacts to the Kona Village Resort. This buffer are will be restricted to open space uses such as golf course and related improvements, landscaping, infrastructure, existing heliport, and other uses which may be acceptable to Kona Village Resort.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The provisions for restricted activity and public access within Subzone B1, B2, and B3 are addressed in the following documents on file with the Commission. REFERENCE: 1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&Rs' Regarding Restricted Parcels (Recorded on 12/23/05; Document No.: 2005-262407), as amended. 3) Declaration of Coastal Planning Area (Recorded on 11/10/04; Document No.: 2004-228042) [B1 = 31.961 acres; B2 = 19.660 acres; B3 = 47.656 acres]
2e.	Subzone C shall consist of approximately 37 acres just inland of Kona Village Resort and will be an archaeological preserve for 38 archaeological sites containing 191 separate features, as identified in the archaeological inventory level survey conducted by Paul H. Rosendahl, Inc. Improvements in this subzone will be limited to interpretive signage and trail maintenance.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The provisions for restricted activity and public access within Subzone C are addressed in the following documents on file with the Commission. REFERENCE: 1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&Rs' regarding Restricted Parcels (Recorded on 12/23/05; Document No.: 2005-262407) as amended. 3) Declaration of Coastal Planning Area (Recorded on 11/10/04; Document No.: 2004-228042) [C = 37.064 acres]
3a.	Petitioner shall preserve and protect the gathering and access rights of native Hawaiians by providing appropriate access to the salt gathering resource at Kalaemano and fund adequate security and maintenance to maintain trails and salt gathering areas in accordance with traditional and customary native Hawaiian practices located within Subzone A as decided and monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The access provisions of this condition are included and addressed in the IRMP and the Kaupulehu Lot 4-A CPAP. The Successor Petitioner funds the annual budget for the maintenance and security of the resource management area, which was done in consultation with and is monitored by the KDMC.

3b.	Petitioner shall preserve and protect the gathering for cultural purposes including religious practice by providing appropriate access to burial sites and other archaeological sites within the Petition area consistent with this decision and order. Petitioner shall adhere to prevailing and/or published protocols of the Hawaii County Burial Council and/or State Historic Preservation Division where these sites are found to exist as monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The approved "Archaeological Site Preservation Plan" addresses public access to archaeological sites, as monitored by the KDMC members. <u>REFERENCE:</u> 1) Hawaii Island Burial Council approval (08/15/02): "Burial Treatment Plan - Kaupulehu Resort Expansion Project" 2) DLNR- State Historic Preservation Division ("SHPD") (08/19/02): "Burial Sites Program" 3) SHPD approval (08/14/03): "Archaeological Data Recovery and Interim Site Preservation Plans, Remainder of Lot 4, Kaupulehu Makai" (October 2002) 4) DLNR-SHPD submittal (02/12/08): "Archaeological Data Recovery, Kaupulehu Makai, Reminder of Lot 4" (January 2008) 5) SHPD approval (08/8/08): "Archaeological Site Preservation Plan" (January 2008) 6) SHPD approval (01/07/19) - Revised Long-term Preservation Plan for Kalaemano Cultural Reserve in Subzones A and B-1.
3c.	Pele worship shall be allowed to continue however, it shall not be further allowed in the portion of the 1800-1801 Hualalai lava flow to be developed. There is no reference in the record to a specific site on the flow that has been utilized for such worship. Therefore, the Land Use Commission is not designating a specific site. However, if the KDMC should identify a specific site in the course of their monitoring of Petitioner's efforts to maintain and/or preserve traditional native Hawaiian cultural resources, it shall forward its recommendation to the Land Use Commission for its approval that such site be designated for Pele worship.	Satisfied and On-going	The Successor Petitioner has complied and shall continue to comply with this condition for the Kaupulehu Project. To date, the KDMC has not reported observing or being aware of any Pele worship activities occurring on within the development, therefore, the KDMC has not identified a specific site for Pele worship.
3d.	Petitioner shall initiate and fund a nearshore water quality monitoring program. The parameters of the monitoring program shall be approved by the State Department of Health (DOH). Petitioner shall provide regular reports to the Land Use Commission and the KDMC as to the findings of this water quality monitoring program.	Satisfied and On-going	The Successor Petitioner shall continue to comply with this condition for the Kaupulehu Project. Environmental Assessment, LLC prepared regular monitoring reports on the nearshore water quality, copies of which were provided to the Commission, PD, DLNR, DOH/Clean Water Branch, and the KDMC. Governor Ige also approved the creation of a new marine reserve at Kaupulehu via rule on July 29, 2016. The rule established a 10-year no take "rest period" (with limited exceptions) to allow for the recovery of reef fish stocks. In 2018 Environmental Assessment, LLC indicated that with the University of Hawaii and Nature Conservancy monitoring the changes occurring o the nearshore natural resources as they related to the area closure, the Kalaemano

			marine biological monitoring program which only sampled twelve sites may be redundant. The County of Hawaii Planning Director in a letter dated August 8, 2019 acknowledging the Annual Water Quality/Marine Life/Salt Plan Monitoring Report submitted in compliance with Conditions 3(d) and 31 of LUC Docket No. A93-701 and a corresponding condition in an SMA permit stated that the condition was "satisfied" and requested review/discussion of future marine community monitoring reports conducted by other parties be included in the annual progress reports. Please see: https://www.pacioos.hawaii.edu/metadata/hi_tnc_bigi_kaupulehu_monitoring.html https://www.nature.org/content/dam/tnc/nature/en/documents/Kaupulehu-Marine-Reserve-4-Year-Update-March-2022.pdf https://static1.squarespace.com/static/664f8561ed215d00fe279f70/t/664f998b0e10c12d20895db1/1716492704425/Kaupulehu+Marine+Reserve+6-Year+Update.pdf REFERENCE: 1) DOH submittal (PBR, 09/16/04): "Proposed Water Quality/Salt Pan/Marine Life Monitoring Program for Kaupulehu Lot 4-A" 2) DOH Letter (01/11/05) 3) PD acknowledgement letter (02/08/06) 4) PD submittal (WB KD, 05/13/13): "2012 Annual Water Quality Monitoring Report, Kalaemano, North Kona (Jan. 2013; EAC Report No. 2013-01)" and "Quantitative Assessment of the Marine Communities Fronting the Kalaemano Development - 2012 Annual Survey (Jan. 2013; EAC Report No. 2013-02)". 5) PD submittal (Kaupulehu) 2017 and 2018 Annual Water Quality Monitoring Reports in Support of Development at Kalaemano; 2017 Annual Survey - Quantitative Assessment of the Marine Communities Fronting the Kalaemano Development (Oct. 2017) & Rationale For Not Having Carried Out A Marine Biological Survey For The Ka Lae Mano Project Site In 2018. 6) PD letter (08/08/19) - Marine community monitoring and reporting requirement satisfied. 7) Annual Report 2019 Monitoring of Marine Waters, Groundwater, and Marine Communities in the vicinity of the Ka'upulehu Development, North Kona, Hawaii (April 2020) - See attached.
4	Petitioner shall to the extent feasible inventory non-renewable resources such as Pele's Tears found at the makai edge of the 1800-1801 Hualalai lava flow located in Subzones A, B2, and B3. The	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project.

	KDMC shall review this inventory and recommend to the Land Use Commission methods to preserve, protect, exhibit, or provide appropriate access to any such resource in its six-month plan for the LUC approval.		The Successor Petitioner has surveyed the described location and has not found any Pele's Tears.
5	Petitioner shall provide appropriate access to the shoreline of the Petition Area to preserve and protect access rights of native Hawaiians and the general public to Kupe`e shells that may be found along the shoreline as monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. All public access improvements per the CPAP were completed in 2008, and access to the public was provided upon completion of archaeological preservation measures. REFERENCE: 1) PD approval (09/29/04) - Kaupulehu Lot 4-A CPAP
6a.	At a minimum, to preserve and protect mauka and makai view planes and the shoreline as a site for spiritual meditation and educational practices, Petitioner shall cause to be established a setback zone of 75 feet from the certified shoreline within which there shall be no improvements of any kind other than improvements which may be reasonably necessary for purposes of public safety, and where the property will be left in its natural state; provided that certain golf holes may be allowed within the setback subject to mutual agreement between Petitioner, the Department of Land and Natural Resources, and the Office of Planning.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. REFERENCE: 1) PD approval (07/02/03) - Project District Site Plan 2) PD approval (5/10/05) - "Kaupulehu Design Guidelines"
6b.	At a minimum, to preserve and protect mauka and makai view plans and the shoreline as a site for spiritual meditation and education practices, Petitioner shall prohibit any residential development or vertical improvements, other than landscaping and improvements allowed by County ordinance or variance, to be constructed or erected within 150 feet of the certified shoreline.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. REFERENCE: 1) PD approval (7/02/03) - Project District Site Plan 2) Section 5.2 of the Kaupulehu Lot 4-A Declaration of Covenants, Conditions and Restriction, recorded on 12-23-2005 as Doc No.(s) 2005-262401 thru 2005-262403, also provides restrictions within a zone 150 feet from the certified shoreline, where no residential development or vertical structures may be located except for landscaping and improvements allowed by County ordinance or variance.
7a.	The proposed mitigation commitments for all identified sites with burials must be submitted to the State Historic Preservations Division's Hawaii Island Burial Council for vote on the mitigation proposals. Once a decision is made by the Council, then the mitigation commitments for those sites will be finalized. A burial treatment plan for the mitigation treatment for those sites must then be approved by the State Historic Preservation Division, in consultation with their Hawaii Island Burial Council, and a certified copy of said plan shall be filed with the LUC prior to any land	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The KDMC members continue to monitor the mitigation protocols for the identified burial sites. REFERENCE: 1) Hawaii Island Burial Council approval (8/15/02) - "*Burial Treatment Plan"* and mitigation treatment for those sites was approved by SHPD-Burial Sites Program (8/19/02).

	alteration in the vicinity of these sites as monitored by the KDMC. Mitigation commitments shall be monitored by the KDMC.		
7b.	For all sites approved by the State Historic Preservation Division (SHPD) to undergo archaeological data recovery, an archaeological date recovery plan (scope of work) must be prepared by Petitioner. This plan must be approved by the SHPD and a certified copy of said plan shall be filed with the LUC prior to any land alteration in the vicinity of these sites. The approval plan will be monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. REFERENCE: 1) SHPD approval (8/14/03) - "Archaeological Data Recovery and Interim Site Preservation Plans, Remainder of Lot 4, Kaupulehu Makai" 2) DLNR-SHPD submittal on 2/12/08 - "Archaeological Data Recovery, Kaupulehu Makai, Remainder of Lot 4" (January 2008) 3) SHPD approval (8/08/08) - "Archaeological Site Preservation Plan"(January 2008) [Note: Successor Petitioner needs to confirm that a certified copy of said plan was filed with the LUC].]
7c.	For all sites approved for preservation by the State Historic Preservation Division (SHPD), a preservation plan must be prepared by Petitioner. (Burial sites may be covered under the burial treatment plan.) This plan must include buffer zones/interim protection measures during construction, and long-range preservation (including public access and interpretation, where appropriate). The plan must include input from the local native Hawaiian community and relevant Hawaiian groups. The plan must be approved by the SHPD and a certified copy of said plan shall be filed with the LUC prior to any land alteration in the vicinity of these sites. The approval plan will be monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. REFERENCE: 1) SHPD approval (8/8/08) - "Archaeological Site Preservation Plan, Lot 4A, Kaupulehu Makai" (January 2008) 2) SHPD approval (01/07/19) - Revised Long-term Preservation Plan for Kalaemano Cultural Reserve
7d.	Petitioner shall immediately stop work and contact the SHPD should any previously unidentified archaeological resources such as artifacts, shell, bone or charcoal deposits, human burials, rock or coral alignments, pavings or walls be encountered during Project development. Mitigation and preservation shall be monitored by the KDMC.	**Satisfied /On-going**	The Successor Petitioner has satisfied this condition for the Increment 1 Development and shall comply with this condition when further developing the Increment 2 Development. Section 5.10 of the Kaupulehu Lot 4-A Declaration of Covenants, Conditions and Restriction, recorded on 12-23-2005 as Doc No(s) 2005-262401 thru 2005-262403 also provides that if a subsequent owner of a lot within the various increments discovers the existence of a previously undiscovered site, they are to stop work and notify the Kaupulehu Lot 4-A Community Association, Inc. immediately, so appropriate measures can be taken in coordination with the SHPD.
8	Petitioner shall preserve and protect the coastal trail in its entirety and portions of the mauka-makai trail located within the Resource Management Area and Petition Area with interpretive development, pursuant to the recommendations of Paul H. Rosendalh, Inc., and as approved by the State Historic Preservation Division to manage this cultural resource. Preservation and protection shall be monitored by the KDMC.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. The KDMC members monitor the coastal and mauka-makai trails and collaborates with National Park Service ("NPS") Ala Kahakai Trail Program on trail preservation and interpretation. REFERENCE:

			1) PD approval (09/29/04) - Kaupulehu Lot 4-A CPAP 2) SHPD approval (8/08/08) - "Archaeological Site Preservation Plan" (January 2008)
9	Petitioner shall initiate and fund a program to monitor the populations of threatened and endangered green sea turtles, hawksbill turtles, and humpback whales, as required by the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the State Division of Aquatics Resources. Mitigation measures shall be implemented by Petitioner if the results of the monitoring program warrant them. Mitigation measures shall be approved by the US Fish and Wildlife Service, the National Marine Fisheries Service, and Department of Land and Natural Resources.	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. As recommended by the U.S. Fish & Wildlife Service in its 12/16/02 letter, the Successor Petitioner will continue to monitor the area. <u>REFERENCE:</u> 1) DLNR Letter (06/19/02) 2) National Ocean and Atmospheric Administration ("NOAA")/National Marine Fisheries Service ("NMFS") Letter (09/18/02) 3) U.S. Fish and Wildlife Service ("USFWS") Letter (12/16/02)
10	Petitioner shall conduct biological survey for terrestrial invertebrates, the Hawaiian Hoary bat, and Kona Nightingale (feral donkey), prior to submitting an application for rezoning to the County of Hawaii. Petitioner shall consult with the U.S. Fish and Wildlife Service prior to initiating the study, regarding the content and completeness. The study shall be accepted and approved by the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service must also verify in writing the successful execution of the study, and the implementation of the mitigation/preservation plan.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. <u>REFERENCE:</u> 1) USFWS Letter (09/11/98) - "Avifaunal and Feral Mammal Survey of Kaupulehu Phase 2 Expansion Project, North Kona, Hawaii" (Belt Collins, 02/9/94)
11	Petitioner shall provide affordable housing opportunities for low, low-moderate, and gap group income residents in the State of Hawaii to the satisfaction of the County of Hawaii. The location and distribution of the affordable housing or other provisions for affordable housing shall be under such terms as may be mutually agreeable between Petitioner and the County of Hawaii.	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Increment 1 Development and shall comply with this condition when it commences development of the Increment 2 Development. <u>REFERENCE:</u> 1) County PD letter (04/9/08) - Agreement for Assignment of Affordable Housing Credits between Seascape Development LLC and the Successor Petitioner (09/15/06)
12	Petitioner shall implement effective soil erosion and dust control measures during and after construction to ensure that the development activities of the Petitioner shall not impact the salt gathering resources at Kalaemano located within subzone A of the Resources Management Area and other resources. Such measures shall be to the satisfaction of the State Department of Health and the County of Hawaii.	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Increment 1 Development and shall comply with this condition when it commences development of the Increment 2 Development. Soil erosion and dust control measures are mitigated in the Increment 1 Development as required by the approved Grading plans and permits, Drainage Plan, and through developer and individual contractor Best Management Practices, as required and monitored by DOH/NPDES Permit No. HI S000124, which expired on April 18, 2018.
13	Petitioner shall develop a solid waste management plan in conformance with the Integrated Solid Waste Management Act, Chapter 342G, Hawaii Revised Statutes. Petitioner's solid waste	**Satisfied**	The Successor Petitioner satisfied this condition for the Increment 1 Development through the County's issuance of Final Subdivision Approval as

	management plan shall be approved by the County of Hawaii Department of Public Works.		referenced below. The Successor Petitioner shall continue to comply with this condition when further developing the Increment 2 Development. REFERENCE: 1) DPW- Department of Environmental Management ("DEM") approval (7/6/04) - "Solid Water Management Plan for Kaupulehu Lot 4-A, Phase 1 (May 2004)" 2) Increment 1, Phase 1 (SUB 7891) - Final Subdivision Approval ("FSA") (12/30/04) 3) Increment 1, Phase 2 (SUB 05-000066): FSA (11/22/06) 4) Increment 1, Phase 2 (SUB 05-000066 Revised): FSA (02/21/07) 5) Increment 2, Phase 1 (SUB 13-001254): FSA (06/09/14)
14	Petitioners shall fund and construct adequate wastewater treatment, transmission and disposal facilities, as determined by the State Department of Health and the County of Hawaii.	**Satisfied**	The Successor Petitioner satisfied this condition for the Increment 1 Development through the County's issuance of Final Subdivision Approval as referenced below. The Successor Petitioner shall continue to comply with this condition when further developing the Increment 2 Development. REFERENCE: 1) Increment 1, Phase 1 (SUB 7891) - FSA (12/30/04) 2) Increment 1, Phase 2 (SUB 05-000066): FSA (11/22/06) 3) Increment 1, Phase 2 (SUB 05-000066 Revised): FSA (02/21/07) 4) Increment 2, Phase 1 (SUB 13-001254): FSA (06/09/14)
15	Petitioner shall participate in air quality monitoring program as specified by the State Department of Health.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project, as the DOH has not specified an air quality monitoring program for the project and/or surrounding areas.
16	Petitioner shall fund and construct adequate civil defense measures as determined by the State and County of Hawaii civil defense agencies.	On-going	The Successor Petitioner shall continue to comply with this condition for the Kaupulehu Project. The Successor Petitioner has consulted with the County of Hawaii Civil Defense Agency and Fire Dept., and the State of Hawaii, Department of Defense ("DOD") on the appropriate civil defense measures. By letter dated 09/9/04, the DOD identified the coverage area and civil defense equipment to be installed as part of the development. The Successor Petitioner will coordinate with the County of Hawaii Civil Defense Agency on implementation of the civil defense siren. REFERENCE: 1) "Emergency Preparedness & Response Plan Kaupulehu Lot 4A Residential Community" (06/4/04) 2) County of Hawaii Civil Defense Agency and Fire Department approval of Kaupulehu Emergency Plan (07-20-2004). 2) DOD Letter (09/09/04)

17	Petitioner shall provide a fair-share contribution for school facilities as mutually agreed upon with the Department of Education. The contribution may be combination of land and/or cash required to address the impact on school facilities.	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Increment 1 Development and shall comply with this condition when it commences development further developing the Increment 2 Development. REFERENCE: 1) "Educational Contribution Agreement for Kaupulehu Lot 4-A" (Phase I - 4/28/05; Phase II - 07/07/05)
18	Petitioner shall fund, design and construct necessary local and regional roadway improvements necessitated by the proposed development in designs and scheduled accepted by the State Department of Transportation and the County of Hawaii.	**Satisfied and On-going**	The Successor Petitioner satisfied this condition for the Increment 1 Development through the County's issuance of Final Subdivision Approval as referenced below. The Successor Petitioner shall continue to comply with this condition when it commences development of the Increment 2 Development. REFERENCE: 1) Increment 1, Phase 1 (SUB 7891) - FSA (12/30/04) 2) Increment 1, Phase 2 (SUB 05-000066): FSA (11/22/06) 3) Increment 1, Phase 2 (SUB 05-000066 Revised): FSA (02/21/07) 4) Increment 2, Phase 1 (SUB 13-001254): FSA (06/09/14) 5) Carlsmith Ball transmittal to DOT (04/15/10): Updated Traffic Signal Warrants and Traffic Monitoring Program (11/25/09, PB Americas, Inc.)
19	Petitioner shall fund and construct adequate water source, storage and transmission facilities and improvements shall be coordinated and approved by the appropriate State and County agencies.	**Satisfied and On-going**	The Successor Petitioner satisfied this condition for the Increment 1 Development through the County's issuance of Final Subdivision Approval as referenced below. The Successor Petitioner shall continue to comply with this condition when it commences development of the Increment 2 Development. The Successor Petitioner completed the private water system for the Increment 1, Phase 1 subdivision and the public utility water company now operates the water system. The Successor Petitioner has also bonded the private water systems for the Increment 1, Phase 2 and Increment 2, Phase 1 subdivisions and construction of these improvements are pending completion. The private water system will not be dedicated to the County of Hawaii. REFERENCE: 1) Department of Public Works ("DPW") approval letter (08/03/00) - Water Resource Management Plan for Hualalai Resort, Increment 2, Kaupulehu, North Kona, Hawaii (July 2000); Water Resource Management Plan for Public Water System 163 Kaupulehu (May 2004) 2) Increment 1, Phase 1 (SUB 7891) - FSA (12/30/04) 3) Increment 1, Phase 2 (SUB 05-000066): FSA (11/22/06) 4) Increment 1, Phase 2 (SUB 05-000066 Revised): FSA (02/21/07) 5) Increment 2, Phase 1 (SUB 13-001254): FSA (06/09/14)

20	Petitioner shall fund the design and construction of drainage improvements required as a result of the development of the Property to the satisfaction of the appropriate State and County agencies.	**Satisfied and On-going)**	The Successor Petitioner satisfied this condition for the Increment 1 Development through the County's issuance of Final Subdivision Approval as referenced below. The Successor Petitioner shall continue to comply with this condition when it commences development of the Increment 2 Development. REFERENCE: 1) "Drainage Report for Kaupulehu Lot 4A – Increment 1: Phase 1 Subdivision Improvements; Phase 2 Mass Grading Improvements" (May 2004) 2) Increment 1, Phase 1 (SUB 7891) - FSA (12/30/04) 3) Increment 1, Phase 2 (SUB 05-000066): FSA (11/22/06) 4) Increment 1, Phase 2 (SUB 05-000066 Revised): FSA (02/21/07) 5) Increment 2, Phase 1 (SUB 13-001254): FSA (06/09/14)
21	Petitioner shall initiate and fund a groundwater monitoring program as determined by the State Department of Health. Mitigation measures shall be implemented by Petitioner if the results of the monitoring program warrant them. Mitigation measures shall be approved by the State Department of Health.	**Satisfied**	The Successor Petitioner has satisfied this condition. REFERENCE: 1) DOH approval (1/11/05) - "Proposed Water Quality/Salt Pan/Marine Life Monitoring Plan" (Environmental Assessment, LLC) 2) PD submittal (WB KD, 05/13/13): "2012 Annual Water Quality Monitoring Report, Kalaemano, North Kona (Jan. 2013; EAC Report No. 2013-01)" and "Quantitative Assessment of the Marine Communities Fronting the Kalaemano Development - 2012 Annual Survey (Jan. 2013; EAC Report No. 2013-02)". 3) Annual Report 2019 Monitoring of Marine Waters, Groundwater, and Marine Communities in the vicinity of the Ka‘upulehu Development, North Kona, Hawaii (April 2020).
22	Petitioner shall make available adequate golf tee times for affordable rates for public play to State of Hawaii residents.	On-going	The Successor Petitioner shall comply with this condition upon development of the golf course, if any.
23	Petitioner shall comply with environmental health conditions for the State Department of Health, dated August, 1994 (version 5), and entitled “Guidelines Applicable for Golf Courses in Hawaii.”	On-going	The Successor Petitioner shall comply with this condition upon development of the golf course, if any.
24	In developing and operating the golf course and residential development in the Kaupulehu Resort Development Project, Petitioner shall at a minimum protect public access along the accessible coastline by the following:	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Kaupulehu residential development, and it will do so with respect to a golf course if and when one is completed. REFERENCE: 1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&R’s for Restricted Parcels (12/23/05), as amended
24a.	Petitioner shall establish a perpetual right of public access along the coastline from the State’s Puuwaawaa landholding to the intersection of the shoreline with the southernmost boundary of the Project area, which will allow public pedestrian access in perpetuity without	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu development. REFERENCE:

	obstruction or interference with such access, subject to reasonable rules and regulations for public safety, provided that access shall be maintained.		1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&R's for Restricted Parcels (12/23/05), as amended 3) Designation of Easement 44 for trail purposes (Fil Plan 2393)
24b.	In operating the golf course and any future residential development in the Kaupulehu Development Petition Area, Petitioner shall maintain and protect the public's right of access along the shoreline especially at the 1800-1801 a'a lava flow where the existing trail is near the same level as the proposed dwelling units.	**Satisfied and On-going**	The Successor Petitioner has satisfied this condition for the Kaupulehu residential development and it will do so with respect to a golf course if and when one is completed. REFERENCE: 1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&R's for Restricted Parcels (12/23/05), as amended
24c.	Petitioner shall work with the Department of Land and Natural Resources to incorporate mauka pathways which may be tied to golf course and residential area pathways which will provide alternative access routes to the accessible coastline areas.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu development. REFERENCE: 1) Kaupulehu Lot 4-A CPAP (September 2004) 2) Declaration of CC&R's for Restricted Parcels (12/23/05), as amended
24d.	Petitioner shall adopt golf course rules and provide mutually agreeable signage which may protect the access along the public access areas and pathways.	On-going	The Successor Petitioner shall comply with this condition upon development of the golf course if and when a golf course is completed.
24e.	Petitioner shall provide the plans for golf course layout, location of holes, access pathways, and signage to OP and the appropriate governmental agencies in advance of any final approval of such plans.	On-going	The Successor Petitioner shall comply with this condition if and when a golf course is completed.
24f.	Petitioner shall record with the appropriate governmental agency all necessary and appropriate instruments to accomplish the purpose of this paragraph.	On-going	The Successor Petitioner shall comply with this condition if and when a golf course is completed.
25	Petitioner shall complete the Project in substantial compliance with the representations made before the Land Use Commission. Failure to so develop the Property may result in reversion of the Property to its former land use classification, or change to a more appropriate classification.	On-going	The Successor Petitioner shall continue to comply with this condition for the Kaupulehu Project. The Successor Petitioner provided the Commission with a status report on compliance with LUC Docket No. A93-701 on 6/21/07. The Commission acknowledged the Successor Petitioner's "substantial compliance" on 10/12/07.
26	Petitioner shall give notice to the Land Use Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interest in the Property covered by the approved Petition prior to the visible commencement of construction of the Property.	**Satisfied**	The Successor Petitioner (KD Acquisition, LLLP (fka WB KD Acquisition, LLC) and KD Acquisition II, LP) remain the developers of this Project as memorialized in the Kaupulehu Lot 4-A Declaration of Covenants, Conditions and Restrictions, recorded on December 23, 2005, as amended. The Successor Petitioner is the lessee of Lot 4-A by way of Memorandum of Lease recorded in the State Bureau of Conveyances ("BOC") on 02/13/04, as Document No.: 2004-031733.

27	Petitioner shall provide annual reports to the Land Use Commission, the Office of Planning, and the County of Hawaii in connection with the status of the subject Project and Petitioner's progress in complying with the conditions imposed. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission and shall also include written documentation from each State and County agency responsible, indicating that the terms of the condition(s) are progressing satisfactorily or have been completed to the satisfaction of the agency.	**Satisfied**	The Successor Petitioner shall continue to comply with this condition for the Kaupulehu Project. The Successor Petitioner submits this 2017 to 2025 Annual Progress Report in compliance with this condition.
28	The Commission may fully or partially release the conditions provided herein as to all or any portion of the Property upon timely motion and upon the provision of adequate assurance of satisfaction of these conditions by Petitioner.	On-going	The Successor Petitioner acknowledges this condition and will seek the Commission's approval when and if it ever seeks full or partial release of any of the conditions.
29	Within 7 days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall: (a) record with the Bureau of Conveyances a statement that the Property is subject to conditions imposed by the Land Use Commission in the reclassification of the Property, and (b) shall files a copy of such recorded statement with the Commission.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. <u>REFERENCE:</u> 1) Notice of Imposition of Conditions by the Commission - BOC recordation 10/26/01 (Document No. 2001-169466).
30	Petitioner shall record the conditions imposed by the Commission with the Bureau of Conveyances pursuant to Section 15-15-92, Hawaii Administrative Rules.	**Satisfied**	The Successor Petitioner has satisfied this condition for the Kaupulehu Project. <u>REFERENCE:</u> 1) Certificate of Conditions Imposed by the Commission in LUC Docket No. A93-701 - BOC recordation 8/19/96 (Document No. 96-118872). 2) Notice of Imposition of Conditions by the Commission - BOC recordation 10/26/01 (Document No. 2001-169466).

MONITORING OF MARINE WATERS, GROUNDWATER, AND MARINE COMMUNITIES IN THE VICINITY OF THE KA'UPULEHU DEVELOPMENT, NORTH KONA, HAWAII

ANNUAL REPORT 2019

Prepared For:

KD Acquisition II, LP
PO Box 3549
Kailua-Kona, HI 96745

By:

MARINE RESEARCH CONSULTANTS, INC.
1039 Waakaua Pl.
Honolulu, HI 96822

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EXECUTIVE SUMMARY

During permitting for the original Ka'upulehu Development Project (the Development) several specific conditions were set forth by the State Land Use Commission to include the establishment and implementation of water quality monitoring, groundwater monitoring, and monitoring of marine biota. This multi-faceted program commenced in 1993 under the direction of Marine Research Consultants, Inc (MRC). From 2005 until 2018 the program was conducted by Environmental Assessment LLC (EAL). In 2019, the program was transferred back to MRC. While survey locations for monitoring have remained identical throughout the entire period, several of the methods were upgraded in 2019 to utilize more modern techniques.

Water samples were collected along five transects that extended from the shoreline to open coastal waters along the length of the Ka'upulehu property. Sampling was conducted once during each of the final three quarters of 2019 and water was analyzed for all constituents listed in the State of Hawaii Department of Health Water Quality Standards. Results of these analyses revealed patterns typical of West Hawaii where groundwater enters the ocean at or near the shoreline. Dissolved inorganic nutrients (silica, nitrogen, and phosphorus) that occur in elevated concentrations in naturally occurring groundwater displayed horizontal gradients of decreasing concentration with increasing distance from shore. Salinity displayed the opposite trend, with lowest values nearest the shoreline. The nutrient and salinity gradients were most pronounced during the sampling in May 2019 and least prominent in August 2019. Concentrations of these nutrients sampled from a series of irrigation and monitoring wells showed elevated levels of nitrate nitrogen in wells located shoreward of the Development relative to wells located landward of the property. These subsidies are likely a result of percolation of fertilizer nutrients through the vadose zone. While there was a discernible subsidy of nitrate nitrogen to groundwater as it passed under the Development, the effect to ocean waters was negligible as the increases were mixed to background levels within several meters of the shoreline. As a result, it can be concluded that during 2019 the Ka'upulehu Development did not cause any discernable impacts to marine water quality.

The methods for evaluating benthic community structure were updated in 2019 to utilize computer generated orthomosaic images of large areas of reef surface. These methods require less time in the field and produce a photographic product that can serve multiple purposes, including providing a permanent photographic

record that is not possible with *in situ* methods. Results of the benthic marine survey conducted in 2019 revealed that the reef community offshore of the Ka'upulehu Development conforms to the typical zonation found off West Hawaii. Three distinct zones, defined by the physical composition of the marine habitat and dominant coral species, comprise the reef community. Comparison of one component of coral reef community structure (percent bottom cover of living corals) over the course of the monitoring program from 1993 to 2019 indicates the most significant change occurred between 2014 and 2015, likely as a result of sudden elevation of water temperature owing to a global El Nino event. Coral reefs throughout the world suffered a range of impacts owing to bleaching of corals in response to the elevated temperature. Survey data suggests coral mortality on the Ka'upulehu reefs from the El Nino event in 2014 was on the order of 20-40%. Surveys since 2014 indicate a gradual increase in cover suggesting that the reef communities are on a recovery trajectory. Future surveys will determine if the upward trend in coral cover continues.

Reef fish surveys in 2019 utilized a different method than in the past EAL surveys. Results of fish surveys did not reveal any apparent impacts to community structure, particularly with respect to human activities.

In summary, results of the surveys conducted in the marine environment off the Ka'upulehu Development in 2019 indicate that there are no significant changes or declines in marine habitats that can be attributed to the Development. Results of water chemistry analyses reveal that detectable nutrient subsidies above background levels are of a magnitude that could not affect marine communities. In addition, the notable impacts to coral communities at Ka'upulehu fit the timeline of global impacts. As the coral communities appear to be on a trajectory of recovery to pre-El Nino levels, there is no evidence of impacts from shoreline development.

I. INTRODUCTION

The Ka'upulehu Development project site consists of approximately 1,071 acres that extend along 2.7 kilometers (km) of the coastline in the North Kona District of the Island of Hawaii. The Development is comprised of approximately 75 residential lots with supporting infrastructure (roads, utilities, etc.). The Development is set back approximately 100 meters (m) inland from the shoreline with the intervening land left in a natural state to serve as a buffer.

During permitting for the original project, specific conditions were set forth by the State Land Use Commission (A93-701; 18 October 2001). These include:

"LUC 3d. Water Quality Monitoring: *Petitioner shall initiate and fund a nearshore water quality monitoring program. The parameters of the monitoring program shall be approved by the State Department of Health. Petitioner shall provide regular reports and the Land Use Commission and Ka'upulehu Development Monitoring Committee as to the findings of this water quality monitoring program.*"

"LUC 21 - Groundwater Monitoring Program: *Petitioner shall initiate and fund a groundwater monitoring program as determined by the State Department of Health. Mitigation measures shall be implemented by Petitioner if the results of the monitoring program warrant them. Mitigation measures shall be approved by the State Department of Health.*"

Besides these water quality requirements, conditions were also imposed requiring marine community monitoring.

Under the original developer, the required marine water quality monitoring was carried out in August 1993, January 1994, April 1998, and April 2002 by Marine Research Consultants, Inc. (MRC). In 2004 ownership of the property changed hands and the monitoring was conducted by Environmental Assessment, LLC (EAL) through 2018. In 2019, the program was transferred back to MRC. The present report presents the results of marine water, groundwater, and marine community structure monitoring for 2019.

During the 57 surveys carried out by MRC and EAL from 1993 to 2018, several human-induced and natural occurrences took place (e.g., residential construction, high surf events, and elevated temperature events). The quarterly EAL reports provide a detailed chronology and history of these events and how they affected the marine

communities and water quality offshore of the Ka'upulehu Development. As the program has now undergone a change in investigators, it is not the intent to repeat the presentation of this chronology of historical change. Should a reviewer wish to acquire a detailed understanding of these events, they can be found in the series of EAL reports. The approach taken from this point forward is to treat all past data as a singular set, with mean values that represent the average conditions over the 25-year time frame, along with the minimum and maximum outliers. Hence, reporting from 2019 onward is to compare conditions that exist at the time of sampling to the range of the conditions that have existed in the past.

II. WATER CHEMISTRY

A. SAMPLING STATIONS

Water chemistry was evaluated along five transects that extend seaward from the shoreline to the open ocean and are spaced along the length of the Ka'upulehu Development (Figure 1). On each transect, water samples were collected at seven distances from shore (0, 10, 50, 100, 200, 300, 500 m). At all stations, water was collected within 10 centimeters (cm) of the surface. At stations 10, 50, and 100 m from shore a sample was also collected within 50 cm of the ocean floor. The sampling design is intended to detect any gradients of material input emanating at the shoreline fronting the Development. In addition to ocean samples, water was collected from six groundwater wells on or just mauka of the property, as well as from one anchialine pool located near the shoreline at the norther end of the property (Figure 1).

B. SAMPLING FREQUENCY

Since the inception of the program, water monitoring has been carried out quarterly (4 times per calendar year). Owing to the transition of investigators in early 2019, only three surveys were carried out that year (May 10, August 7, and December 27). It is anticipated that quarterly sampling will resume in 2020.

C. METHODS

Marine water sampling was conducted by investigators working from a 20-foot boat. At "0" m stations, water samples were collected by investigators swimming as close to the shoreline as possible then opening a 500-ml triple-rinsed polyethylene bottle

within the water column. At all other stations sampling was conducted from the boat. Surface samples were collected by opening the sample bottle 10 cm from the sea surface. Deep samples were collected using Niskin type samplers, which are lowered through the water column with spring loaded endcaps cocked in an open position. At the desired depth, endcaps are tripped closed by a messenger weight released down the line from the surface. Groundwater well samples were collected using a bailer that is lowered through the water column to the desired sampling depth. On retrieval, a ball float closes the aperture in the bailer isolating the contained water. Groundwater was collected from the approximate mid-point in the water column of each well.

All samples were stored on ice following collection and delivered to the analytical laboratory as soon as possible. Processing was initiated within 8 hours of collection. All laboratory chemistry analyses were performed by Marine Consulting and Analytical Resources Laboratory (MCAR) in Honolulu, HI (Lab. No. HI00928). MCAR possesses the acceptable rating from EPA-compliant proficiency and quality control testing.

Analyses were performed for the following chemical constituents specified in DOH Water Quality Standards:

- Ammonium (NH_4^+)
- Nitrate + nitrite (NO_3^-+ NO_2^-, hereafter referred to as NO_3^-)
- Orthophosphate phosphorus (PO_4^{3-})
- Total nitrogen (TN)
- Total phosphorus (TP)
- Turbidity
- Chl *a*
- pH
- Temperature
- Salinity
- Dissolved oxygen

In addition, dissolved silica (Si) was analyzed as this constituent serves as an indicator of groundwater from terrestrial sources.

Analyses for Si, NH_4^+, PO_4^{3-}, and NO_3^- were performed with a Seal Analytical AutoAnalyzer 3 HR (AA3HR) using standard methods for seawater analysis. TN and TP

were analyzed in a similar fashion following digestion. Total organic nitrogen (TON) and total organic phosphorus (TOP) were calculated as the difference between TN and dissolved inorganic N and TP and dissolved inorganic P, respectively.
Water for other analyses was kept chilled until analysis. Chl *a* was measured by filtering 150 ml through a GFF/F glass-fiber filters; pigments on filters were extracted in 90% acetone in the dark at -20 °C for 24 hours. Fluorescence of the extract was measured with a Turner Designs Trilogy Fluorometer model 7200-000 equipped with an extracted chlorophyll non-acidification module. Salinity was determined using a Mettler Toledo Seven Excellence Multi-parameter meter with an InLab 731-ISM conductivity probe. Turbidity was determined using a Hanna Instruments Model #HI88703 Turbidimeter and reported in nephelometric turbidity units (NTU). *In situ* measurements of temperature, salinity and dissolved oxygen were acquired using a RBR Concerto CTD calibrated to factory standards.

EPA and Standard Methods (SM) methods that were employed for the monitoring program, as well as resolution / detection limits, are listed in the Code of Federal Regulations (CRF) Title 40, Chapter 1, Part 136, and are as follows:

- NH_4^+ EPA 350.1, Rev. 2.0 or SM4500-NH3 G, detection limit 0.48 µg/L.
- $NO_3^- + NO_2^-$, EPA 353.2, Rev. 2.0 or SM4500-NO3 F, detection limit 0.084 µg/L.
- PO_4^{-3} EPA 365.1, Rev, 2.0 or SM4500-P F, detection limit 0.28 µg/L.
- TP EPA 365.1, Rev. 2.0 or SM4500-P E, detection limit 0.93 µg/L.
- TN SM 4500-N C., detection limit 1.96 µg/L.
- Si, EPA 366.0 or SM 4500 SiO2 C, detection limit 0.45 µg/L.
- Chlorophyll a, EPA 445.0 rev. 1.2 or SM10200, detection limit 0.006 µg/L.
- pH, EPA 150.1 or SM4500H+B, resolution 0.01 pH units.
- Turbidity, EPA 180.1, Rev. 2.0 or SM2130 B, resolution 0.01 NTU.
- Temperature, SM 2550 B, resolution 0.01 degrees centigrade.
- Salinity, SM 2520, resolution 0.01 ppt.
- Dissolved Oxygen, SM4500 O G, resolution 0.01% sat.

D. RESULTS

1. Overview of Marine Water Chemistry

Tables 1, 2, and 3 show results of water sample analyses from May 10, August 7, and December 27, 2019, respectively. Concentrations of eight dissolved nutrient

constituents in surface waters are plotted as functions of distance from the shoreline in Figures 2-4, while plots of Chl *a*, turbidity, salinity, pH, temperature, and dissolved oxygen versus distance from shore are shown in Figures 5-7.

Surface concentrations of Si showed distinct patterns of peak concentrations at the shoreline with progressively decreasing concentrations with increasing distance from shore on all five of the transects (Tables 1-3, Figure 2). These horizontal "gradients" (defined as progressively changing values with increasing distance offshore) for Si extended from the shoreline to approximately 100 m from the shoreline. At sampling distances greater than 200 m from the shoreline to the most distant sampling site (500 m) values of Si remained essentially constant. The highest concentration of Si at the shoreline (~2,000 µg/L) occurred on Transect A in May 2019 and was an order of magnitude higher than on the other transects. During the August and December 2019 samplings, values of Si were substantially lower than in May. During the December survey, Si in the sample collected at the shoreline of Transect A was also substantially elevated relative to all other locations, while there was no shoreline peak in August (Tables 1-3, Figure 2).

The pattern of dissolved NO_3^- closely mirrored that of Si, with the peak value occurring at the shoreline of Transect A during the May and December surveys (Tables 1-3, Figure 2). During these two surveys the concentration of NO_3^- at the shoreline of Transect A was an order of magnitude higher than that measured 500 m offshore. Lesser gradients in NO_3^- were observed on Transects B-E during the May and December surveys. There were essentially no horizontal gradients in NO_3^- during the August 2019 survey. During the May survey, the elevated concentrations of NO_3^- dissipated within 200 m of the shoreline, while in December the elevated concentrations extended no further than 50 m from shore.

Horizontal gradients of PO_4^{3-} were similar to those of Si and NO_3^- with peak concentrations at the shoreline of Transect A during the May and December surveys (Tables 1-3, Figure 3). Dissolved NH_4^+, TN, and TP displayed weaker gradients, although in most cases the highest concentrations occurred at the shoreline of Transect A (Tables 1-3, Figure 3 and 4).

Values of salinity were lowest near the shoreline on all five transects and increased steadily with distance from shore (Tables 1-3, Figure 5). The greatest depression of salinity occurred at the shoreline of Transect A during the May survey.

The pattern of decreasing concentrations of inorganic nutrients (Si, NO_3^- and PO_4^{3-}) and increasing salinity with increasing distance from shore is typical off the coastline of West Hawaii. These consistent gradients are the result of input of groundwater to the ocean at the shoreline. Groundwater contains substantially higher concentrations of Si and NO_3^- compared to ocean water, and has salinity near 0‰ compared to approximately 35‰ in open ocean water. Following discharge at the shoreline, a narrow zone of mixing occurs where groundwater merges with ocean water. The extent of the mixing zone is proportional to both the magnitude of groundwater discharge and the intensity of physical mixing processes (primarily wave energy) in the nearshore region. The sampling in May 2019 was conducted during a period of particularly low tide and low wind shear, which resulted in relatively low mixing conditions in the nearshore area. Under these conditions, gradients from the shoreline to offshore ocean are more pronounced than during the other two surveys which were conducted during periods of higher tides and more vigorous wind and wave mixing. The results from the May 2019 survey likely reflect ideal conditions for detecting groundwater input at the shoreline off the Ka'upulehu Development.

Concentrations of NH_4^+ in surface waters did not show a consistent horizontal pattern relative to distance from shore (Tables 1-3, Figure 3,). As NH_4^+ is not generally found in elevated concentration in groundwater relative to coastal ocean water, any observed elevated values would not likely be a result of groundwater discharge at the shoreline, but rather would be a result of biotic processes occurring in the nearshore area. Inspection of the plots of concentration of NH_4^+ as a function of distance from shore shows the greatest variation between sample sites of all measured nutrients (Tables 1-3, Figures 2-4). Such variation is likely a result of spatial variation between sources of organic material in the water column (e.g., schools of fish).

Plots of Chl *a* showed several elevated values at the shoreline, with consistent values of about 0.2-0.3 µg/L throughout the rest of the sampling range (Tables 1-3, Figure 6). Similarly, values of turbidity were consistently in the range of 0.2 to 0.5 NTU (Tables 1-3, Figure 6). Temperature was consistent across all transects, with overall values reflecting seasonal variance with the warmest in August and the coolest in December (Tales 1-3, Figure 7). Dissolved oxygen shows varying patterns over the surveys. In May, oxygen concentrations were elevated near the shoreline on all five transects, while in August concentrations were essentially uniform across the

sampling regime on all transects. In December, the shoreline samples from Transect E were lower than at all other sites (Tables 1-3, Figure 7).

Tables 1-3 also show concentrations of water chemistry constituents at the three deep water sampling sites (10, 50, and 100 m from shore). Groundwater efflux in the nearshore zone often results in a surface lens with lower salinity and higher nutrient content relative to subsurface water. During the May and August 2019 sampling, distinct surface layers were apparent for the nutrient constituents that occur in high concentrations in groundwater (primarily Si and NO_3^-). The surface layer contained higher nutrient concentrations and lower salinity than the underlying water column.

2. Groundwater

Table 4 shows a summary of water chemistry data from an anchialine pool, an irrigation well (No. 1), and five monitoring wells (Nos. 2-6) on the Ka'upulehu Development property sampled during three surveys in 2019. Wells 1-3 are located along the mauka (upland) boundary of the property, while monitoring wells 4-6 are located on the makai (shoreline) boundary of the property. There is a slight pattern of lower salinity in the three mauka wells relative to the makai wells, which would be expected as salinity in groundwater should increase with proximity to the ocean. The salinity in the anchialine pool during the August survey of near zero appears to be an anomaly, as the anchialine pool is located closer to the ocean than any of the wells. There is no clear pattern with respect to salinity in each well between the three surveys.

Plots of dissolved Silica also show a weak pattern with respect to distance from shore, with mauka wells having slightly higher values than the makai wells (Figure 8). The plots of NO_3^- show a pattern that is the mirror image of salinity and Si. During August and December, Wells 1-3, located upland from the Ka'upulehu Development, have consistently lower concentrations of NO_3^- than wells 4-6. As Wells 4-6 are located near the shoreline, the elevated values are likely a result of input of NO_3^- to groundwater from percolation of fertilizer nitrogen through the vadose zone. However, this pattern is not present in the May sampling. It is also not present in the plots of NH_4^+ and PO_4^{3-}, which show no clear variation between wells (Figure 8).

3. Conservative Mixing Analyses

A useful treatment of water chemistry data for interpreting the extent of material inputs from land is the application of a hydrographic mixing model. In the simplest form, such a model consists of plotting the concentration of a dissolved chemical species as a function of salinity. It is possible to evaluate the extent of nutrient input from sources other than groundwater efflux by plotting the concentration of the dissolved material as a function of salinity (Officer 1979, Smith and Atkinson 1992, Dollar and Atkinson 1992). The State of Hawaii Administrative Rules Chapter 11-54-6(d) is the area specific water quality standards criteria for the Kona Coast of the Island of Hawaii, which employs conservative mixing analysis as one method of determining compliance.

Comparison of the curves produced by such plots with conservative mixing lines provides an indication of the origin and fate of the material in question. Figure 9 shows the concentrations of four dissolved nutrient constituents (Si, NO_3^-, NH_4^+, and PO_4^{3-}) at all five transects during the three surveys in 2019 plotted as functions of salinity. Also shown in the plots are data points for the four surveys conducted in 2018 by EAL. Each mixing plot also shows a conservative mixing line constructed by connecting the endpoint concentrations of open ocean water and groundwater from Irrigation wells 1-3, which are located mauka of the Ka'upulehu Development. As irrigation wells 1-3 are located above the development, groundwater sampled from these wells should not contain any materials that may originate from land use activities on the project site.

If the parameter in question displays purely conservative behavior (no input or removal from any process other than physical mixing), and the only source of groundwater is from the aquifer where the endpoint wells are located, data points should fall on the conservative mixing line. If, however, external material is added to the system, data points will fall above the mixing line. If material is being removed from the system by processes such as biological uptake, data points will fall below the mixing line.

Dissolved Si represents a check on assumptions of the method, as it is present in high concentration in groundwater, but is not a major component of fertilizer, and is not generally utilized rapidly within the nearshore marine environment by biological processes. For the November 2019 sampling, most data points for Si fall on or below

the mixing line (Figure 9). The two shoreline samples with lowest salinity that were collected in May 2019 fall slightly above the mixing line. At all five transect sites data points from the 2019 samplings fall in essentially linear arrays with little distinct upward curvature. This pattern suggests that during this survey there was no detectable uptake of Si in marine waters between the shoreline and the most seaward sampling sites.

The data points of Si versus salinity from the 2018 surveys prescribe a similar, but slightly different array than the 2019 points (Figure 9). Overall, the 2018 points lie above the mixing line. The differences may be a result of variability in the analytical results from two different laboratories.

Nitrate nitrogen (NO_3^-) is the form of nitrogen most common in agricultural fertilizer mixes and is the most mobile form of nitrogen within soils and groundwater. In the mixing plot the concentrations of NO_3^- as functions of salinity produce a pattern of data points that is similar to that of Si where most of the 2018 and 2019 data points fall slightly below both mixing lines. The data points that fall above the mixing line for the 2019 surveys are the samples collected at the shoreline with salinities below 33.75‰.

The other form of dissolved nitrogen, NH_4^+, shows no linear relationship with salinity at any of the transect sites during the 2019 sampling (Figure 9). Samples from the 2018 surveys show a slight relationship with the bulk of the high salinity samples having the lowest concentrations of NH_4^+.

Phosphate phosphorus (PO_4^{3-}) is also a component of fertilizer, but because of a high absorptive affinity in soils it does not usually leach to groundwater to the extent that NO_3^- does. For the 2019 data collected off of Ka'upulehu, the points representing concentrations of PO_4^{3-} as functions of salinity showed patterns similar to Si and $NO_3^-$with linear arrays on or near the conservative mixing line. The data from the 2018 surveys showed considerably more scatter with points spread out both above and below the mixing line (Figure 9).

The linear Y-intercept of the linear regression of a nutrient as a function of salinity can be interpreted as the expected concentration of the nutrient at a salinity of zero. As groundwater has salinity close to zero, the Y-intercept can be used to

evaluate the relationship between groundwater from upslope of a shoreline development and groundwater that is entering the ocean at the shoreline. The 95% confidence limits for the Y-intercepts of Si versus salinity in irrigation wells 1-3 is 16.9 – 34.6 mg/L. The 95% confidence limits of the Y-intercepts of the regression lines of Si vs. salinity of 2019 ocean samples is 30.1-33.7 mg/L. Hence, the range of the Y-intercept for the ocean samples is within the range encompassing the groundwater endpoint concentration for the irrigation wells. These Y-intercepts indicate that Si entering the ocean is primarily from naturally occurring groundwater from mauka of the project site. The highly significant coefficient of determination (R^2) of 0.89 of the regression of Si on salinity also indicates that groundwater is the source of Si in the ocean.

The linear regression of NO_3^- versus salinity is similar to that of Si. The 95% confidence limit of the regression of NO_3^- on salinity in irrigation well water is 1.29-4.5 mg/L, while the confidence limit for ocean samples is 3.1-3.4 mg/L, with an R^2 of 0.90. Hence, results of the mixing analysis indicate that the amount of NO_3^- reaching the ocean is similar to groundwater in the mauka monitoring wells. This result is important in that it indicates that there are no detectable subsidies of NO_3^- entering the ocean from groundwater that passes under the Development. Had such subsidies been occurring, the Y-intercepts of the regressions of NO_3^- on salinity would have been statistically greater than the range of the monitoring wells. However, it is important to note that the data comparing the concentrations of NO_3^- in the mauka and makai monitoring wells reveals that there is a small subsidy to groundwater that is likely a result of percolation of fertilizer nutrients used for landscaping that pass through the vadose zone. While this subsidy is evident in the wells and in the ocean samples collected at the shoreline, it is so small that it is mixed to background levels within 10 m of the shoreline.

Phosphate phosphorus (PO_4^{3-}) is also a major component of fertilizer. Calculating linear regression of the concentrations of PO_4^{-3} on salinity results in the same findings as for Si and NO_3^- (Figure 9). Phosphate measured in ocean samples originates from groundwater with the composition of wells 1-3, with no subsidy from land.

NH_4^+, shows a different relationship than Si, NO_3^-, and PO_4^{-3}. Plots of concentrations of NH_4^+ versus salinity exhibit no distinct linear trends. Linear regression of concentrations of NH_4^+ vs. salinity shows no significant relationship (Figure 9). The lack of a significant regression indicates that the source of most of the NH_4^+ in the

ocean is not from the groundwater, but rather from biological processes occurring in the nearshore areas.

4. Compliance with Water Quality Standards

As mentioned above, the State of Hawaii Water Quality Standards include a set of criteria specific to the Kona Coast of the Island of Hawaii (11-54-6[d]). These standards include a set of regression coefficients based on salinity for samples with salinity less than 32‰. As none the samples for the 2019 sample set had salinities below 32‰, these regression criteria do not apply. Rather, the Kona standards include a set of specific numeric criteria for geometric means of samples with salinities above 32‰.

Table 5 shows the geometric means of the samples collected at each sampling location for the three surveys conducted in 2019, as well as the geometric means of the four samples collected in 2018. Also shown are the values that exceed the DOH WQS geometric mean limits. For the nutrients with specific limits (NO_3^-, PO_4^{-3}, NH_4^+, TP, and TN), most of the samples within 100 m of the shoreline exceeded the specific limits during both survey years. On transects A and D the limit for NO_3^- was exceeded for the entire length of the transects. The very low geometric mean standard for turbidity (0.1 NTU) was exceeded for all samples in 2019 and most in 2018. Chl *a* is the only constituent where only two samples exceeded the standard, both of which were located at the shoreline in the surf zone where wave-suspended algal fragments occur.

While these results indicate that marine waters off the Ka'upulehu Development are out of compliance with DOH WQS, it is more likely that the standards do not represent the actual natural composition of all nearshore waters off the West Coast of Hawaii. As shown in the plots of nutrient concentrations as functions of salinity, the values fall close to the mixing line generated from the concentrations of upland irrigation waters. As natural groundwater contains a range of nutrient concentrations depending on a variety of factors, it is somewhat misleading to limit the consideration of groundwater input to only water with salinities below 32‰.

III. MARINE BIOTA

A. SAMPLING SITES

Four marine biota monitoring transects offshore of the Ka'upulehu Development were established during the original monitoring program in 1993 and have remained fixed during all surveys. At each transect, three survey stations were selected in areas that represented the three major coral reef zones that typify the Kona coast (Dollar 1982, Dollar and Tribble 1993). The locations and geographic coordinates of the 12 survey stations (three sites along four transects) are shown in Figure 10 and Table 6, respectively.

B. METHODS

EAL utilized a variety of traditional *in situ* survey methods to gain a quantitative data base of benthic and fish community structure. While these methods were standards in the scientific community for decades, they have the disadvantage of requiring extensive time in the field, and they do not provide a permanent photographic record of the area of interest that can be utilized for quantifying change over time. Because of these disadvantages, MRC upgraded the methods used for benthic habitat analysis by employing several software programs that can join numerous *in situ* digital photographs into a single orthomosaic image. These images provide a permanent record of the reef habitat at a point in time and can be analyzed to provide quantification of various components of benthic community structure.

At each of the 12 survey stations the GPS location was marked by dropping a weight with an attached float from the boat to the reef surface. Two divers then entered the water and used measuring tapes to mark a 5 m x 5 m square centered at the weighted float. Metal bars 0.5 m in length and marked with colored tape at 10 cm intervals were placed on the corners of the square to provide scale to photographs. Large plastic tie-wraps were used to mark the corners of the square for site location in future surveys. In all subsequent surveys, the same 5 m x 5 m area of reef will be surveyed.

Using digital cameras fitted with 24-mm lenses in underwater housings, each 25 m^2 area of survey area was photographed by a diver in "lawn-mower" fashion. This method of photo acquisition produced 300-600 overlapping digital photographs of each survey area. Following fieldwork, all photographs for each area were

processed using Adobe Bridge, Adobe Photoshop, and Agisoft Metashape software to produce a seamless orthomosaic image that shows the entire 25 m^2 area as a high-resolution single image. In addition to the orthomosaic imaging, a second diver examined the 25 m^2 survey area to ensure that any rare, small, or cryptic species were included in the survey results. All orthomosaics are shown in Appendix A.

A MatLab® program developed for large images (up to 400 megabytes) was used to grid 200 points on each orthomosaic. Corals underlying the gridded points were identified to the species level while other benthic cover types were identified to a more general level. Data from MatLab® was then exported to Microsoft® Excel®. The resulting data set provides percent cover of all bottom types.

To date, no standardized and agreed-upon fish survey method has emerged within the scientific community. However, approximately 90% of survey-based projects employ one of three methods: belt transect, stationary point count, or timed swim. Inherent disadvantages of all these methods include diver bias, fish detectability, fish change in response to diver presence, changes due to seasonal events such as spawning, change in fish stocks due to the presence of predators, the periodic appearance of very large schools, and visibility on the effectiveness of visual surveys.

EAL used the belt transect method for censusing fish communities. These surveys were done by the same individual who subsequently conducted the benthic surveys. In order to economize on time underwater, the new format for field surveys involved a team approach where fish censuses were conducted simultaneously with benthic surveys by separate investigators. Stationary point count fish surveys were conducted by a diver separated from the benthic survey team by approximately 10 meters. All fish observed in a 10-minute period within a cylinder approximately 5 m in diameter surrounding the diver were recorded.

C. RESULTS

1. Reef Communities

As with most reef communities in Hawaii, composition of coral assemblages on the West Coast of the Island of Hawaii in general, including the Ka'upulehu area, are primarily determined by physical forces in the form of wave energy (Dollar 1982, Dollar and Tribble 1993, Fletcher et al. 2008, Grigg and Maragos 1974, Grigg 1983).

As the North Kona area is mostly an open coastal area directly exposed to long-period north and northwest swells during the winter months and south swells during the summer months, the response to these forces is clearly reflected in both physical composition and community structure of the reef.

Numerous surveys have been conducted on the nearshore reef areas in the vicinity of Ka'upulehu. In brief, these reports describe the coral reef communities in this area consisting of three distinct zones: boulder, platform, and slope. The boulder zone, extending from the shoreline to approximately 50 m offshore, is composed primarily of lava benches and large boulders interspersed with rubble and sand channels. As this shallow area is regularly impacted by large waves during the winter, organisms are relatively rare when compared to deeper sites. While sparse in distribution, the dominant stony coral is *Pocillopora meandrina*. This species has been documented to be a "pioneering species" in that it is able to colonize areas that are too physically harsh for most other corals (Figures 11 and 12).

At the seaward boundary of the boulder zone bottom composition grades into a solid reef platform. With increasing depths and subsequently decreasing wave energy, this region is well suited for coral colonization and growth. The dominant coral on the platform is *Porites lobata*, which occurs in a variety of growth forms including large conical shaped colonies and flat encrustations. Numerous other species of the genera *Montipora*, *Leptastrea,* and *Pavona* are also present in this zone (Figures 13 and 14).

The seaward edge of the reef platform generally terminates in a sharp shelf break with bottom slope increasing to abyssal depths. The substratum on the deep slope consists primarily of sand and rubble. The dominant coral in this zone is *Porites compressa*, which occurs in interconnected thickets of thin branching fingers (Figures 15 and 16).

Table 7 shows the 2019 results of analysis of the orthomosaic images of each reef zone on each transect. Overall coral cover in the three zones increased with depth from 24.8% in the shallow boulder zone, 42.3% in the mid-depth platform zone, to 46.5% in the deep slope zone. Ten species of coral were encountered in the quantitative surveys. The most abundant coral species in all three zones was *Porites lobata*, which accounted for 87% of coral in the boulder zone, 93% of coral in the platform zone, and 51% of coral on the slope. The only other coral that accounted for a substantial portion of coral cover was *Porites compressa* in the slope zone

(46%). None of the remaining eight species of corals had bottom cover greater than 1.5% in any zone.

Table 8 and Figure 17 show total percent coral cover on each of the four transects in each of the three reef zones measured off Ka'upulehu during 15 surveys beginning in 1993 and extending to 2019. The overall patterns of coral cover were similar at all four transect sites and in all three zones (Figure 17). Peak cover values occurred in 2002 followed by a sharp decline in 2005, followed by steady increases up to 2014. Between 2014 and 2015 there was a consistent decrease at all sites in all three zones. This consistent decrease in coral cover coincides with an El Nino event that resulted in global impacts to coral reefs owing to rapid increases in water temperature during the summer months. The elevated water temperatures exceeded the physiological tolerances of many corals, resulting in widespread bleaching and mortality. While reefs throughout Hawaii were affected, the degree of impact varied greatly. The timeline shown in Figure 17 suggests that the reefs off Ka'upulehu showed decreases in live coral on the order of 20-40% from the bleaching event. Such a range falls approximately midway on the scale of impact noted on reefs in the main Hawaiian Islands.

Plots of the number of coral species on each transect in the three reef zones show less distinct patterns than for coral cover (Figure 18). As with coral cover there is a noticeable drop in the number of coral species between the 2014 and 2015 surveys. Such a decrease is likely a result of differential effects to coral species from the extreme temperature events. Observations on other reefs in Hawaii indicated that several species that are major components to reef communities (*Pocillopora* spp., *Montipora* spp.) are more susceptible to bleaching that other species. As both *Pocillopora* and *Montipora* are components of the reef communities at Ka'upulehu it is likely that the observed drop in species richness post-2015 is a result of increased bleaching of these corals (Table 8, Figure 18).

Survey results from 2015 to 2019 show and increasing trend in coral cover at all survey locations (Figure 19). Had the shoreline development, which has been ongoing since approximately 2005, caused impacts to coral communities, it would be expected that there would be a pattern of continuous decline. Such declines are not the case with the observed pattern of increasing coral cover that was only interrupted by the severe temperature event in 2014. Future surveys in 2020 and beyond will reveal if the trajectory of increasing coral cover continues toward the pre-El Nino values.

Table 7 also shows percent bottom cover of non-corals. Of the biogenic components, crustose coralline algae contributed 4.4% in the boulder zone, 2.5% in the platform zone, and 1.9% in the slope zone. Macroalgae and turf algae were rare throughout the reef with less than 0.5% in any zone. The most abundant bottom cover was uncolonized basalt and limestone rock surfaces, which comprised 64% of bottom cover in the boulder zone, 52% in the platform zone, and 42% in the slope zone.

2. Reef Fish Community Structure

The EAL long-term data set describes various specific contributors to changes, or apparent changes, in fish abundance and biomass in the previous 25 years of surveys. In sum, it is noted that there are natural fluctuations in abundance and local distribution of fishes over time. These fluctuations occurred at all stations suggesting that these changes are natural in origin and are not due to any decline that is coupled with the Ka'upulehu Development.

Table 9 is a summary of the estimates of individual fish by family that comprised the standing crop present at each of the 12 transect stations during the 2019 survey. In total 1135 fish from 59 species were enumerated. The dominant fish family between all stations collectively was the damselfishes (Pomacentridae) and surgeonfishes (Acanthuridae), which together accounted for 79% of individuals at all stations. The dominant species were the yellow tang (*Zebrasoma flavescens*), goldring surgeonfish (*Ctenochaetus strigosus),* and the brown surgeonfish (*Acanthurus nigrofuscus*). These three species comprised 81% of the surgeonfishes and 49% of the entire fish population. When considering fish abundance by reef zone, 438 individuals were counted on the mid-depth reef platform, 409 on the reef slope, and 288 in the boulder zone (Table 9).

Table 10 shows results of reef fish surveys (number of species, number of individuals) from the 15 surveys conducted off the Ka'upulehu Development between 1993 and 2019. Surveys in 1993, 2002, and 2019 were conducted by MRC, while the surveys from 2005 to 2017 were conducted by EAL. It can be seen in Table 10 and Figure 12 that the results of fish count surveys varied greatly between the two investigators, with counts by MRC consistently lower than those conducted by EAL. However, survey results from EAL showed considerable variability through the course of the monitoring program with no consistent pattern. Unlike coral cover, the pattern of fish

abundance did not show any recognizable variation that could be attributable to the 2014 El Nino event.

Part of the variation in fish survey results is likely a result of the use of different survey methodologies rather than actual differences in the abundance of fish. All fish survey methods are affected by diver bias, fish detectability, and fish behavior in response to diver presence, the periodic appearance of very large schools, and the significant effects of visibility on the effectiveness of visual surveys. However, there are also factors associated with each individual method that affect survey results. As a result, it is not surprising that there are large differences in survey results between differing investigators and methods.

IV. SUMMARY AND CONCLUSIONS

During permitting for the original Ka'upulehu Development project, several specific conditions were set forth by the State Land Use Commission that included monitoring of marine water quality, groundwater, and marine biota. Monitoring commenced in 1993 and continue to the present. While survey locations for all three facets of the monitoring remained identical through the entire period, several of the methods were revised to utilize a more modern approach.

Analysis of water chemistry from samples collected during the final three quarters of 2019 revealed patterns typical of West Hawaii where groundwater enters the ocean at or near the shoreline. Dissolved inorganic nutrients (silica, nitrogen, and phosphorus) that occur in elevated concentrations in naturally occurring groundwater displayed small horizontal gradients of decreasing concentration with distance from shore. Salinity showed the opposite trend with lowest values nearest the shoreline. These gradients were most pronounced during the sampling in May 2019 and least prominent in August 2019. Concentrations of these nutrients sampled from a series of irrigation and monitoring wells showed elevated levels of nitrate nitrogen in wells located along the shoreward side of the Development, likely as a result of percolation of fertilizer nutrients through the vadose zone. While there was a discernible subsidy to groundwater, the magnitude was small enough that it was mixed to background levels within several meters of the shoreline. As a result, it can be concluded that during 2019 the Ka'upulehu Development did not cause any negative impacts to marine water quality.

The methods for evaluating benthic community structure were updated in 2019 to utilize computer generated orthomosaic images of large areas of reef surface. These methods have advantages over traditional *in situ* techniques including requiring less time in the field and producing a permanent photographic product that can serve many purposes and can be revisited in the future.

Results of the benthic marine survey conducted in 2019 revealed that the reef community offshore of the Development conforms to the typical zonation found off the West Coast of the Island of Hawaii. Three distinct zones, defined by the physical composition of the marine habitat, comprise the reef community. Comparison of percent bottom cover of living corals over the course of the monitoring program (1993 to 2019) indicates the most significant change occurred between 2014 and 2015 as a result of elevated water temperature owing to a global El Nino event. Coral reefs throughout the world suffered a range of impacts owing to bleaching of corals in response to elevated temperatures. Data suggests coral mortality on the order of 20-40% from the El Nino event in 2014. Surveys since then indicate a gradual increase in cover suggesting that the reef communities are on a recovery trajectory.

Reef fish surveys in 2019 utilized a different method than in the EAL surveys. Results of fish surveys did not reveal any apparent impacts to community structure, particularly with respect to human activities.

In summary, results of the water chemistry surveys conducted in 2019 reveal that there are no detectable nutrient subsidies above background levels that could affect marine communities offshore of the Ka'upulehu Development. Marine biota surveys conducted in 2019 did not identify any significant impacts to coral community structure that could be attributed to the Development. In addition, the notable impacts to coral communities since 1993 fit the timeline of effects from the global El Nino event. Results of the surveys since 2015 suggest that the coral communities offshore of Ka'upulehu appear to be on a trajectory of recovery toward pre-El Nino levels. If the Development was causing continual negative conditions for coral growth such an upward trajectory would not be occurring.

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FIGURE 1. Aerial photo of Kaupulehu Development and locations of five water monitoring transects. Seven survey stations extending from the shoreline to 500 meters offshore were sampled on each transect. Also shown are the locations of one irrigation well (Well 1), five monitoring wells (Wells 2-6), and an anchialine pool. Ocean, pool, and well sampling was conducted in May, August, and December 2019.

TABLE 1. Water chemistry measurements collected off Kaupulehu Development collected on May 10, 2019. Abbreviations as follows: S=surface; D=deep; DFS=distance from shore. Concentrations of nutrients are shown in units of micrograms per liter (µg/L). For site locations, see Figure 1.

	Analytical Method		EPA 365.5	Std Meth 4500-NO3 F	Std Meth 4500-NH3 G	EPA 366.0	Std Meth 4500-P	Std Meth 4500-N	EPA 150	Std Meth 2520	EPA 445.0 1.2	Std Meth 2130B	Std Meth 2550B	Std Meth 4500 OG
SITE	DFS (m)	DEPTH (m)	PO4 (µg/L)	NO3 (µg/L)	NH4 (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	pH (rel)	Salt (ppt)	Chl *a* (µg/l)	TURB (ntu)	TEMP (deg. C)	DISS. O2 (% sat.)
TRANSECT A	0 S	0.2	16.06	194.60	6.83	1,958.70	23.81	232.54	8.25	32.69	0.70	0.79	26.43	110.92
	10 S	0.2	9.36	112.98	6.71	1,168.64	20.31	182.45	8.28	33.33	0.26	1.11	26.37	109.32
	10 D	2.2	5.02	43.82	5.12	471.24	18.20	126.18	8.26	33.98	0.36	0.36	26.29	109.54
	50 S	0.2	8.99	114.64	7.48	1,134.24	21.76	199.91	8.26	33.28	0.19	0.30	26.36	108.45
	50 D	2.6	4.00	28.36	4.34	244.89	15.72	115.56	8.21	34.15	0.33	0.25	26.31	101.31
	100 S	0.2	4.90	39.55	4.37	391.66	14.57	126.55	8.20	34.05	0.25	0.57	26.45	97.26
	100 D	5.3	3.44	9.79	3.42	90.49	12.96	87.40	8.21	34.33	0.18	0.21	26.22	100.35
	200 S	0.2	3.13	6.37	3.04	70.53	11.78	81.34	8.17	34.30	0.18	0.34	26.35	89.11
	300 S	0.2	3.16	3.40	2.80	38.89	10.57	88.26	8.18	34.29	0.15	0.52	26.21	95.97
	500 S	0.2	2.98	4.50	2.84	57.25	12.52	79.58	8.20	34.26	0.17	0.19	26.28	94.22
TRANSECT B	0 S	0.2	6.98	58.48	6.06	641.24	17.83	138.25	8.22	33.77	0.26	0.21	26.13	105.59
	10 S	0.2	6.32	49.81	5.25	517.96	15.38	138.26	8.19	33.88	0.20	0.24	26.09	102.78
	10 D	4.5	4.93	22.62	4.84	266.14	14.17	126.48	8.19	34.05	0.19	0.34	26.12	105.04
	50 S	0.2	4.40	24.09	3.79	229.75	14.07	104.62	8.14	34.12	0.20	0.24	26.32	92.80
	50 D	4.8	4.65	21.23	3.93	217.11	13.89	97.71	8.17	34.24	0.16	0.13	26.14	102.56
	100 S	0.2	3.50	9.28	3.21	86.00	14.60	90.27	8.15	34.38	0.15	0.15	26.26	89.57
	100 D	8.1	3.97	9.84	3.58	77.08	15.97	84.32	8.18	34.38	0.12	0.21	26.01	103.63
	200 S	0.2	2.57	3.96	3.16	39.28	17.24	84.55	8.17	34.38	0.18	0.13	26.20	95.76
	300 S	0.2	2.05	1.97	2.76	36.58	17.39	88.31	8.20	34.34	0.26	0.18	26.30	100.35
	500 S	0.2	2.36	1.65	1.15	37.67	16.15	84.43	8.21	34.34	0.17	0.35	26.21	101.25
TRANSECT C	0 S	0.2	7.97	73.49	7.62	654.14	13.61	152.18	8.21	33.75	0.36	0.15	26.00	107.71
	10 S	0.2	7.53	66.90	6.19	554.22	15.13	154.34	8.20	33.82	0.29	0.16	25.99	106.51
	10 D	3.9	4.15	11.79	4.28	94.53	13.52	89.12	8.20	34.35	0.16	0.14	25.92	103.56
	50 S	0.2	5.98	34.91	5.52	313.69	16.00	110.42	8.22	34.06	0.18	0.20	26.09	100.58
	50 D	5.9	3.72	5.37	3.64	26.44	14.63	85.93	8.23	34.42	0.14	0.26	25.84	102.90
	100 S	0.2	3.66	17.40	3.60	163.59	13.39	95.90	8.20	34.24	0.17	0.19	26.09	98.56
	100 D	7.6	2.45	3.82	2.45	23.43	11.90	77.04	8.22	34.38	0.12	0.18	25.85	104.11
	200 S	0.2	3.07	8.93	3.19	83.56	11.87	91.66	8.21	34.31	0.16	0.24	26.12	97.19
	300 S	0.2	3.53	14.39	3.19	126.94	12.46	101.36	8.22	34.31	0.16	0.16	26.05	97.29
	500 S	0.2	3.84	21.40	3.46	179.37	13.89	100.58	8.22	34.28	0.18	0.16	26.04	98.60
TRANSECT D	0 S	0.2	4.59	17.68	5.80	240.79	15.93	98.17	8.21	34.20	0.28	0.30	26.06	104.20
	10 S	0.2	5.36	31.29	6.66	342.76	14.26	115.42	8.19	34.02	0.23	0.19	26.03	101.54
	10 D	3.7	4.03	10.84	4.73	98.77	12.52	87.01	8.19	34.31	0.18	0.14	25.98	100.22
	50 S	0.2	4.15	16.65	4.27	180.53	12.56	100.93	8.18	34.12	0.16	0.25	26.01	97.20
	50 D	4.9	3.50	10.51	4.75	45.82	11.22	93.18	8.18	34.38	0.13	0.16	25.84	97.56
	100 S	0.2	3.84	16.30	3.77	167.37	12.40	94.50	8.16	34.28	0.18	0.20	26.03	96.33
	100 D	6.7	3.29	9.74	3.37	31.45	12.62	86.11	8.19	34.42	0.17	0.24	25.80	100.55
	200 S	0.2	2.95	10.68	4.40	106.53	14.51	96.56	8.18	34.35	0.20	0.19	26.11	96.94
	300 S	0.2	2.42	8.85	3.93	92.54	15.53	92.67	8.18	34.35	0.24	0.36	26.06	96.24
	500 S	0.2	2.45	7.31	3.11	80.41	16.12	101.05	8.18	34.35	0.20	0.24	26.21	98.31
TRANSECT E	0 S	0.2	1.80	24.61	13.10	238.93	11.47	156.67	8.16	34.21	0.27	0.28	25.91	99.00
	10 S	0.2	4.62	20.47	3.95	186.30	12.52	102.07	8.17	34.16	0.20	0.24	26.01	97.26
	10 D	5.0	4.43	12.15	3.99	78.23	12.28	96.17	8.18	34.31	0.19	0.21	25.83	97.84
	50 S	0.2	2.76	21.74	11.86	214.16	12.77	113.51	8.17	34.20	0.24	0.30	26.02	96.35
	50 D	8.3	3.47	10.53	4.62	58.08	14.88	87.88	8.18	34.38	0.17	0.20	25.75	100.64
	100 S	0.2	3.81	17.24	3.88	174.11	16.03	92.81	8.18	34.28	0.22	0.23	26.04	94.89
	100 D	24.3	2.70	4.38	3.19	16.94	15.47	86.59	8.19	34.46	0.19	0.18	25.47	107.29
	200 S	0.2	4.09	21.85	6.34	219.10	14.23	111.64	8.18	34.25	0.23	0.17	26.02	93.85
	300 S	0.2	3.88	12.46	3.61	114.88	11.81	102.20	8.20	34.31	0.21	0.14	26.05	95.09
	500 S	0.2	3.44	6.83	3.37	84.84	13.64	96.66	8.21	34.31	0.21	0.18	26.26	96.30

TABLE 2. Water chemistry measurements collected off Kaupulehu Development on August 7, 2019. Abbreviations as follows: S=surface; D=deep; DFS=distance from shore; bdl = below detection limit. Concentrations of nutrients are shown in micrograms per liter (µg/L). For site locations, see Figure 1.

	Analytical Method		EPA 365.5	Std Meth 4500-NO3 F	Std Meth 4500-NH3 G	EPA 366.0	Std Meth 4500-P	Std Meth 4500-N	EPA 150	Std Meth 2520	EPA 445.0 1.2	Std Meth 2130B	Std Meth 2550B	Std Meth 4500 OG
SITE	DFS (m)	DEPTH (m)	PO4 (µg/L)	NO3 (µg/L)	NH4 (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	pH (rel)	Salt (ppt)	Chl-a (µg/l)	TURB (ntu)	TEMP (deg. C)	DISS. O2 (% sat.)
TRANSECT A	0 S	0.2	4.03	6.89	3.74	140.71	13.49	99.41	8.20	34.38	0.25	0.72	28.28	101.43
	10 S	0.2	4.25	10.21	1.81	159.25	13.02	84.50	8.18	34.38	0.25	0.39	28.22	91.25
	10 D	4.6	3.50	6.04	2.10	97.08	12.16	87.63	8.21	34.39	0.22	0.76	28.14	94.17
	50 S	0.2	4.40	10.96	2.35	153.34	12.23	90.37	8.21	34.39	0.20	0.41	28.12	96.10
	50 D	6.2	3.32	5.67	2.07	80.28	13.50	81.38	8.22	34.42	0.21	0.32	28.10	96.11
	100 S	0.2	3.75	10.64	2.07	142.22	15.67	89.80	8.21	34.38	0.22	0.33	28.17	93.87
	100 D	8.6	2.60	3.83	0.85	50.83	16.98	85.33	8.24	34.60	0.17	0.41	27.94	99.89
	200 S	0.2	3.53	9.90	1.75	130.59	17.68	92.79	8.22	34.64	0.21	0.35	28.18	92.87
	300 S	0.2	3.78	8.95	1.48	117.71	14.71	91.35	8.22	34.64	0.20	0.32	28.18	93.37
	500 S	0.2	4.15	9.83	1.32	127.68	12.97	86.44	8.22	34.35	0.20	0.24	28.17	92.09
TRANSECT B	0 S	0.2	4.28	6.34	3.51	125.83	12.56	85.82	8.23	34.35	0.21	0.27	27.99	97.70
	10 S	0.2	3.91	6.80	3.01	118.42	11.08	85.82	8.23	34.32	0.21	0.40	28.00	96.67
	10 D	4.7	3.60	6.14	2.37	110.91	10.92	84.98	8.23	34.46	0.19	0.27	27.94	98.21
	50 S	0.2	3.57	6.23	2.13	106.05	10.30	83.26	8.24	34.38	0.18	0.24	28.05	96.13
	50 D	4.9	3.13	2.89	0.94	49.31	10.77	75.68	8.25	34.57	0.15	0.31	27.88	97.54
	100 S	0.2	3.32	7.08	1.09	102.02	12.96	85.32	8.23	34.42	0.18	0.22	28.09	94.06
	100 D	16.3	3.22	3.23	0.66	51.60	13.98	79.27	8.24	34.49	0.15	0.20	27.63	99.35
	200 S	0.2	2.57	3.86	0.91	59.86	13.22	80.46	8.24	34.49	0.17	0.24	28.07	95.02
	300 S	0.2	2.73	5.81	1.27	81.88	10.68	83.93	8.24	34.45	0.21	0.21	28.10	94.70
	500 S	0.2	2.45	2.51	0.91	49.88	10.23	76.69	8.26	34.45	0.18	0.40	28.06	96.65
TRANSECT C	0 S	0.2	3.16	7.41	3.49	94.28	9.61	89.70	8.23	34.34	0.23	0.39	27.99	97.35
	10 S	0.2	3.16	7.72	4.47	98.45	12.09	92.15	8.23	34.38	0.24	0.43	28.00	95.75
	10 D	4.8	3.38	7.06	3.18	90.31	10.85	86.31	8.22	34.38	0.23	0.28	27.98	96.22
	50 S	0.2	3.81	7.27	2.63	92.31	12.71	86.56	8.23	34.46	0.22	0.18	28.02	93.45
	50 D	6.6	3.13	5.17	1.60	71.91	14.26	86.67	8.25	34.49	0.20	0.23	27.98	97.92
	100 S	0.2	3.01	7.47	2.14	91.83	13.02	84.90	8.26	34.41	0.20	0.32	28.01	91.43
	100 D	10.9	2.51	3.03	0.91	51.28	13.33	78.01	8.25	34.45	0.19	0.31	27.90	96.97
	200 S	0.2	2.73	4.46	1.30	69.31	8.68	84.62	8.26	34.41	0.19	0.22	28.02	96.64
	300 S	0.2	2.73	4.25	0.95	73.31	9.61	83.65	8.25	34.45	0.20	0.37	27.97	97.12
	500 S	0.2	3.50	5.39	1.34	77.05	14.57	84.21	8.26	34.41	0.20	0.26	28.04	95.73
TRANSECT D	0 S	0.2	3.91	5.45	3.01	78.65	13.95	90.93	8.24	34.45	0.46	0.25	27.99	95.80
	10 S	0.2	3.63	5.99	2.55	77.60	14.57	89.61	8.24	34.45	0.22	0.17	28.03	93.46
	10 D	5.8	3.47	6.53	2.70	70.48	14.26	85.04	8.24	34.41	0.19	0.28	27.95	90.03
	50 S	0.2	3.19	6.48	2.28	81.77	13.02	85.23	8.24	34.45	0.21	0.22	28.01	91.68
	50 D	8.6	3.75	6.85	1.92	76.05	12.28	84.85	8.24	34.45	0.18	0.24	27.95	93.32
	100 S	0.2	2.64	3.71	1.97	58.54	13.02	88.44	8.27	34.45	0.20	0.26	27.99	97.52
	100 D	23.9	4.90	3.28	2.98	64.00	12.98	90.17	8.27	34.34	0.22	0.47	27.90	97.32
	200 S	0.2	3.04	4.07	1.34	68.68	11.78	83.06	8.28	34.38	0.21	0.27	28.03	98.67
	300 S	0.2	2.85	5.35	1.40	83.20	10.54	85.46	8.27	34.42	0.20	0.22	28.07	96.88
	500 S	0.2	3.75	5.66	4.30	93.60	12.71	89.77	8.27	34.40	0.24	0.56	28.02	97.01
TRANSECT E	0 S	0.2	2.70	5.99	3.64	81.25	13.93	111.26	8.24	34.40	0.28	0.45	27.97	96.80
	10 S	0.2	3.84	6.47	2.62	85.34	15.63	89.28	8.24	34.37	0.23	0.25	27.99	93.96
	10 D	4.8	5.18	6.94	3.46	73.86	16.33	86.17	8.24	34.41	0.19	0.26	27.94	90.42
	50 S	0.2	3.07	4.93	1.68	72.23	12.91	85.55	8.26	34.41	0.29	0.14	27.99	96.89
	50 D	10.8	2.73	5.34	2.09	72.51	11.54	82.63	8.26	34.41	0.17	0.19	27.92	93.66
	100 S	0.2	2.33	3.53	2.16	61.60	10.51	92.43	8.28	34.44	0.19	0.26	28.00	98.07
	100 D	25.8	2.36	3.42	1.09	59.94	11.37	86.42	8.29	34.44	0.20	0.28	27.94	97.03
	200 S	0.2	2.36	4.79	1.62	74.60	14.08	88.73	8.28	34.41	0.21	0.21	28.07	98.38
	300 S	0.2	2.51	3.15	1.30	58.57	15.37	86.44	8.28	34.45	0.20	0.18	28.06	98.81
	500 S	0.2	2.39	2.55	1.12	54.34	15.80	84.80	8.28	34.45	0.21	0.21	28.02	97.59

TABLE 3. Water chemistry measurements collected off Kaupulehu Development collected on December 27, 2019. Abbreviations as follows: S = surface; D = deep; DFS = distance from shore, bdl = below detection limit. Concentrations of nutrients are shown in units of micrograms per liter (µg/L). For site locations, see Figure 1.

	Analytical Method		EPA 365.5	Std Meth 4500-NO3 F	Std Meth 4500-NH3 G	EPA 366.0	Std Meth 4500-P	Std Meth 4500-N	EPA 150	Std Meth 2520	EPA 445.0 1.2	Std Meth 2130B	Std Meth 2550B	Std Meth 4500 OG
SITE	DFS (m)	DEPTH (m)	PO4 (µg/L)	NO3 (µg/L)	NH4 (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	pH (rel)	Salt (ppt)	Chl-a (µg/l)	TURB (ntu)	TEMP (deg. C)	DISS. O2 (% sat.)
TRANSECT A	0 S	0.2	5.08	28.37	1.06	281.58	12.48	110.87	8.15	34.16	0.26	0.53	26.61	95.37
	10 S	0.2	3.75	12.21	bdl	115.23	11.06	88.44	8.14	34.25	0.27	0.43	26.63	92.76
	10 D	9.5	3.84	12.60	0.94	115.11	11.49	91.95	8.14	34.35	0.28	0.42	26.62	93.23
	50 S	0.2	3.29	4.02	1.18	54.71	11.46	89.24	8.16	34.38	0.36	0.28	26.68	94.04
	50 D	11.2	3.72	5.38	0.53	58.12	11.59	86.28	8.16	34.39	0.36	0.26	26.62	93.27
	100 S	0.2	3.60	3.99	1.43	53.30	11.49	86.45	8.16	34.38	0.24	0.48	26.65	93.55
	100 D	16.1	3.66	4.02	0.69	50.55	11.71	86.51	8.16	34.38	0.24	0.34	26.58	92.91
	200 S	0.2	3.22	2.93	0.39	42.62	10.98	81.16	8.16	34.40	0.26	0.42	26.66	93.70
	300 S	0.2	2.51	3.36	0.06	33.58	10.01	87.29	8.17	34.36	0.25	0.24	26.68	94.35
	500 S	0.2	2.51	3.50	0.01	31.41	10.62	86.18	8.17	34.43	0.28	0.27	26.66	94.94
TRANSECT B	0 S	0.2	4.00	5.64	0.31	56.06	11.59	85.99	8.16	34.43	0.25	0.28	26.63	92.05
	10 S	0.2	3.88	9.53	0.74	96.27	11.47	86.39	8.16	34.36	0.25	0.47	26.62	94.97
	10 D	14.5	3.75	5.84	1.48	80.13	11.27	92.58	8.16	34.35	0.25	0.51	26.59	94.41
	50 S	0.2	3.10	1.75	0.32	35.69	11.09	83.40	8.16	34.35	0.24	0.26	26.62	91.65
	50 D	19.2	2.57	3.08	0.24	36.46	10.81	87.93	8.16	34.39	0.27	0.32	26.59	94.90
	100 S	0.2	2.51	3.36	0.39	33.52	11.09	82.47	8.16	34.28	0.29	0.23	26.65	94.28
	100 D	21.7	2.51	2.94	0.55	29.77	10.93	86.06	8.17	34.36	0.28	0.25	26.58	94.66
	200 S	0.2	2.82	4.34	0.57	32.70	10.73	85.32	8.18	34.28	0.28	0.19	26.65	94.77
	300 S	0.2	2.64	3.50	0.15	31.18	10.15	82.95	8.18	34.32	0.26	0.31	26.64	95.24
	500 S	0.2	2.70	3.92	0.36	33.35	10.57	87.33	8.18	34.43	0.28	0.26	26.67	94.79
TRANSECT C	0 S	0.2	3.35	5.11	3.19	60.11	10.62	90.40	8.17	34.43	0.21	0.21	26.60	95.29
	10 S	0.2	3.29	2.87	0.77	46.61	11.06	87.49	8.16	34.29	0.23	0.17	26.59	92.38
	10 D	6.6	2.85	2.77	1.15	41.04	11.12	91.80	8.17	34.32	0.25	0.25	26.57	90.93
	50 S	0.2	3.26	2.33	0.95	37.63	11.01	85.19	8.17	34.34	0.24	0.41	26.62	91.49
	50 D	21.2	3.26	2.93	0.63	38.51	11.06	85.74	8.16	34.34	0.25	0.37	26.57	92.61
	100 S	0.2	2.79	2.05	1.18	36.11	11.21	93.32	8.16	34.46	0.27	0.33	26.61	95.58
	100 D	20.8	2.73	2.02	0.20	36.51	10.58	78.04	8.18	34.35	0.27	0.17	26.59	93.73
	200 S	0.2	2.64	1.04	0.50	35.17	10.16	76.17	8.17	34.46	0.30	0.27	26.64	93.53
	300 S	0.2	2.51	0.69	0.20	34.40	10.07	77.31	8.18	34.35	0.32	0.26	26.63	94.04
	500 S	0.2	2.05	0.50	0.41	35.46	9.85	79.49	8.18	34.28	0.28	0.29	26.64	94.05
TRANSECT D	0 S	0.2	3.32	5.57	0.66	42.80	10.53	79.13	8.16	34.35	0.22	0.26	26.53	91.99
	10 S	0.2	3.69	5.42	1.48	46.08	10.38	78.47	8.15	34.35	0.20	0.19	26.55	92.25
	10 D	4.4	3.16	4.94	0.42	44.50	9.72	81.05	8.15	34.32	0.23	0.22	26.53	92.69
	50 S	0.2	2.76	2.28	0.76	33.29	10.39	80.81	8.17	34.27	0.26	0.24	26.59	91.57
	50 D	7.8	2.73	1.76	1.32	33.93	10.51	88.93	8.17	34.46	0.19	0.30	26.59	92.25
	100 S	0.2	2.88	2.24	1.62	36.57	10.18	90.17	8.17	34.38	0.23	0.34	26.61	92.78
	100 D	21.8	2.26	2.52	0.66	30.88	10.03	88.05	8.17	34.42	0.25	0.33	26.58	93.33
	200 S	0.2	2.36	2.52	0.56	35.81	9.57	89.25	8.18	34.35	0.25	0.29	26.62	93.01
	300 S	0.2	2.36	3.08	0.22	35.28	9.36	84.10	8.18	34.35	0.27	0.19	26.62	92.95
	500 S	0.2	1.89	3.64	1.50	29.94	9.55	90.30	8.18	34.43	0.24	0.19	26.64	93.35
TRANSECT E	0 S	0.2	3.26	2.66	1.05	43.56	10.93	91.81	8.15	34.39	0.21	0.26	26.51	87.30
	10 S	0.2	3.38	2.52	1.33	41.21	11.42	85.40	8.16	34.42	0.25	0.25	26.56	88.54
	10 D	4.2	3.35	1.26	0.35	41.86	10.34	80.71	8.15	34.42	0.17	0.25	26.54	88.09
	50 S	0.2	3.13	1.54	1.27	36.69	10.78	84.98	8.17	34.42	0.19	0.21	26.59	90.91
	50 D	15.8	3.04	2.10	1.61	36.11	10.96	86.46	8.16	34.42	0.20	0.33	26.58	92.41
	100 S	0.2	2.88	2.24	1.29	36.28	10.34	83.86	8.18	34.42	0.20	0.28	26.59	92.51
	100 D	21.4	3.01	1.12	1.86	32.41	10.68	77.78	8.17	34.41	0.22	0.30	26.58	92.65
	200 S	0.2	2.73	1.26	0.46	35.17	9.85	80.35	8.18	34.44	0.23	0.23	26.59	92.68
	300 S	0.2	2.88	1.40	1.55	39.39	10.87	83.06	8.18	34.39	0.23	0.43	26.61	92.87
	500 S	0.2	2.51	1.54	0.39	32.58	11.03	83.48	8.18	34.43	0.17	0.19	26.62	93.66

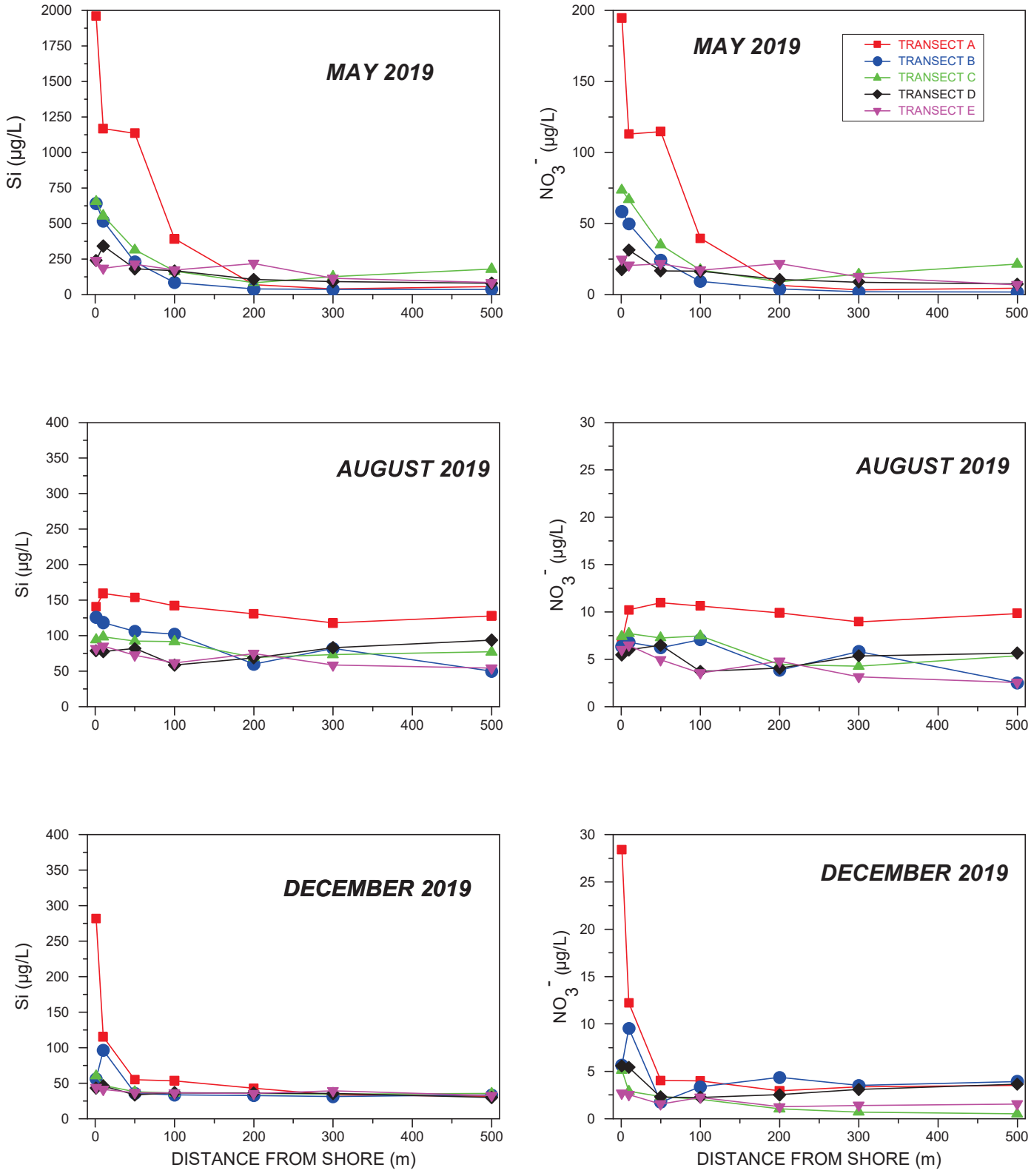


FIGURE 2. Plots of dissolved Silica (Si) and Nitrate Nitrogen (NO3) as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

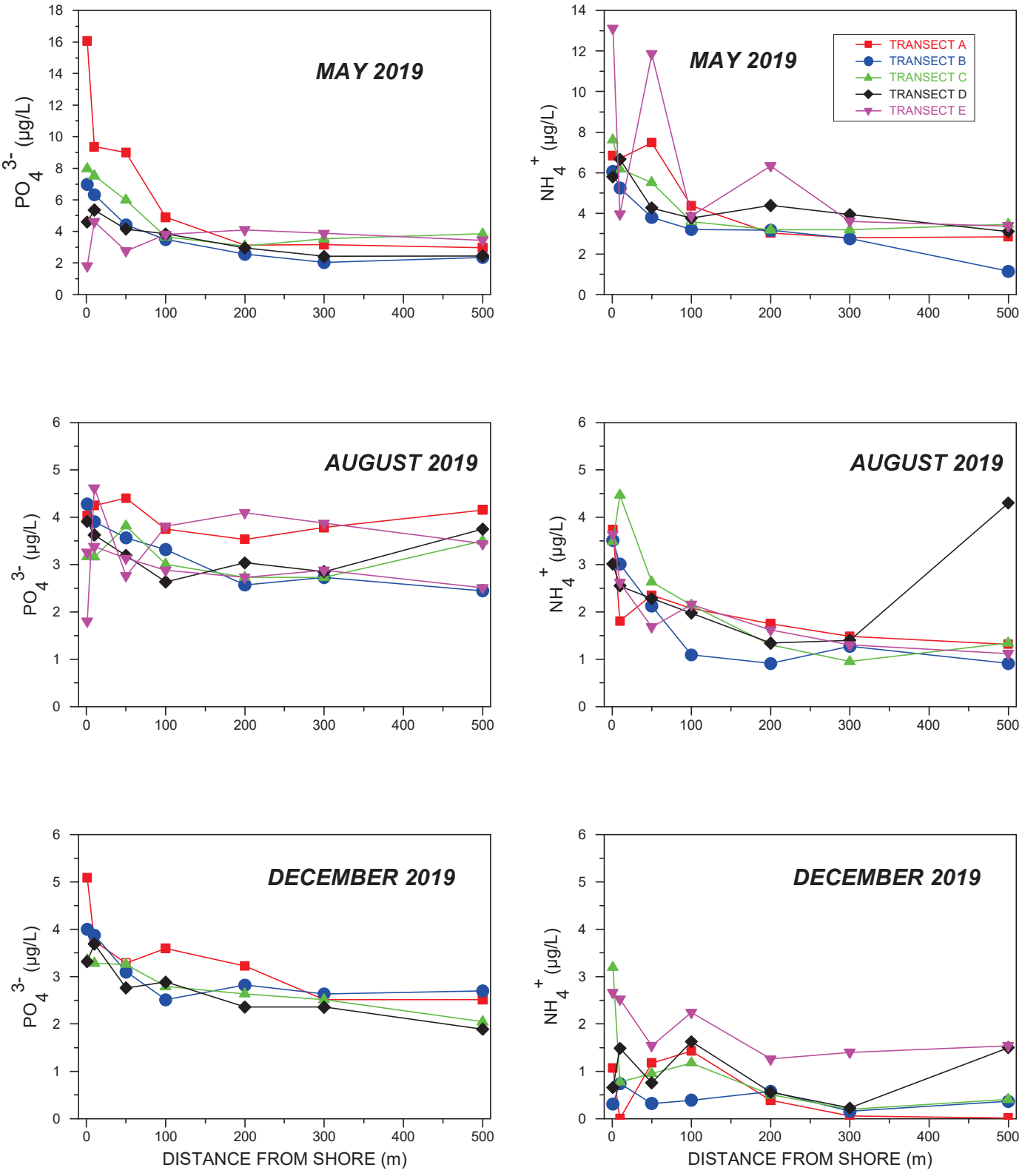


FIGURE 3. Plots of dissolved Phosphate Phosphorus (PO4) and Ammonium Nitrogen (NH4) as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

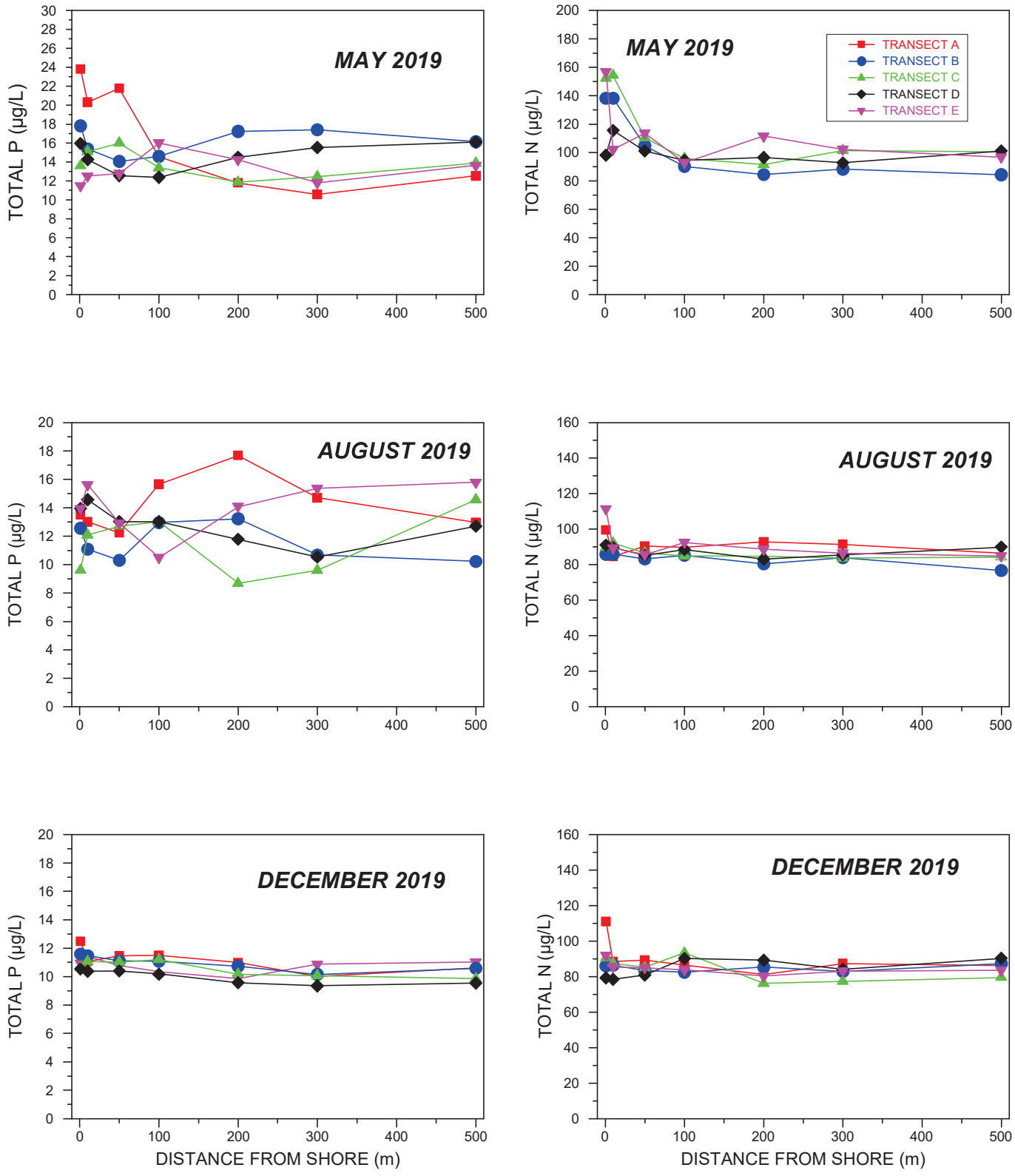


FIGURE 4. Plots of Total Phosphorus (TP) and Total Nitrogen (TN) as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

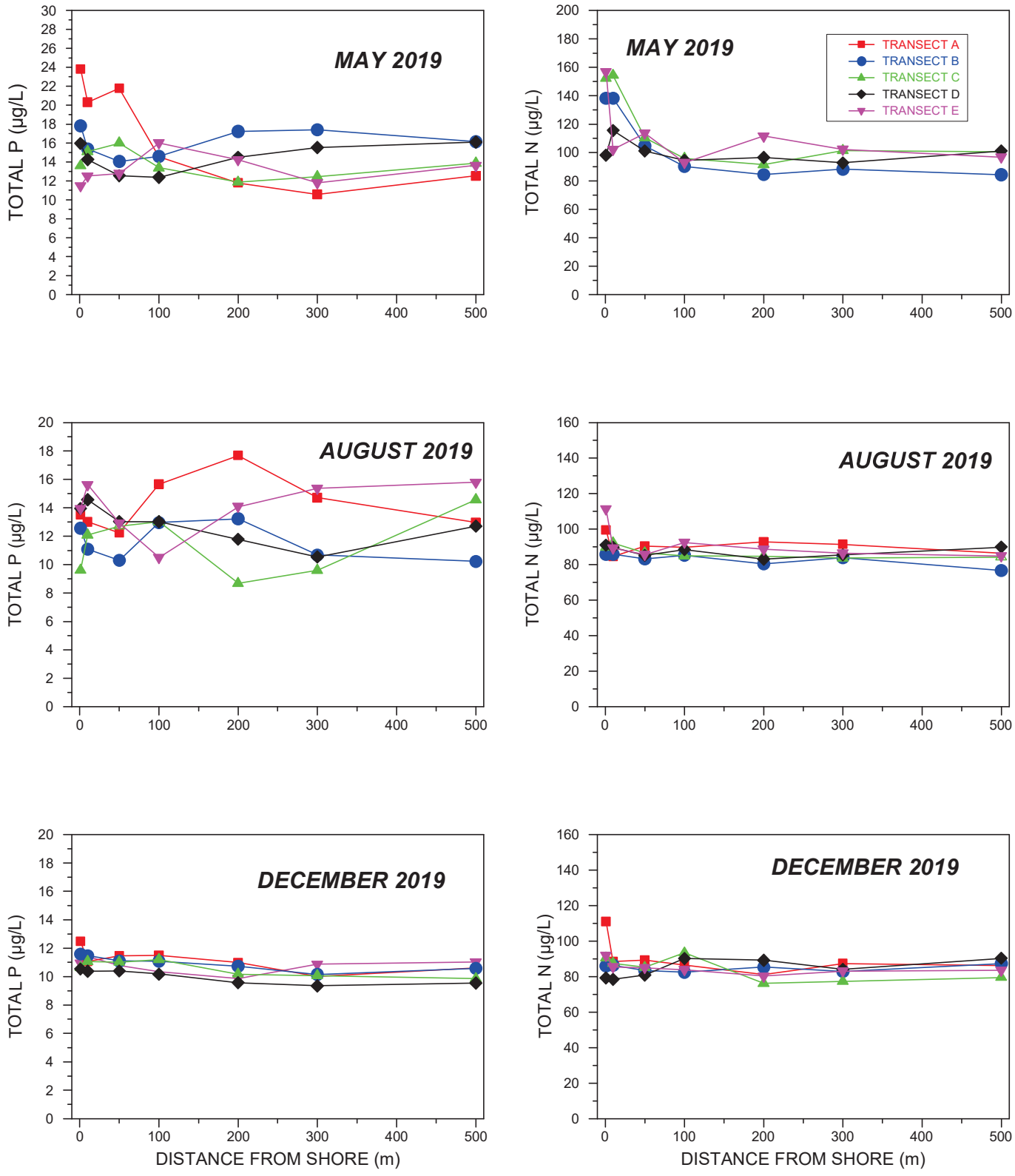


FIGURE 4. Plots of Total Phosphorus (TP) and Total Nitrogen (TN) as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

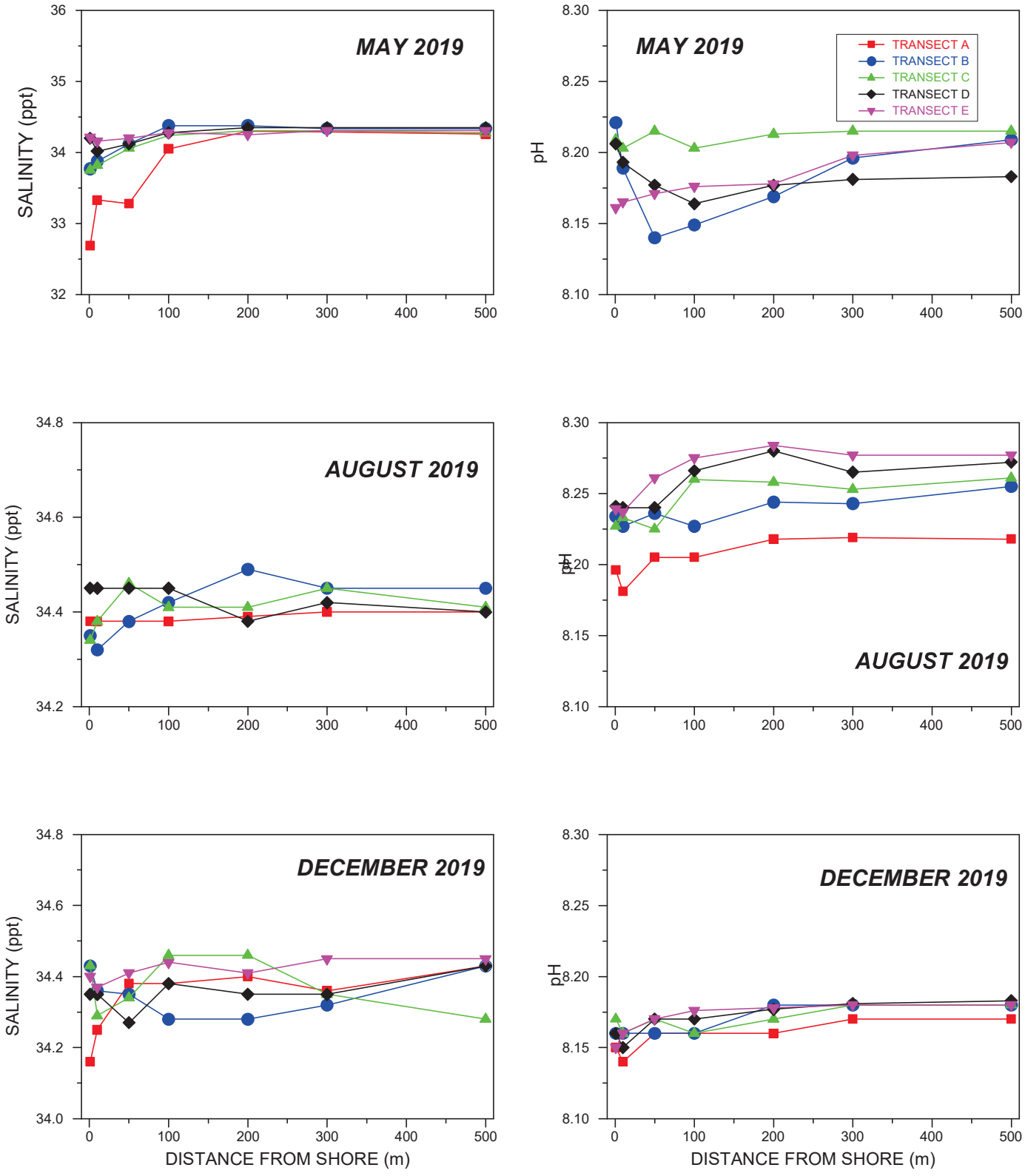


FIGURE 5. Plots of salinity and pH as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

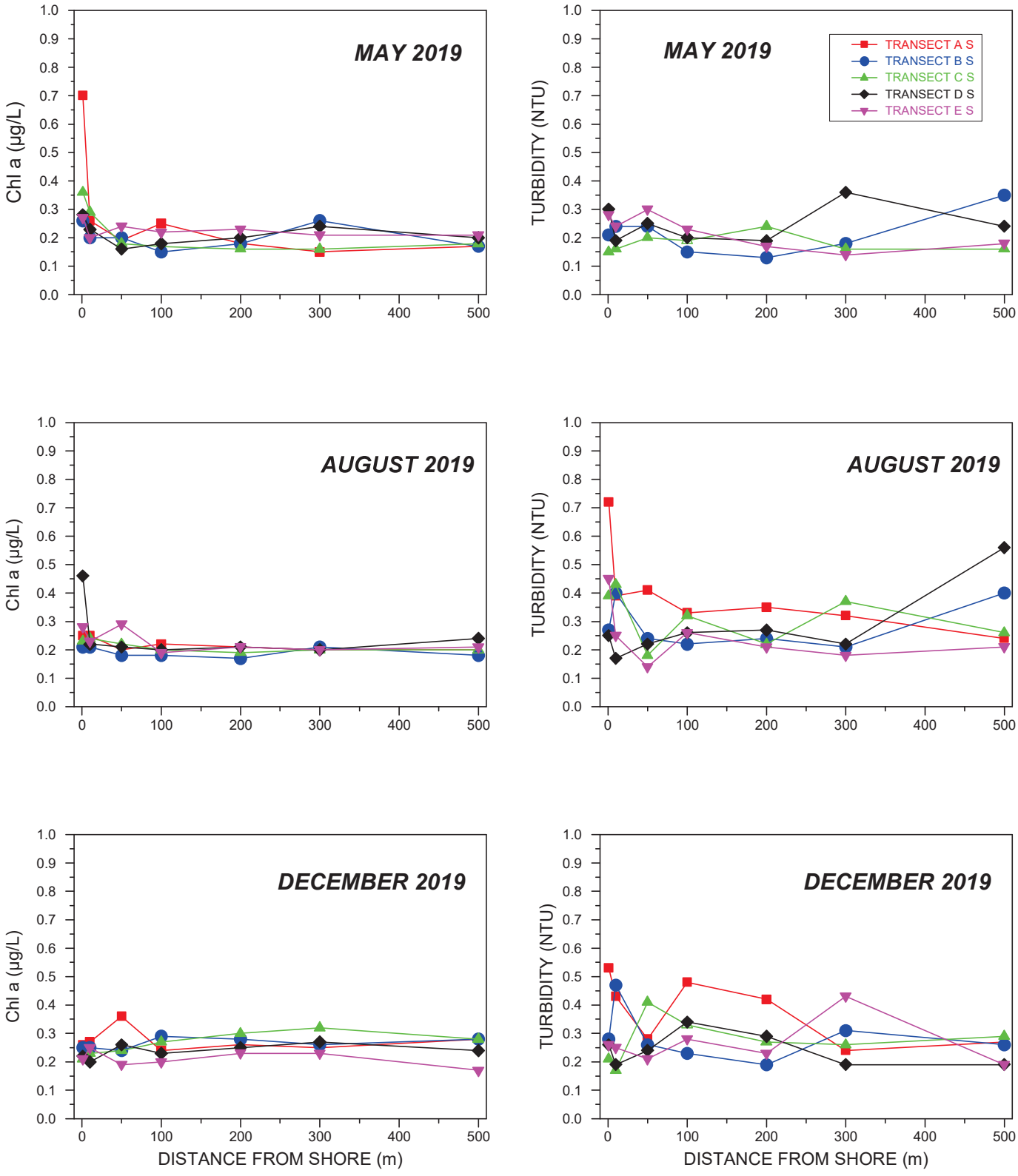


FIGURE 6. Plots of Chlorophyll *a* and Turbidity as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). For transect locations, see Figure 1.

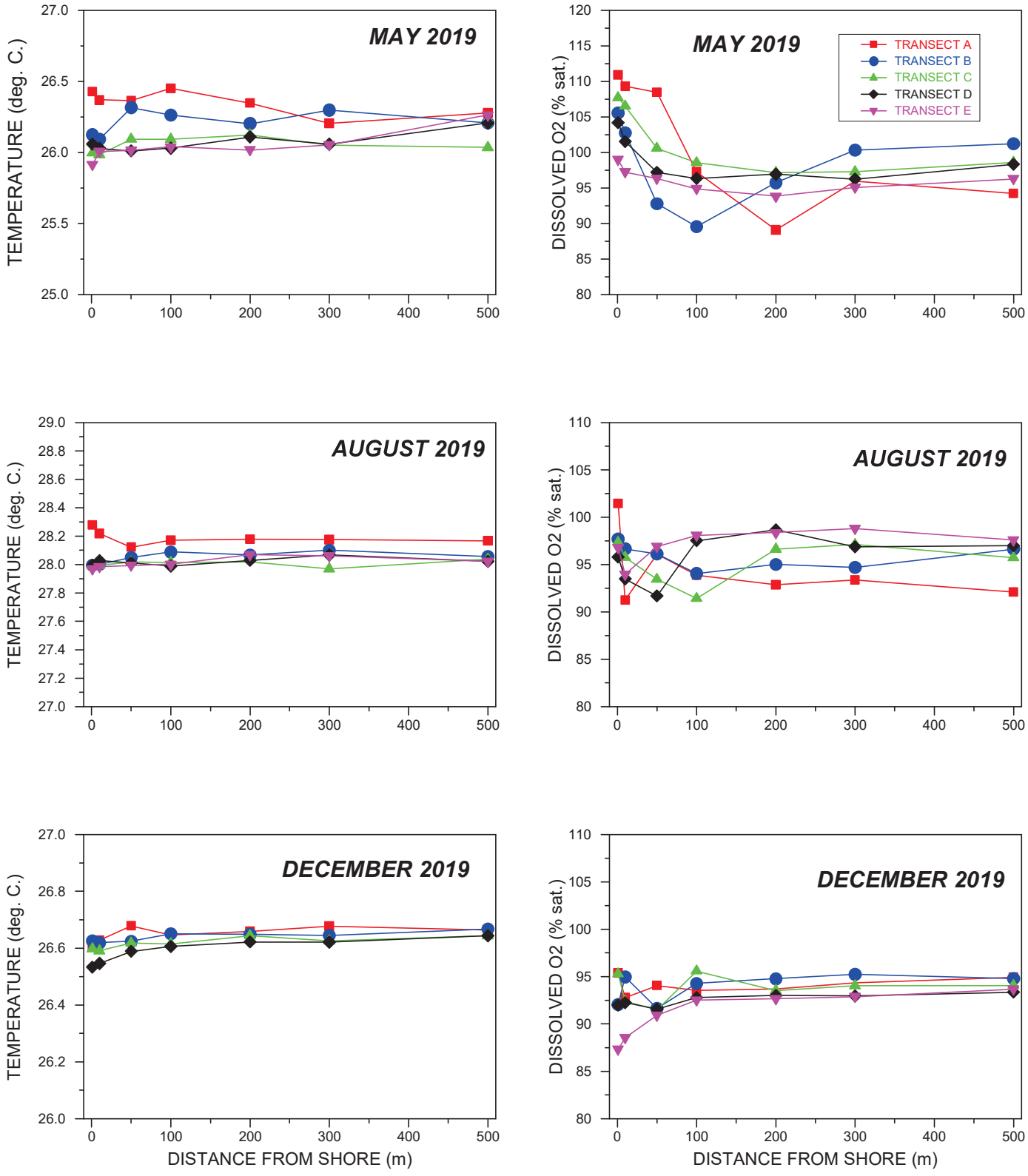


FIGURE 7. Plots of temperature and dissolved oxygen as functions of distance from the shoreline along five transects (A-E) off the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). Note changes in scale of Y axes. For transect locations, see Figure 1.

TABLE 4. Water chemistry measurements collected in six groundwater wells and one anchialine pool at Kaupulehu Development collected in May, August and December 2019. For well and pool locations, see Figure 1.

Analytical Method		EPA 365.5	Std Meth 4500-NO3 F	Std Meth 4500-NH3 G	EPA 366.0			Std Meth 4500-P	Std Meth 4500-N	EPA 150	Std Meth 2520	Std Meth 2130B
WELL NO.	DATE	PO_4^{3-} (µg/L)	NO_3^- (µg/L)	NH_4^+ (µg/L)	Si (µg/L)	TOP (µg/L)	TON (µg/L)	TP (µg/L)	TN (µg/L)	pH (rel)	Salt (ppt)	TURB (NTU)
POOL	5/19	166.06	1,197.98	13.76	18,299	20.13	549.47	186.19	1,761	7.74	2.98	6.93
	8/19	520.81	1,265.64	0.80	8,053	167.82	390.60	688.63	1,657	7.94	0.15	0.80
	12/19	166.78	2,682.79	0.78	25,282	19.13	474.82	185.91	3,158	-	2.22	0.20
1	5/19	165.25	3,070.21	3.53	19,305	9.89	229.70	175.14	3,303	8.04	3.19	0.49
	8/19	266.28	1,743.84	26.47	25,054	36.49	309.25	302.78	2,080	7.75	2.80	1.13
	12/19	191.27	1,889.97	1.29	23,966	14.35	312.20	205.62	2,203	8.05	2.30	1.00
2	5/19	175.22	2,233.95	6.40	21,587	18.72	550.83	193.94	2,791	8.01	2.32	0.62
	8/19	194.74	2,057.51	bdl	25,247	22.01	695.58	216.75	2,754	7.91	2.34	0.66
	12/19	204.60	2,300.17	0.69	25,107	27.90	396.94	232.50	2,698	8.02	1.81	2.20
3	5/19	153.90	2,786.88	2.35	19,196	16.10	307.99	170.01	3,097	8.00	1.82	1.36
	8/19	212.25	2,560.81	bdl	26,338	18.45	381.74	230.70	2,944	7.99	1.83	0.62
	12/19	229.71	1,492.04	35.32	22,747	31.90	298.66	261.61	1,826	7.77	3.65	0.70
4	5/19	141.04	2,893.35	2.11	16,487	5.45	408.67	146.48	3,304	8.09	2.55	1.69
	8/19	298.60	2,901.57	735.70	22,326	27.21	1,072.05	325.81	4,709	7.82	2.44	0.97
	12/19	167.40	2,822.01	1.02	25,739	27.81	223.23	195.21	3,046	8.15	2.66	0.60
5	5/19	144.98	3,172.76	1.72	19,977	4.29	284.07	149.27	3,459	8.12	2.68	1.96
	8/19	185.45	2,728.74	bdl	24,994	11.00	654.78	196.45	3,384	8.08	2.69	0.43
	12/19	167.71	2,599.55	1.41	23,417	21.33	463.36	189.04	3,064	8.09	3.46	2.20
6	5/19	167.40	3,178.67	2.48	16,528	4.79	500.99	172.20	3,682	8.06	3.30	1.82
	8/19	188.50	2,651.32	bdl	25,031	36.21	699.30	224.72	3,351	8.06	3.22	1.16
	12/19	194.37	2,633.12	0.97	23,789	23.56	529.35	217.93	3,163	8.13	2.69	1.20

bdl = below detection limit.

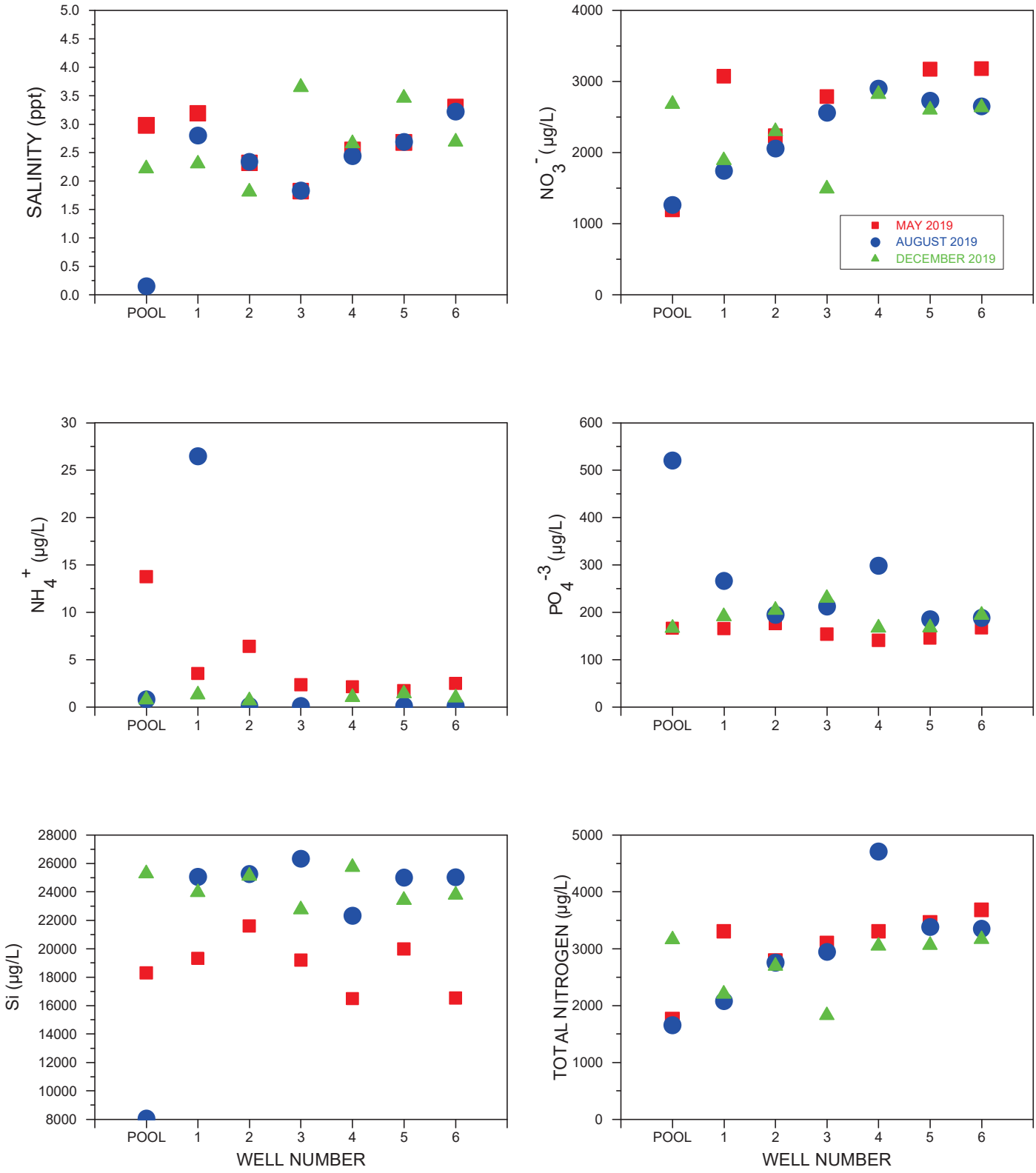


FIGURE 8. Plots of dissolved nutrients and salinity from six groundwater wells and one anchialine pool located in the Kaupulehu Development. Sampling was conducted three times in 2019 (May, August, December). For well locations, see Figure 1.

TABLE 5. Geometric means for quarterly water samples collected in 2018 (black) and 2019 (red) from five transects (A-E) off the Kaupulehu Development by the Environmental Assessment LLC. (EAL). At each transect samples were collected at seven distances from shore (0, 10, 50, 100, 200, 300 and 500 m). "S" indicates surface sample: "D" indicates deep sample. Also shown are data from an achialine pool and six wells located on the property. State of Hawaii Department of Health Water Quality Standards (WQS) for the Kona Coast of Hawaii are also shown. Values shaded in blue indicate exceedance of geometric mean WQS.

SAMPLE STATION	PO_4^{3-} (µg/L)	NO_3^- (µg/L)	NH_4^+ (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	pH	SALINITY (o/oo)	Chl *a* (µg/l)	TURB (NTU)	TEMP (deg. C)	Diss. O_2 (% sat.)
WQS	5.00	4.50	2.50		12.50	100.00			0.30	0.10		
A-0	13.75	99.43	8.22		20.04	206.62				0.29	26.11	97.75
	6.90	33.63	3.01		15.88	136.85			0.36	0.67	27.09	102.38
A-10S	12.01	80.19	3.96		16.81	165.51				0.20	26.18	98.00
	5.30	24.15	3.48		14.30	110.89				0.57	27.06	97.44
A-10D	6.08	18.58	4.39			118.18				0.17	26.19	97.00
	4.07	14.94			13.65	100.55				0.49		
A-50S	9.74	65.81	3.38		13.80	133.72				0.14	25.91	99.25
	5.07	17.15	2.74		14.50	117.25				0.33	27.04	99.34
A-50D	4.25	5.66	2.85							0.12	26.58	97.25
	3.67	9.53			13.50					0.28		
A-100S	6.46	18.76	2.47	255.84	11.75	92.52	8.03	34.37	0.14	0.10	26.02	99.75
	4.04	11.88			13.79					0.45	27.08	94.88
A-100D	3.38	4.46	1.58	78.18	9.84	89.40	8.03	34.61	0.14	0.12		
	3.20	5.32			13.71					0.31		
A-200S	6.16	12.49				108.00				0.15	26.42	100.00
	3.29	5.70			13.17					0.37		
A-300S	5.72	5.45	2.86		13.20					0.12	26.67	100.00
	3.11	4.67								0.34		
A-500S	3.14	5.37								0.23	27.02	93.74
B-0	8.23	34.02	4.52		12.63	119.98				0.18	26.16	98.75
	4.92	12.79			13.74	100.67				0.25		
B-10S	7.41	29.08	2.70			101.59				0.14	25.96	99.00
	4.57	14.78			12.50	100.83				0.36	26.89	98.08
B-10D	4.01	9.05	2.56							0.16	25.99	98.00
	4.05	9.32	2.57							0.36	26.87	99.12
B-50S	5.64	6.86	1.57	149.44	10.62	79.81	8.03	34.59	0.12	0.10		
	3.65	6.41	1.38	95.45	11.72	89.89	8.18	34.28	0.21	0.25		
B-50D	4.42	4.94	1.65	97.01	10.37	78.78	8.04	34.62	0.14	0.12		
	3.35	5.74	0.96	73.08	11.74	86.64	8.19	34.40	0.19	0.23		
B-100S	3.08	6.04			12.80					0.20	26.99	92.61
B-100D	3.79	2.32	1.50	59.01	9.90	71.02	8.05	34.58	0.15	0.11		
	3.18	4.54			13.46					0.22	26.73	99.15
B-200S	3.35	1.38	1.11	53.49	9.58	74.44	8.06	34.67	0.16	0.11		
	2.65	4.05	1.18	42.52	13.47					0.18		
B-300S	2.45	3.42	0.81	45.37	12.35	85.03	8.21	34.37	0.24	0.23		
B-500S	2.50	2.53	0.72	39.72	12.04	82.70	8.21	34.41	0.20	0.33	26.97	97.52
C-0	10.04	72.85	5.10	780.66	13.59	158.41	8.05	33.88	0.18	0.14	26.06	98.99
	4.39	14.06	4.39	154.77	11.16	107.26	8.20	34.17	0.26	0.23	26.85	99.97
C-10S	8.07	45.94	2.53	544.44	13.07	132.23	8.04	34.14	0.18	0.12	25.83	98.99
	4.28	11.41	2.77	136.50	12.65	107.55	8.20	34.16	0.25	0.23	26.84	98.04
C-10D	5.44	13.52	4.48	194.48	11.31	102.70	8.04	34.49	0.16	0.14	25.96	97.50
	3.42	6.13	2.50	70.50	11.77	89.05	8.20	34.35	0.21	0.21	26.81	96.77
C-50S	5.90	16.82	2.65	279.82	13.34	97.47	8.04	34.22	0.17	0.11	26.34	99.25
	4.20	8.39	2.40	102.91	13.08	93.38	8.20	34.29	0.21	0.25	26.90	95.09
C-50D	4.68	4.45	1.34	91.77	10.65	95.06	8.05	34.60	0.14	0.10	25.83	97.50
	3.36	4.34	1.54	41.84	13.22	86.11	8.21	34.42	0.19	0.28	26.78	97.72
C-100S	5.29	6.66	1.38	157.28	13.85	80.05	8.05	34.51	0.16	0.08	26.13	99.50
	3.13	6.43	2.08	81.55	12.50	91.25	8.21	34.37	0.21	0.27	26.90	95.15
C-100D	3.72	2.39	1.66	69.44	12.04	85.89	8.06	34.59	0.15	0.10	26.29	97.00
	2.56	2.86	0.76	35.27	11.89	77.69	8.22	34.39	0.18	0.21	26.76	98.17
C-200S	3.58	1.77	1.89	57.40	11.58	78.56	8.06	34.64	0.16	0.09	26.22	100.50
	2.80	3.46	1.28	58.84	10.16	83.91	8.21	34.39	0.21	0.24	26.92	95.78
C-300S	3.50	1.06	1.67	50.70	10.18	75.80	8.06	34.63	0.16	0.09	26.49	100.50
	2.89	3.49	0.84	68.41	10.64	86.87	8.22	34.37	0.22	0.25	26.87	96.14
C-500S	3.59	0.90	0.85	47.55	9.79	70.67	8.07	34.70	0.13	0.08	26.47	100.50
	3.02	3.87	1.24	78.84	12.59	87.65	8.22	34.32	0.22	0.23	26.89	96.11

TABLE 5. continued.

SAMPLE STATION	PO_4^{3-} (µg/L)	NO_3^- (µg/L)	NH_4^+ (µg/L)	Si (µg/L)	TP (µg/L)	TN (µg/L)	pH	SALINITY (o/oo)	Chl *a* (µg/l)	TURB (NTU)	TEMP (deg. C)	Diss. O_2 (% sat.)
D-0	4.70	8.89	2.53			124.13				0.13	25.86	99.00
	3.90	8.13	2.26	93.24	13.28	89.06	8.20	34.33	0.30	0.27	26.85	97.20
D-10S	5.47	10.70	4.45	156.31	11.07	87.05	8.04	34.54	0.15	0.12	25.96	99.00
	4.16	10.05	2.93	107.02	12.92	93.28	8.19	34.27	0.22	0.18	26.85	95.67
D-10D	4.40	8.13	2.03	123.40	11.26	94.25	8.03	34.60	0.14	0.14	26.08	98.00
	3.54	7.04	1.75	67.66	12.02	84.33	8.19	34.35	0.20	0.21	26.81	94.22
D-50S	4.59	3.78	1.20	86.41	11.14	79.31	8.05	34.64	0.17	0.08	26.11	100.00
	3.32	6.27	1.95	78.91	11.93	88.58	8.20	34.28	0.21	0.24	26.86	93.45
D-50D	3.84	2.99	1.66	80.69	10.62	82.51	8.05	34.66	0.15	0.11	26.25	98.00
	3.30	5.02	2.29	49.08	11.31	88.92	8.20	34.43	0.16	0.23	26.78	94.35
D-100S	3.52	1.56	0.98	54.08	10.24	71.24	8.06	34.67	0.15	0.07	26.26	100.00
	3.08	5.14	2.29	71.03	11.80	91.00	8.20	34.37	0.20	0.26		
D-100D	3.60	2.13	1.37	55.25	10.91	77.34	8.06	34.69	0.14	0.10	26.25	97.25
	3.31	4.32	1.88	39.61	11.80	88.10	8.21	34.39	0.21	0.33	26.74	97.02
D-200S	3.99	1.94	1.00	54.24	10.94	77.70	8.06	34.65	0.15	0.08	26.06	100.00
	2.76	4.79	1.49	63.99	11.78	89.45	8.21	34.36	0.22	0.25	26.91	96.18
D-300S	3.38	1.43	1.10	50.74	10.81	77.44	8.06	34.66	0.14	0.07	26.47	100.25
	2.53	5.26	1.07	64.76	11.53	87.33	8.21	34.37	0.23	0.25	26.90	95.34
D-500S	3.79	1.24	0.92	52.91	10.07	74.31	8.07	34.68	0.16	0.08	26.45	100.50
	2.59	5.32	2.71	60.85	12.51	93.57	8.21	34.39	0.23	0.29	26.95	96.20
E-0	6.77	14.59	3.67	207.31	12.37	103.92	8.04	34.54	0.17	0.13	26.10	99.25
	2.51	7.32	3.69	94.56	12.04	116.97	8.18	34.33	0.25	0.32	26.79	94.23
E-10S	6.71	14.46	2.38	336.03	11.50	90.15	8.02	34.42	0.16	0.11	26.22	99.25
	3.91	6.94	2.40	86.85	13.08	91.98	8.19	34.32	0.23	0.25	26.84	93.18
E-10D	4.50	6.89	2.38	154.46	11.19	97.90	8.02	34.59	0.15	0.14	26.20	98.00
	4.25	4.74	1.69	62.30	12.75	87.45	8.19	34.38	0.18	0.24	26.76	92.03
E-50S	5.77	9.65	1.60	173.63	11.81	84.36	8.03	34.52	0.16	0.10	26.03	99.75
	2.98	5.49	2.94	82.79	12.11	93.80	8.20	34.34	0.24	0.21	26.85	94.68
E-50D	3.86	4.17	2.72	86.88	10.11	98.31	8.04	34.71	0.17	0.12	26.23	97.50
	3.06	4.91	2.49	53.37	12.35	85.63	8.20	34.40	0.18	0.23	26.74	95.50
E-100S	4.00	3.79	1.44	95.49	10.48	103.31	8.05	34.56	0.15	0.10	26.50	100.25
	2.95	5.15	2.21	73.01	12.03	89.60	8.21	34.38	0.20	0.26	26.87	95.13
E-100D	3.50	3.57	1.86	69.05	11.63	84.23	8.05	34.69	0.16	0.10	26.20	97.25
	2.67	2.56	1.87	32.05	12.34	83.50	8.21	34.44	0.20	0.25	26.64	98.80
E-200S	4.11	3.07	2.07	68.10	10.22	79.95	8.06	34.65	0.16	0.10	26.30	100.50
	2.97	5.09	1.68	83.14	12.55	92.67	8.21	34.37	0.22	0.20	26.88	94.94
E-300S	3.54	1.52	1.50	54.93	10.87	75.55	8.06	34.74	0.15	0.08	26.53	100.50
	3.04	3.80	1.94	64.24	12.54	90.20	8.22	34.38	0.21	0.22	26.90	95.56
E-500S	3.92	1.06	1.63	50.30	10.12	72.09	8.07	34.71	0.13	0.07	26.78	100.50
	2.74	2.99	1.14	53.16	13.35	88.12	8.22	34.40	0.20	0.19		
POOL	383	861	158.03	32,056	454.58	1,664	7.62	3.27		0.58		
	243	1,596	2.05	15,502	287.79	2,097	7.84	1.00		1.04		
WELL 1	170	2,320	3.61	31,911	186.37	2,910	7.69	3.72		0.58		
	203	2,163	4.94	22,632	221.75	2,474	7.94	2.74		0.82		
WELL 2	192	2,496	3.26	30,356	243.10	3,064	7.85	2.71		0.22		
	191	2,195	2.09	23,919	213.81	2,747	7.98	2.14		0.97		
WELL 3	197	2,483	3.68	30,611	238.85	3,096	7.92	2.87		0.25		
	196	2,200	9.10	22,572	217.30	2,553	7.92	2.30		0.84		
WELL 4	208	1,966	2.68	33,219	238.60	2,507	7.90	1.92		0.21		
	192	2,872	11.67	21,160	210.42	3,619	8.02	2.55		0.99		
WELL 5	192	1,614	5.23	30,068	218.39	2,074	7.82	2.38		0.23		
	165	2,823	1.56	22,697	176.98	3,298	8.10	2.92		1.23		
WELL 6	174	2,190	2.94	33,689	196.39	2,825	7.76	2.39		0.26		
	183	2,810	1.55	21,430	203.54	3,392	8.08	3.06		1.36		

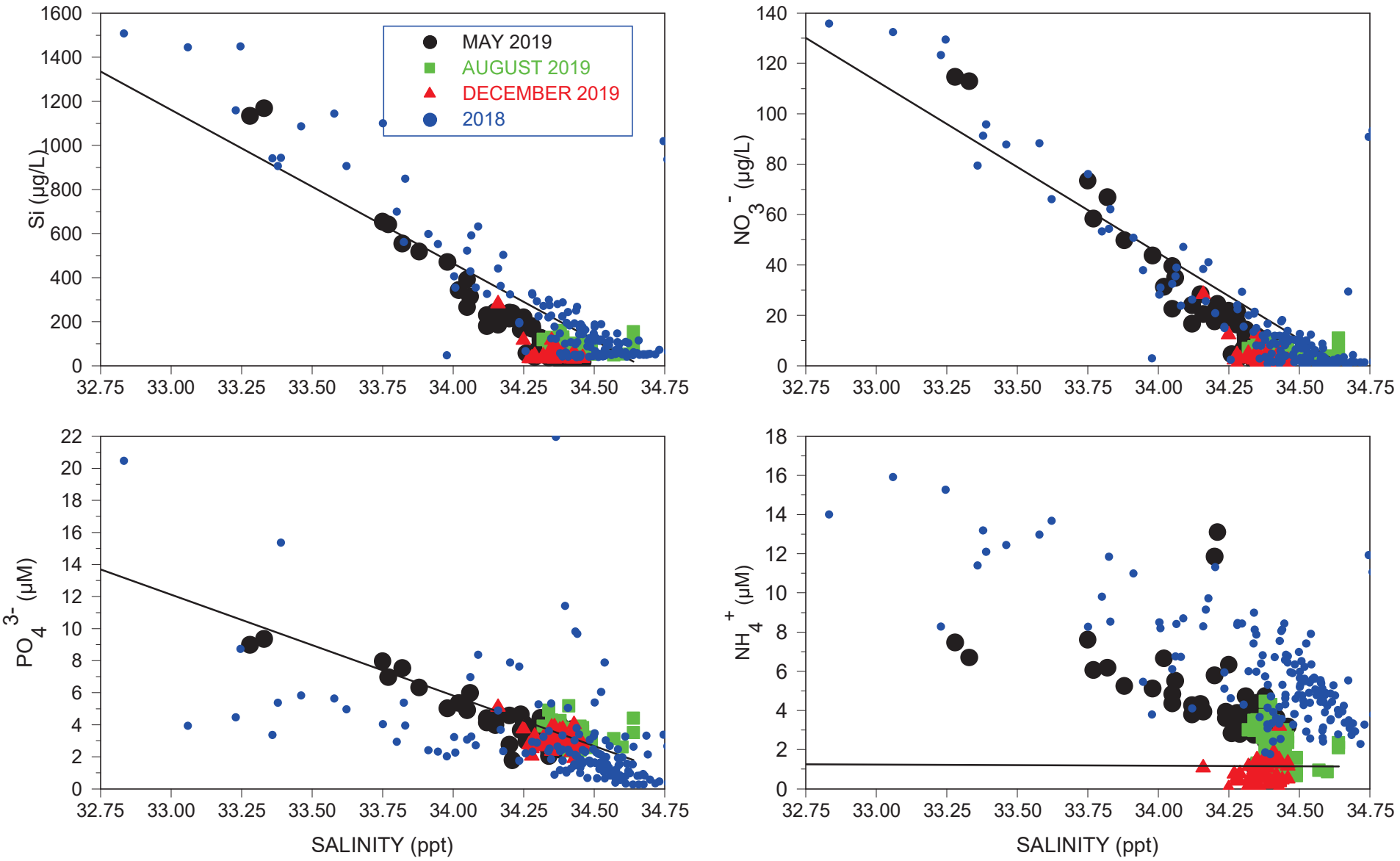


FIGURE 9. Mixing diagram showing concentration of dissolved nutrients from samples collected on four transects off the Kaupulehu Development during three surveys in 2019 as functions of salinity. Also shown are data from four surveys conducted by EAL in 2018. Straight lines in each plot are conservative mixing lines constructed by connecting the concentrations in Wells 1-3 and open coastal water. For sampling site locations, see Figure 1.

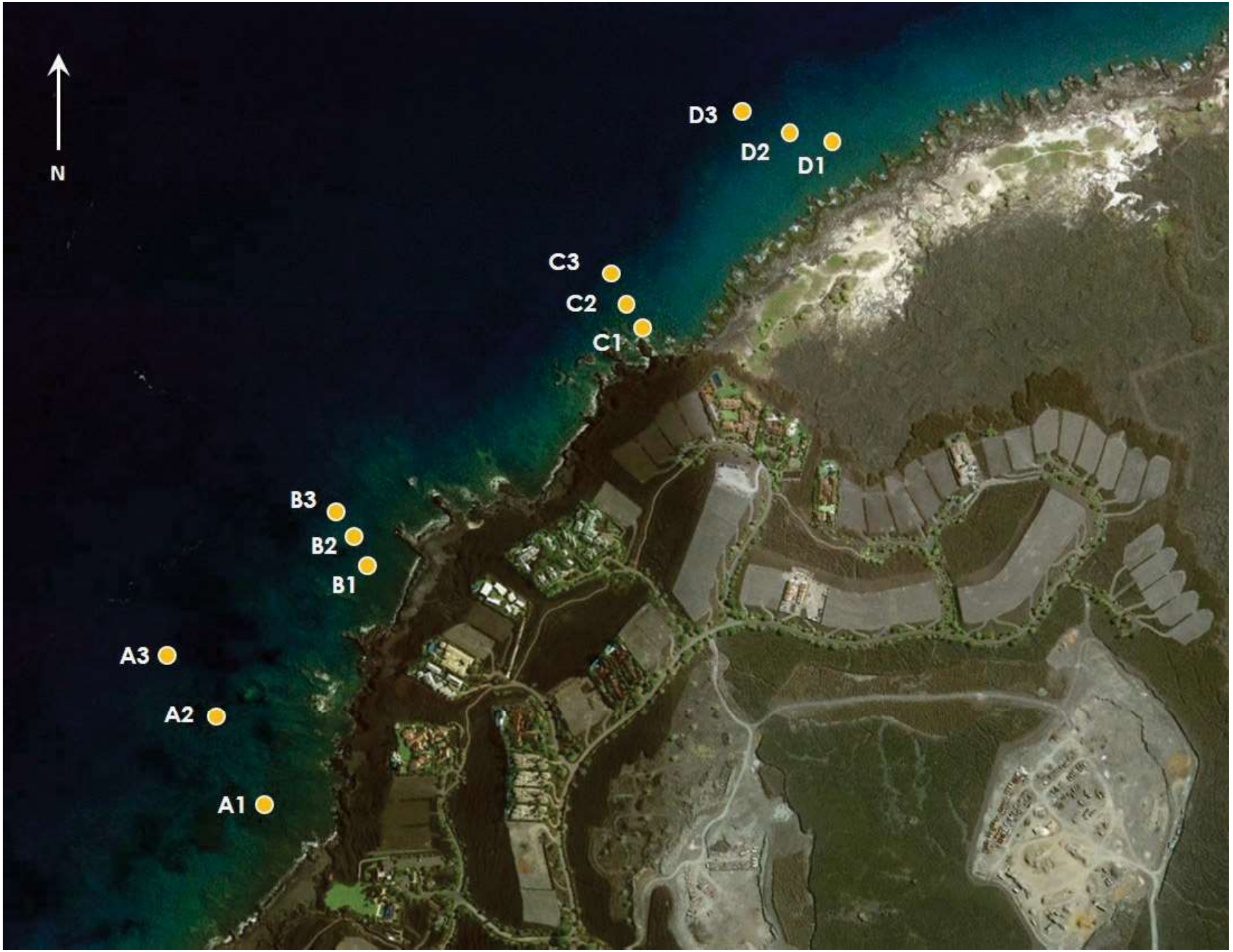


FIGURE 10. Aerial photo of Kaupulehu Development and locations of four marine biota monitoring transects. Three survey stations were established on each transect, A1-D1 are located in the shallow boulder zone; A2-D2 are located in the mid-depth platform zone; and A3 to D3 are located in the deep slope zone.

TABLE 6. Coordinates of marine biota monitoring stations off the Kaupulehu Development. For location of stations, see Figure 10.

STATION	LATITUDE (N)	LONGITUDE (W)
A1	19.8390	-155.9822
A2	19.8402	-155.9829
A3	19.8411	-155.9836
B1	19.8424	-155.9806
B2	19.8428	-155.9808
B3	19.8431	-155.9811
C1	19.8458	-155.9765
C2	19.8461	-155.9767
C3	19.8465	-155.9770
D1	19.8484	-155.9736
D2	19.8485	-155.9742
D3	19.8488	-155.9750

FIGURE 11. Representative views of shallow boulder zone off of Kaupulehu Development. Water depth is approximately 15 feet.

FIGURE 12. Orthomosaic of Transect B – Shallow boulder zone (B1). Ka'upulehu Development marine biota survey on August 6, 2019.

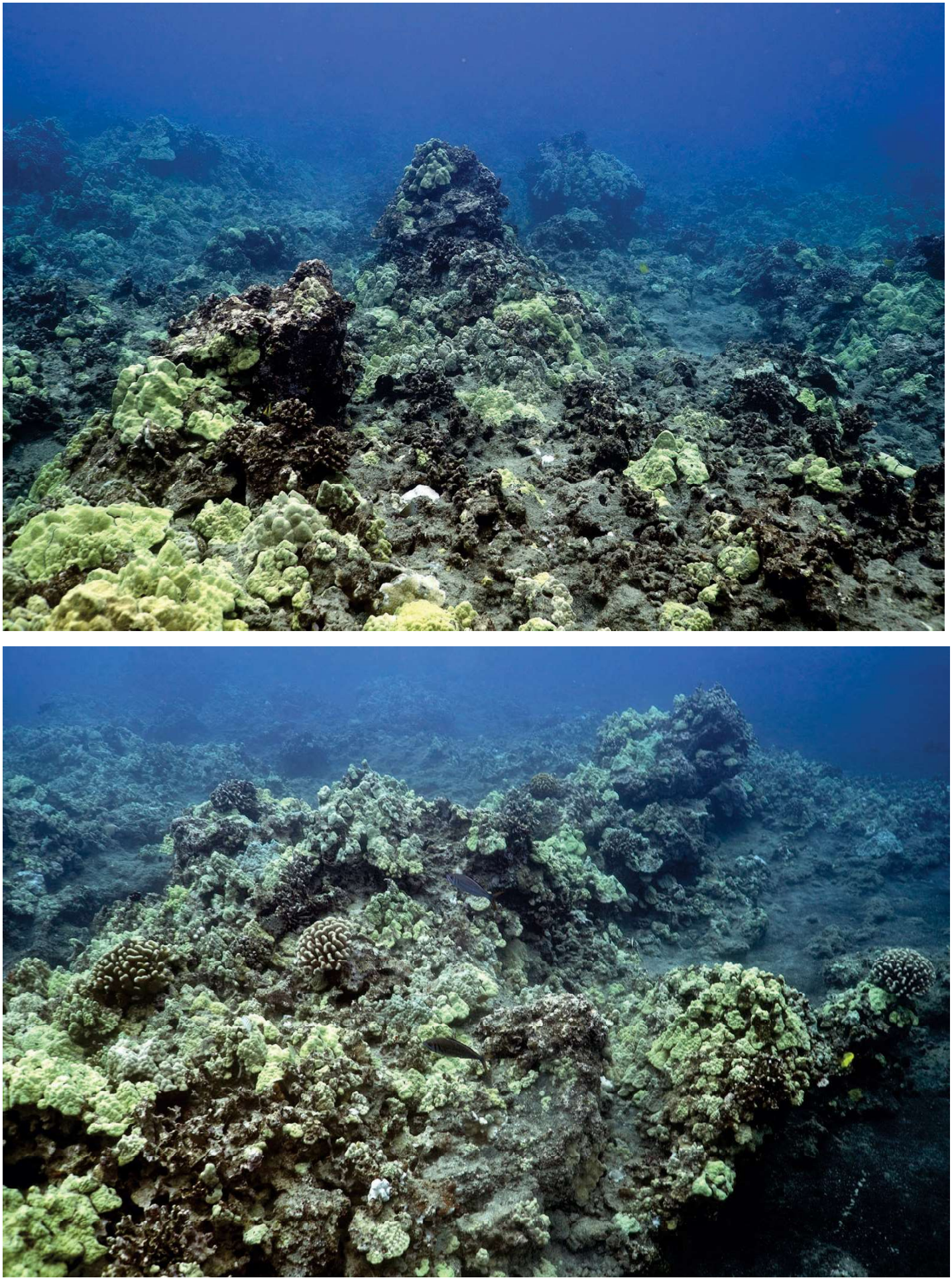


FIGURE 13. Representative views of mid-depth platform zone off of Ka upulehu Development. Water depth is approximately 30 feet.

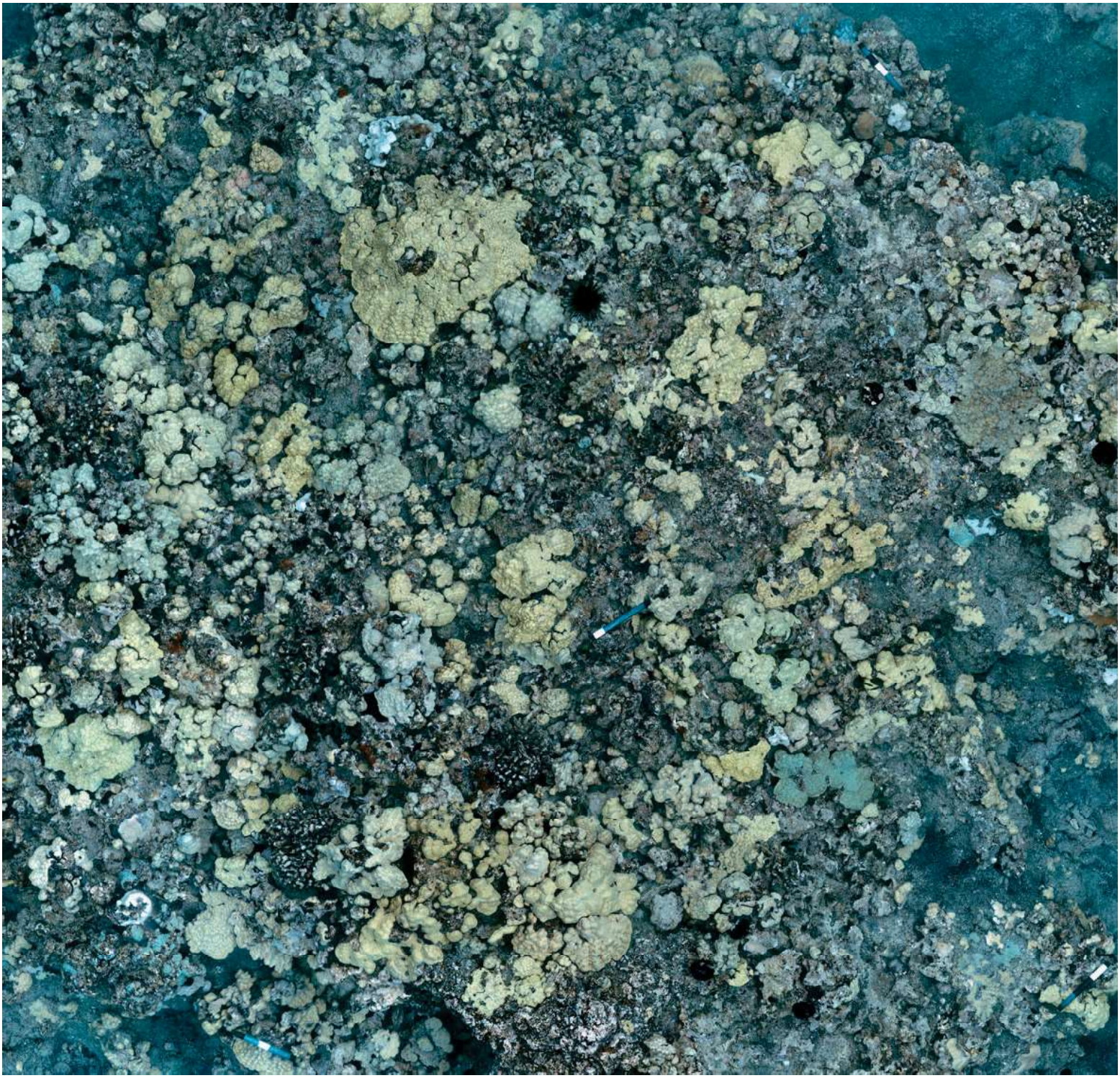


FIGURE 14. Orthomosaic of Transect A – Mid-depth platform zone A2 . Ka upulehu Development marine biota survey on August 6, 2019.

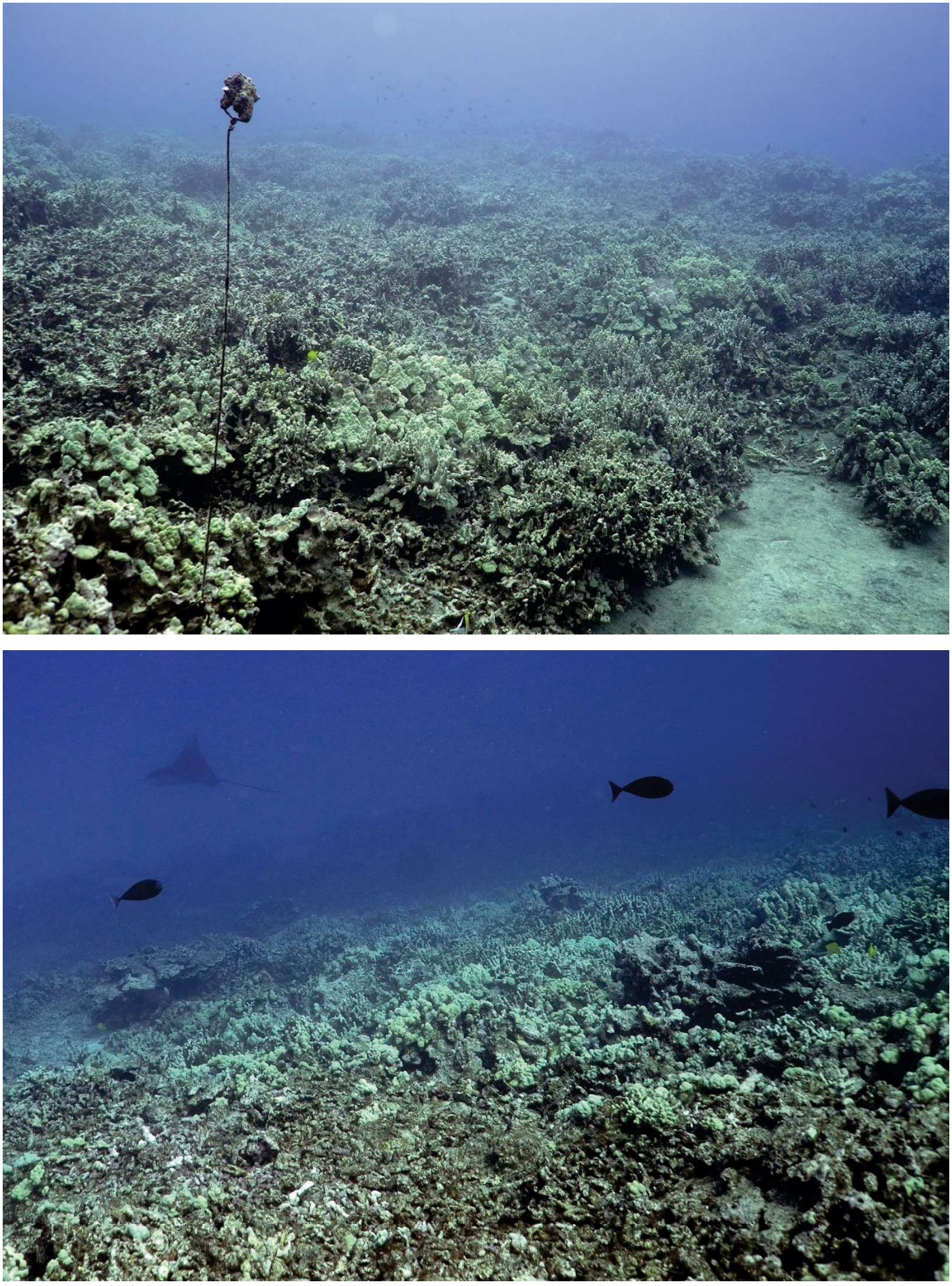


FIGURE 15. Representative views of deep slope zone off of Kaupulehu Development. Buoy in upper photo marks location of survey station. Water depth is approximately 50 feet.

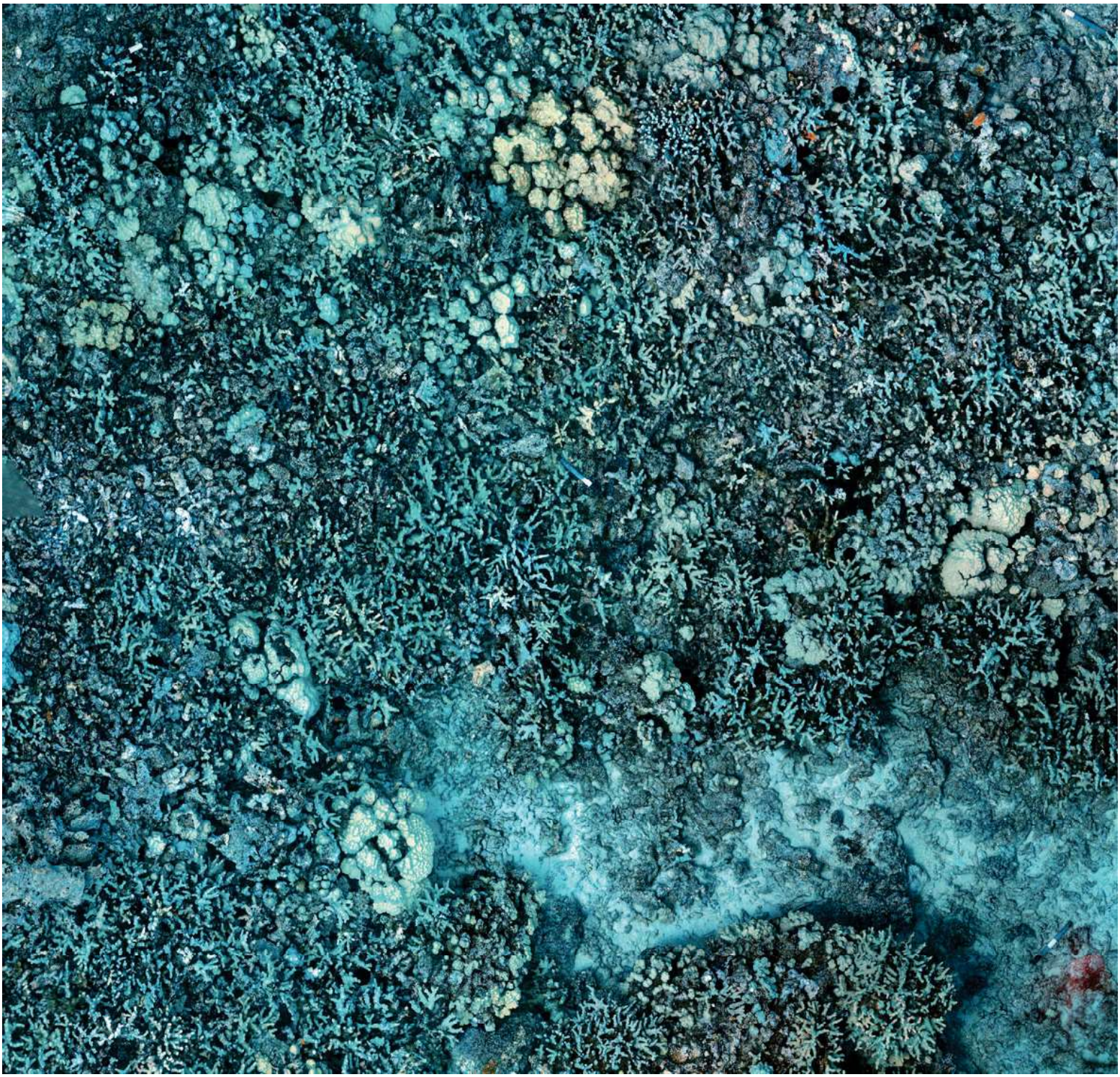


FIGURE 16. Orthomosaic of Transect D – Deep slope zone (D3). Ka'upulehu Development marine biota survey on August 6, 2019.

TABLE 7. Results of point count analyses of orthomosaic images from reef surveys off of Ka upulehu Development on August 6, 2019. For locations of survey sites, see Figure 10.

Species	SURVEY STATION															
	Boulder Zone					Platform Zone					Slope Zone					
	A1	**B1**	**C1**	**D1**	**AVG.**	**A2**	**B2**	**C2**	**D2**	**AVG.**	**A3**	**B3**	**C3**	**D3**	**D3**	**AVG.**
Montipora capitata	4.5	0.5	0.5	0.5	**1.5**	3.0	-	-	-	**0.8**	-	1.5	1.5	0.5	0.5	**1.0**
Montipora patula	-	2.0	-	-	**0.5**	-	-	-	-	**-**	-	0.5	-	0.5	0.5	**0.4**
Montipora flabelata	-	-	-	0.1	**0.0**	-	-	-	-	**-**	-	-	-	-	-	**-**
Pavona duerdeni	-	-	-	-	**-**	-	-	1.0	-	**0.3**	-	-	-	-	-	**-**
Pavona varians	-	0.5	-	-	**0.1**	-		0.5	-	**0.3**	-	-	-	-	-	**-**
Pocillopora meandrina	-	0.5	1.0	0.5	**0.5**	-	1.5	-	-	**0.4**	0.5	-	-	-	-	**-**
Pocillopora grandis	-	-	-	-	**-**	-	-	-	0.1	**-**	-	-	-	-	-	**-**
Porites compressa	-	-	-	-	**-**	-	0.5	3.0	0.5	**0.9**	27.5	11.0	16.5	29.0	29.0	**21.4**
Porites evermanni	-	-	0.5	1.5	**0.5**	1.0	-	0.5	1.0	**0.6**	-	0.5	-		-	**0.1**
Porites lobata	13.0	21.5	27.5	24.5	**21.6**	32.0	39.0	44.5	41.0	**39.1**	17.0	43.5	21.0	15.0	15.0	**23.6**
Total Coral Cover	**17.5**	**25.0**	**29.5**	**27.0**	**24.8**	**36.0**	**41.0**	**49.5**	**42.5**	**42.3**	**45.0**	**57.0**	**39.0**	**45.0**	**45.0**	**46.5**
Crustose coralline algae	-	4.0	1.0	12.5	**4.4**	2.0	3.0	3.5	1.5	**2.5**	1.0	0.5	1.0	3.0	3.0	**1.9**
Macroalgae	0.5	-	-	-	**0.1**	-	-	-	-	**-**	0.5	-	-	0.5	0.5	**0.3**
Turf Algae	-	-	-	-	**-**	-	-	-	-	**-**	-	-	1.5	-	-	**0.4**
Urchin	-	-	-	-	**-**	-	0.5	-	-	**0.1**	-	-	-	-	-	**-**
Dead Coral	0.5	2.5	4.0	3.0	**2.5**	0.5	2.5	1.5	1.5	**1.5**	2.5	1.0	0.5	-	-	**0.4**
Basalt/Limestone	79.0	59.5	61.0	54.5	**63.5**	59.5	52.5	45.5	50.0	**51.9**	44.5	41.5	50.0	37.5	37.5	**41.6**
Rubble	-	-	-	-	**-**	-	-	-	0.5	**0.1**	6.5	-	6.5	12.5	12.5	**7.9**
Sand	2.5	9.0	4.5	3.0	**4.8**	2.0	0.5	-	4.0	**1.6**	-	-	1.5	1.5	1.5	**1.1**

TABLE 8. Comparison of coral community components from surveys off Ka upulehu Development from 1993 to 2019. Surveys shown in bold type (1993, 2002, 2019) were conducted by Marine Research Consultants (MRC); Other surveys were conducted by Environmental Assessment, LLC (EAL). "NA" indicates no survey was conducted by EAL.

NUMBER OF CORAL SPECIES

ZONE	TRANSECT		SURVEY YEAR														
	EAL	**MRC**	**1993**	**2002**	2005	2006	2007	2008	2009	2011	2012	2013	2014	2015	2016	2017	**2019**
BOULDER	1	**A1**	**8**	**7**	6	6	7	7	8	6	7	6	6	5	NA	6	**5**
	4	**B1**	**7**	**5**	4	4	5	6	6	6	8	6	7	7	NA	7	**5**
	7	**C1**	**5**	**8**	6	6	6	7	5	7	5	6	8	6	5	5	**4**
	10	**D1**	**7**	**6**	6	6	3	9	7	6	8	7	8	4	4	4	**6**
PLATFORM	2	**A2**	**6**	**6**	7	7	5	8	7	5	6	7	3	6	NA	5	**3**
	5	**B2**	**7**	**7**	6	6	8	8	7	7	6	9	5	6	NA	5	**4**
	8	**C2**	**8**	**6**	6	6	7	6	7	6	5	7	6	6	4	4	**7**
	11	**D2**	**8**	**7**	5	7	7	8	7	7	7	8	8	6	3	5	**7**
SLOPE	3	**A3**	**2**	**6**	5	6	6	5	6	5	6	6	4	5	NA	3	**3**
	6	**B3**	**4**	**6**	4	6	7	6	6	7	6	8	4	5	NA	3	**7**
	9	**C3**	**4**	**5**	6	5	5	6	6	4	6	6	5	3	4	3	**3**
	12	**D3**	**4**	**6**	7	5	6	5	5	5	5	7	5	4	3	4	**4**

% CORAL COVER

ZONE	TRANSECT		SURVEY YEAR														
	EAL	**MRC**	**1993**	**2002**	2005	2006	2007	2008	2009	2011	2012	2013	2014	2015	2016	2017	**2019**
BOULDER	1	**A1**	**36.1**	**52.3**	13.9	9.4	10.4	22.6	16.8	17.5	23.9	20.8	30.0	14.4	NA	12.8	**17.5**
	4	**B1**	**24.9**	**63.7**	7.1	16.1	16.7	19.4	27.3	24.3	30.5	34.3	42.9	19.7	NA	22.6	**25.0**
	7	**C1**	**17.8**	**46.4**	21.9	13.6	18.0	31.6	28.0	39.5	34.6	31.5	33.2	27.1	14.7	22.1	**29.5**
	10	**D1**	**17.7**	**27.9**	23.4	28.0	18.5	23.5	29.3	32.6	48.7	51.6	36.9	16.8	26.0	26.3	**27.0**
PLATFORM	2	**A2**	**68.2**	**64.2**	29.4	31.9	37.5	38.6	47.5	38.8	40.4	38.6	35.6	23.2	NA	27.5	**36.0**
	5	**B2**	**52.7**	**91.1**	19.3	26.2	33.8	34.7	46.1	52.0	55.0	51.8	51.7	36.6	NA	40.5	**41.0**
	8	**C2**	**65.8**	**78.9**	26.4	35.3	31.2	33.0	26.0	50.4	45.5	50.4	62.0	22.8	27.2	27.8	**49.5**
	11	**D2**	**65.4**	**80.5**	35.5	35.2	52.3	57.3	47.9	51.4	55.2	64.4	63.8	23.3	28.6	25.4	**42.5**
SLOPE	3	**A3**	**77.6**	**93.4**	51.0	39.5	36.2	46.0	36.5	48.4	35.0	43.5	33.7	32.3	NA	34.3	**45.0**
	6	**B3**	**80.7**	**89.0**	37.2	16.8	58.2	49.9	54.4	72.6	53.6	74.6	68.9	41.0	NA	42.1	**57.0**
	9	**C3**	**77.4**	**66.7**	21.0	34.0	29.2	37.8	36.7	43.4	49.1	59.5	38.0	17.5	32.5	30.0	**39.0**
	12	**D3**	**78.9**	**82.9**	29.6	26.0	20.9	32.9	29.9	38.8	23.1	40.2	18.8	16.2	10.2	11.8	**45.0**

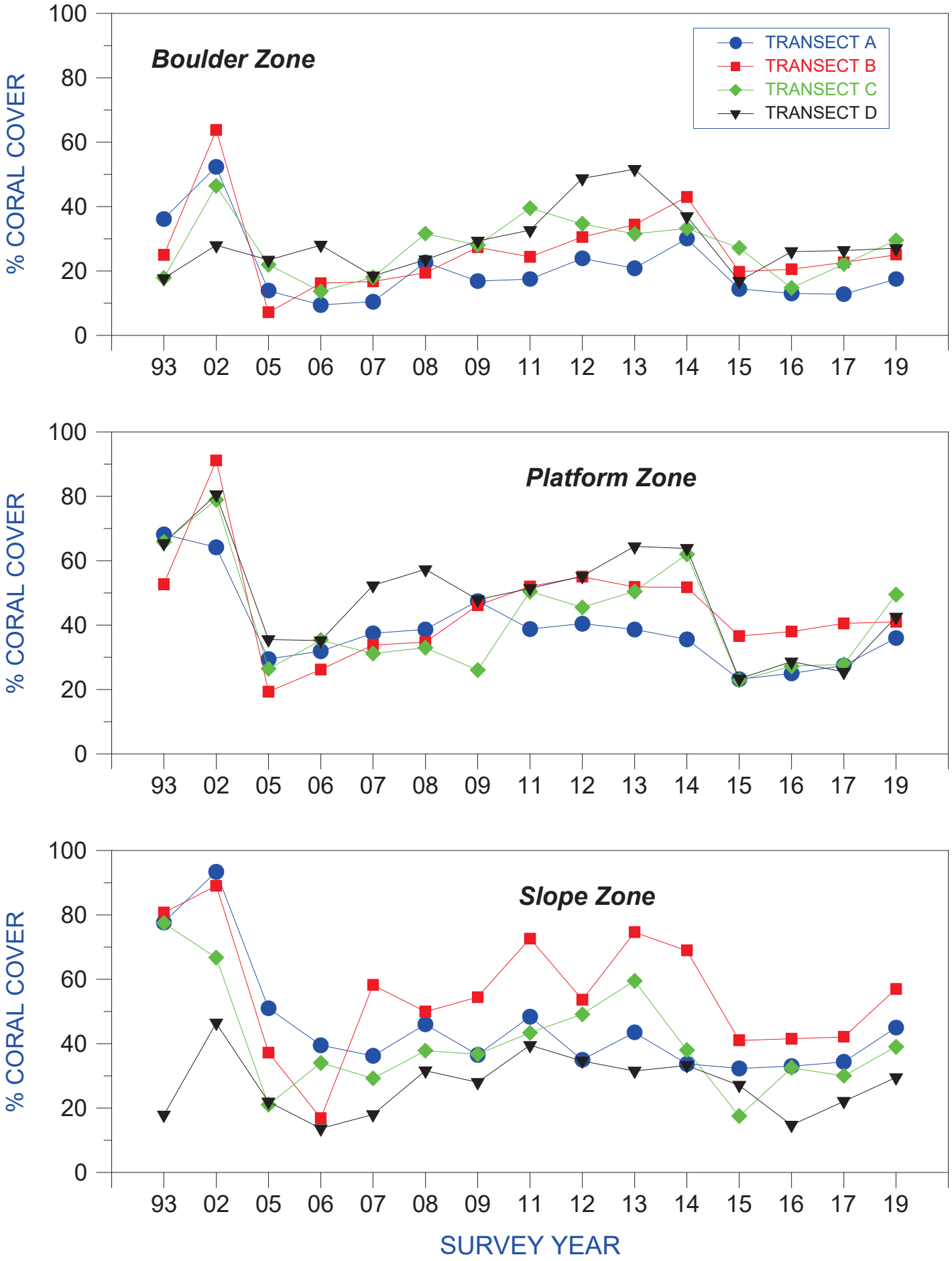


FIGURE 17. Plots of percent coral cover on four transects off Ka upulehu Development. On each transect three sites were surveyed, one in each of the three major reef zones. See Figure 10 for locations of transects and survey sites.

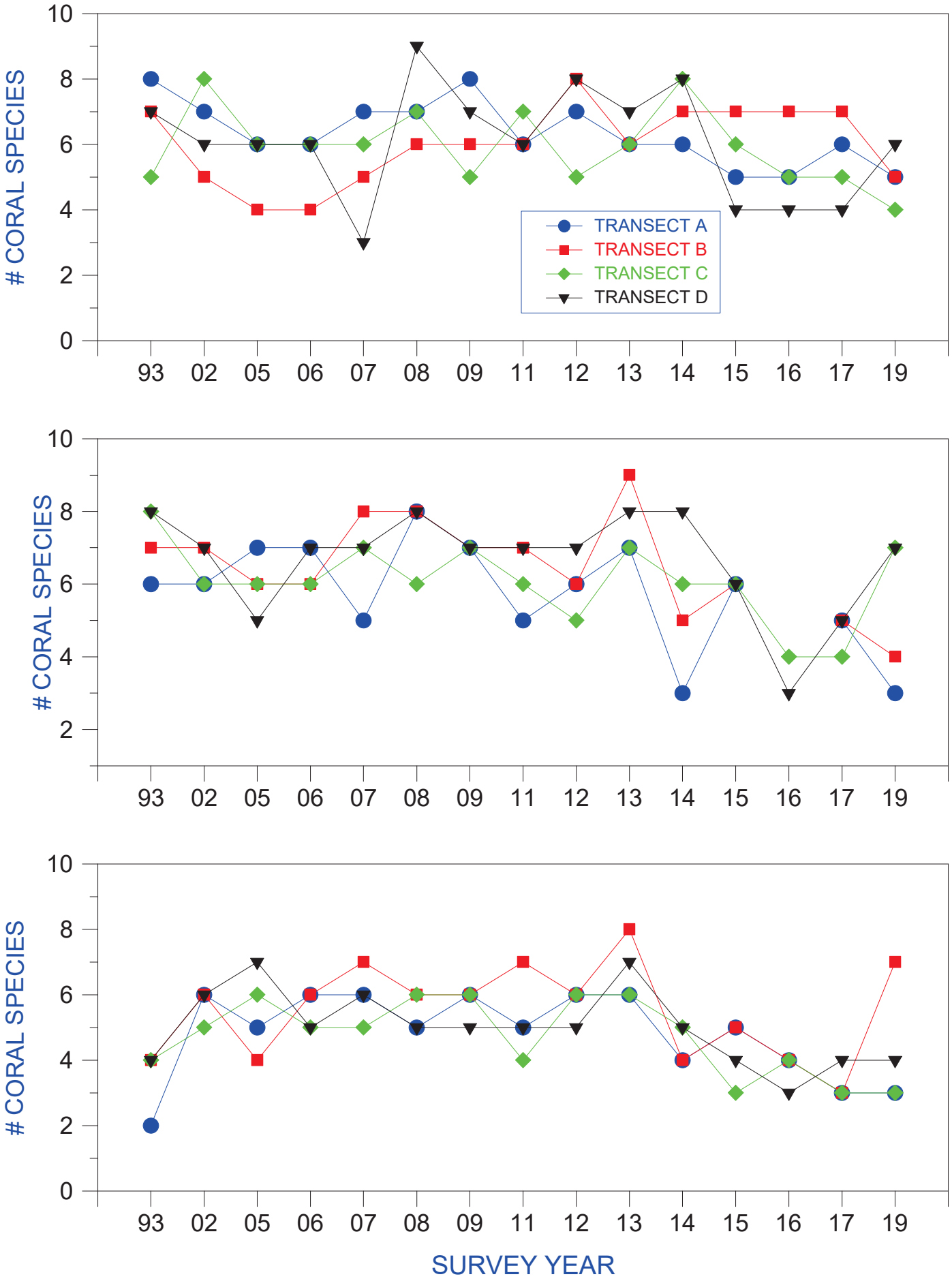


FIGURE 18. Plots of number of coral species on four transects off Ka upulehu Development. On each transect three sites were surveyed, one in each of the three major reef zones. See Figure 10 for locations of transects and survey sites.

TABLE 9. Reef fish abundance on survey stations off the Ka upulehu Development on August 6, 2019.

FISH FAMILY/SPECIES	SURVEY STATION											
	Boulder Zone				Platform Zone				Slope Zone			
	A1	B1	C1	D1	A2	B2	C2	D2	A3	B3	C3	D3
Butterflyfishes												
Chaetodon lunula			1	1								
C. multicinctus		2	1	2		2	3	7	3	7		
C. ornatissimus				1		2	3	2	1	1	1	
C. quadrimaculatus	1				1	10				2		
C. reticulatus	1											
C. unimaculatus		2							2			
Forcipiger flavissimus		1						2				
F. longirostris											2	
Damselfishes												
Abudefduf vaigiensis			1	1								
Chromis agilis					3				26	14	21	21
C. hanui								2		1	1	2
C. ovalis	3	3			4							
C. vanderbilti				20	2	21	32					
C. verater												15
Dascyllus albisella												4
Plectroglyphidodon johnstonianus										1		
P. imparipennis	1					1	2	1			1	
Stegastes marginatus							1					
Goatfishes												
Parupeneus insularis				1				2	1		3	2
Parupeneus Cyclostomus						3						
P.multifasciatus			2	2			2		2	2		1
Hawkfishes												
Paracirrhites arcatus	1		1		1						1	
P. forsteri												1
Parrotfishes												
Chlorurus perspicillatus												1
C. spilurus		6	3	1		3			1		4	3
Scarus psittacus			1									
S. rubroviolaceus			1					1				
Pufferfishes												
Canthigaster jactator	2	1	2		1							
Surgeonfishes												
Acanthurus dussumieri		1										
A. leucopareius		2	17	1								
A. nigrofuscus	1	24	28		7	27	12	40		11	7	
A. nigroris		11		2			3					
A. olivaceus	4		1		2	2						21
A. thompsoni												45
A. triostegus	4											
Ctenochaetus strigosus		3		35	1	15	57	16	17		23	18
Naso lituratus				1			3	4	1		1	3
Zebrasoma flavescens		3	36	15	2	23	41	25	4	20	11	41
Triggerfishes												
Melichthys niger				2			2	6				
M. vidua							1	2				
Sufflamen bursa	1	1	1		1	1	2	2			2	1
Rhinecanthus rectangulus	1											
Wrasses												
Bodianus albotaeniatus	2								2	1		
Coris gaimard					1						1	
Gomphosus varius				2		1	3			2		1
Halichoeres ornatissimus						1	2					
Oxycheilinus unifasciatus								1	2		2	
Pseudocheilinus evanidus										2	1	
P. octotaenia							2			1		
P. tetrataenia											1	
Stethojulis balteata		1			1				1			
Thalassoma duperrey	3	4	7	3	3	2	3	3		4	1	1
Others												
Aphareus furca				2		2						2
Centryopyge potteri										1	2	1
Cephalopholis argus				1			1	1			1	2
Ostracion meleagris									1			
Fistularia commersonii			1									
Caranx Melampygus		1										
Zanclus cornutus												2
TOTAL SPECIES	13	16	16	18	14	16	19	17	14	15	20	21
TOTAL FISH	25	66	104	93	30	116	175	117	64	70	87	188
TOTAL FISH BY REEF ZONE	288				438				409			

TABLE 10. Comparison of fish community components from surveys off Ka upulehu Development from 1993 to 2019. Surveys shown in bold type (1993, 2002, 2019) were conducted by Marine Research Consultants (MRC); Other surveys were conducted by Environmental Assessment, LLC (EAL). "NA" indicates no survey was conducted by EAL.

NUMBER OF FISH SPECIES

ZONE	TRANSECT		SURVEY YEAR														
	EAL	**MRC**	**1993**	**2002**	2005	2006	2007	2008	2009	2011	2012	2013	2014	2015	2016	2017	**2019**
BOULDER	1	**A1**	**20**	**13**	6	8	10	8	12	10	16	14	14	13	NA	15	**13**
	4	**B1**	**18**	**20**	19	33	24	22	27	27	32	23	16	19	NA	19	**16**
	7	**C1**	**12**	**23**	22	23	26	22	25	24	28	25	24	24	29	21	**16**
	10	**D1**	**24**	**21**	22	24	29	29	26	23	26	22	22	22	21	26	**18**
PLATFORM	2	**A2**	**25**	**24**	26	37	33	32	27	27	29	25	25	24	NA	26	**14**
	5	**B2**	**19**	**24**	28	19	28	16	21	23	26	19	16	20	NA	23	**16**
	8	**C2**	**18**	**31**	26	33	31	29	30	22	27	25	22	25	22	30	**19**
	11	**D2**	**26**	**29**	24	26	29	22	28	21	19	21	25	28	27	28	**17**
SLOPE	3	**A3**	**20**	**18**	27	36	34	35	32	25	28	21	29	22	NA	32	**14**
	6	**B3**	**16**	**18**	24	26	25	24	29	24	21	26	17	16	NA	21	**15**
	9	**C3**	**20**	**19**	32	31	31	26	26	22	23	24	24	24	27	20	**20**
	12	**D3**	**21**	**17**	31	40	41	31	29	25	31	27	23	34	29	23	**21**

NUMBER OF FISH INDIVIDUALS

ZONE	TRANSECT		SURVEY YEAR														
	Eal	**MRC**	**1993**	**2002**	2005	2006	2007	2008	2009	2011	2012	2013	2014	2015	2016	2017	**2019**
BOULDER	1	**A1**	**164**	**55**	60	175	104	87	130	33	277	181	96	131	NA	369	**25**
	4	**B1**	**122**	**82**	162	231	216	250	309	197	370	391	141	127	NA	170	**66**
	7	**C1**	**162**	**197**	270	265	264	198	425	229	50	494	336	275	344	292	**104**
	10	**D1**	**192**	**123**	278	412	438	388	467	384	448	209	300	388	299	229	**93**
PLATFORM	2	**A2**	**144**	**101**	221	198	217	185	205	440	145	172	204	129	NA	110	**30**
	5	**B2**	**127**	**128**	239	177	219	108	221	167	194	167	142	263	NA	210	**116**
	8	**C2**	**162**	**134**	240	383	249	199	397	171	270	203	276	313	202	204	**175**
	11	**D2**	**140**	**99**	243	266	326	208	316	247	193	222	211	321	382	462	**117**
SLOPE	3	**A3**	**164**	**55**	202	640	388	341	510	445	497	204	215	285	NA	317	**64**
	6	**B3**	**121**	**65**	150	136	172	127	232	143	145	160	118	147	NA	208	**70**
	9	**C3**	**116**	**107**	368	408	251	229	243	208	317	302	243	286	233	270	**87**
	12	**D3**	**145**	**91**	252	482	441	546	365	392	289	400	175	397	685	388	**188**

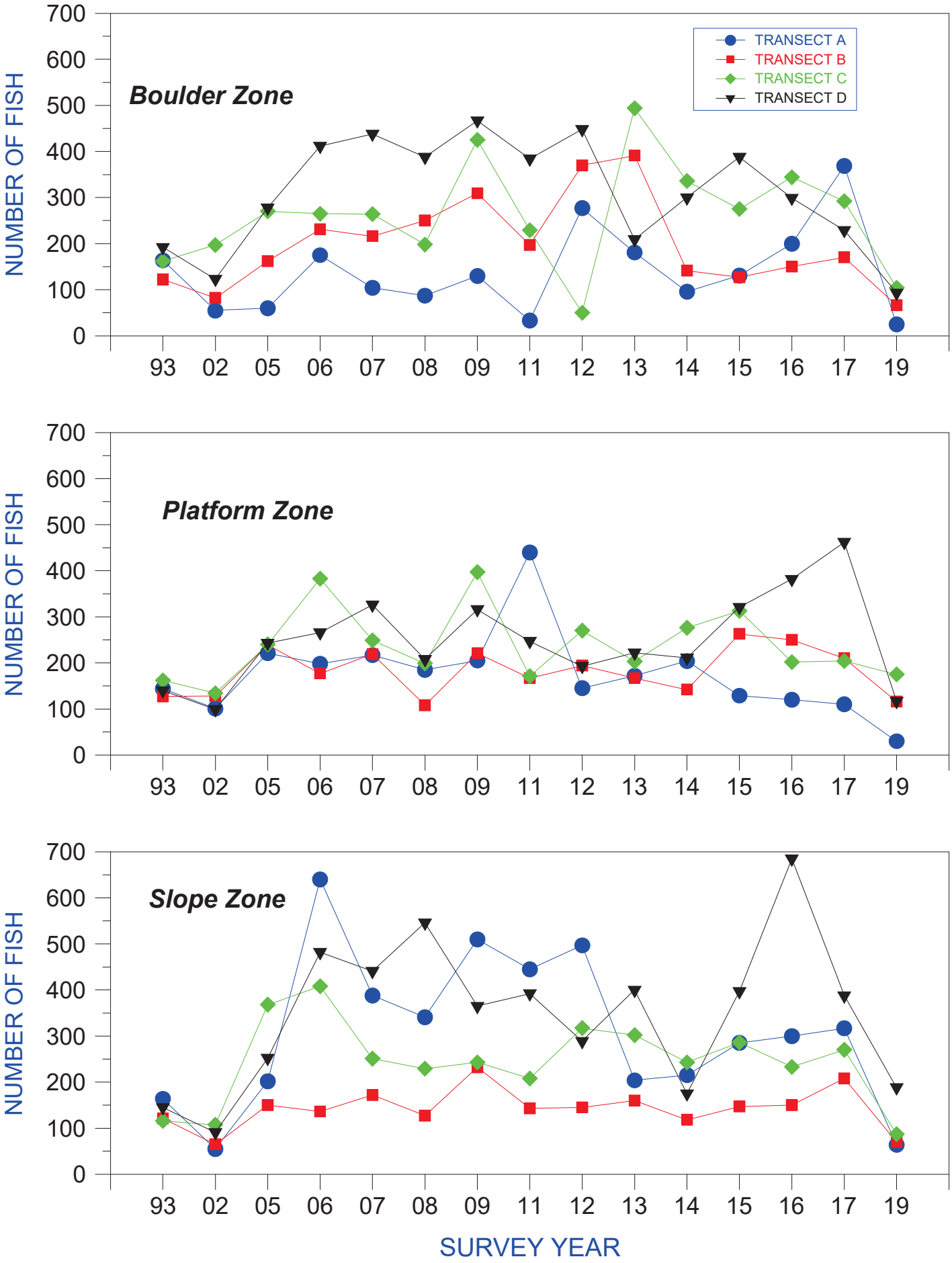


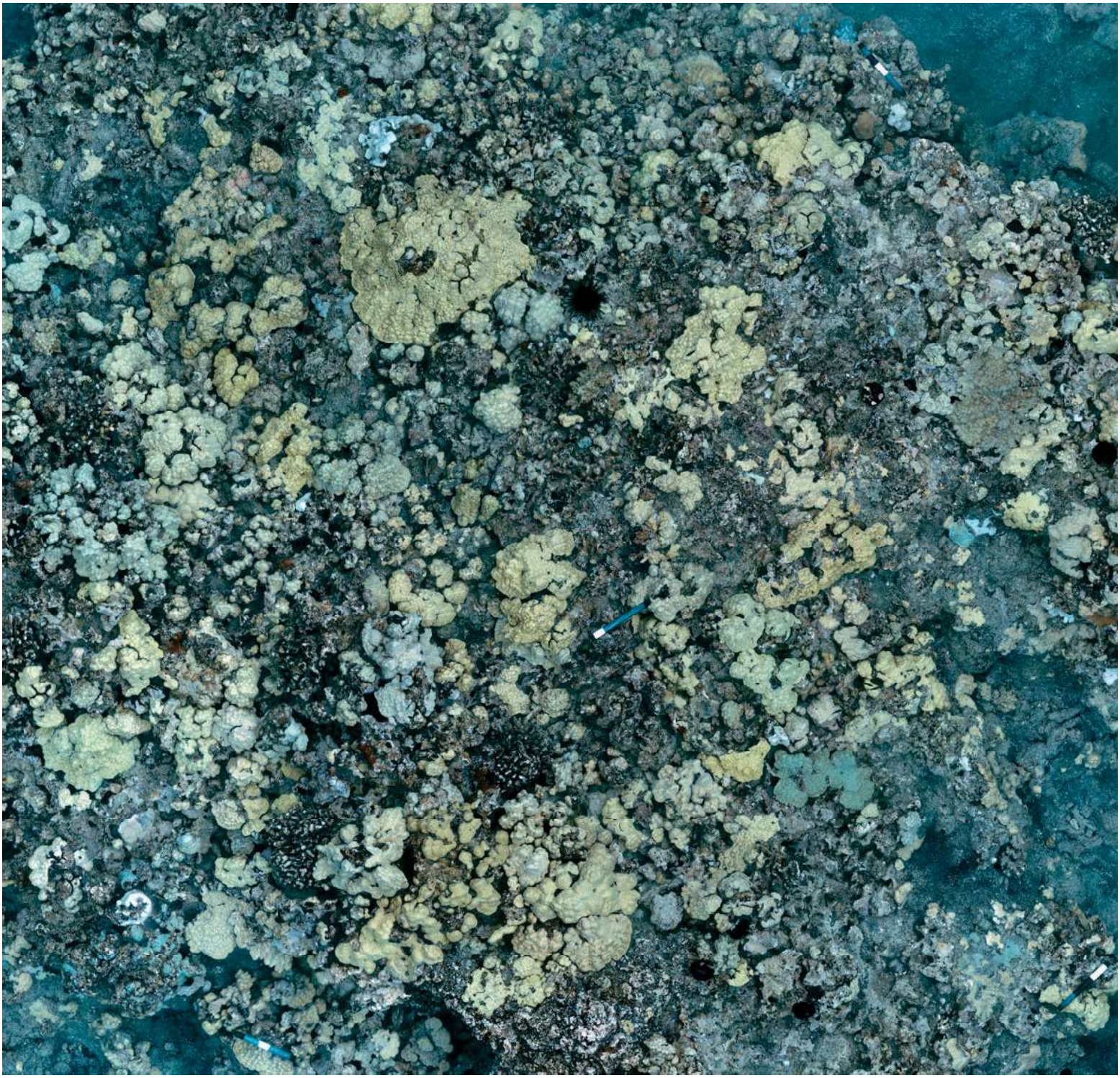
FIGURE 19. Plots of number of fish on four transects off Ka upulehu Development. On each transect three sites were surveyed, one in each of the three major reef zones. See Figure 10 for locations of transects and survey sites.

APPENDIX A.

ORTHOMOSAIC IMAGES TRANSECTS A-D
KAUPULEHU DEVELOPMENT MARINE BIOTA
MONITORING 2019

KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT A STATION 1 – BOULDER ZONE



KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT A STATION 2 – PLATFORM ZONE

KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT A STATION 3 – SLOPE ZONE

KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

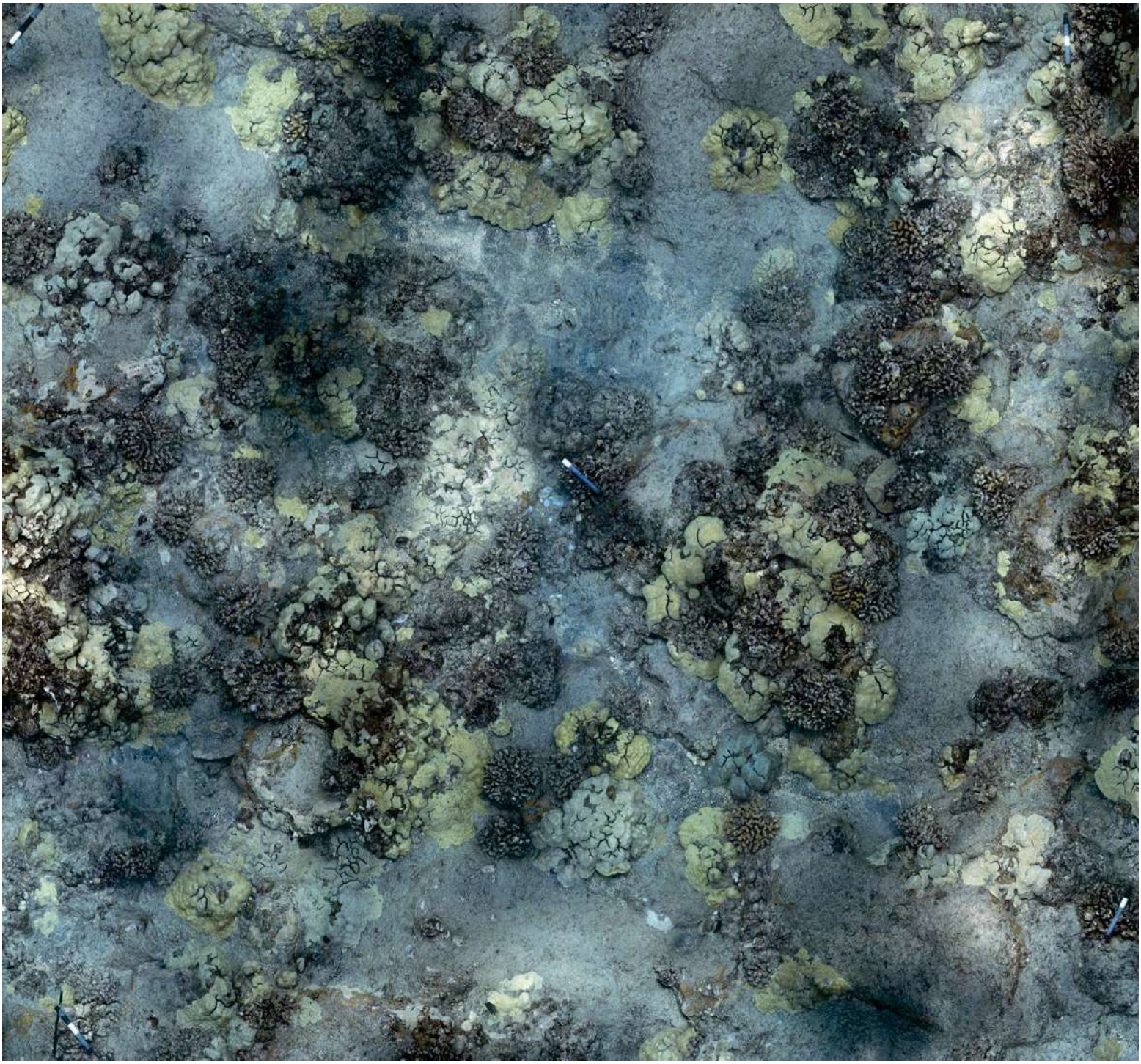
8/6/2019 TRANSECT B STATION 1 – BOULDER ZONE

KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT B STATION 2 – PLATFORM ZONE

KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT B STATION 3 – SLOPE ZONE

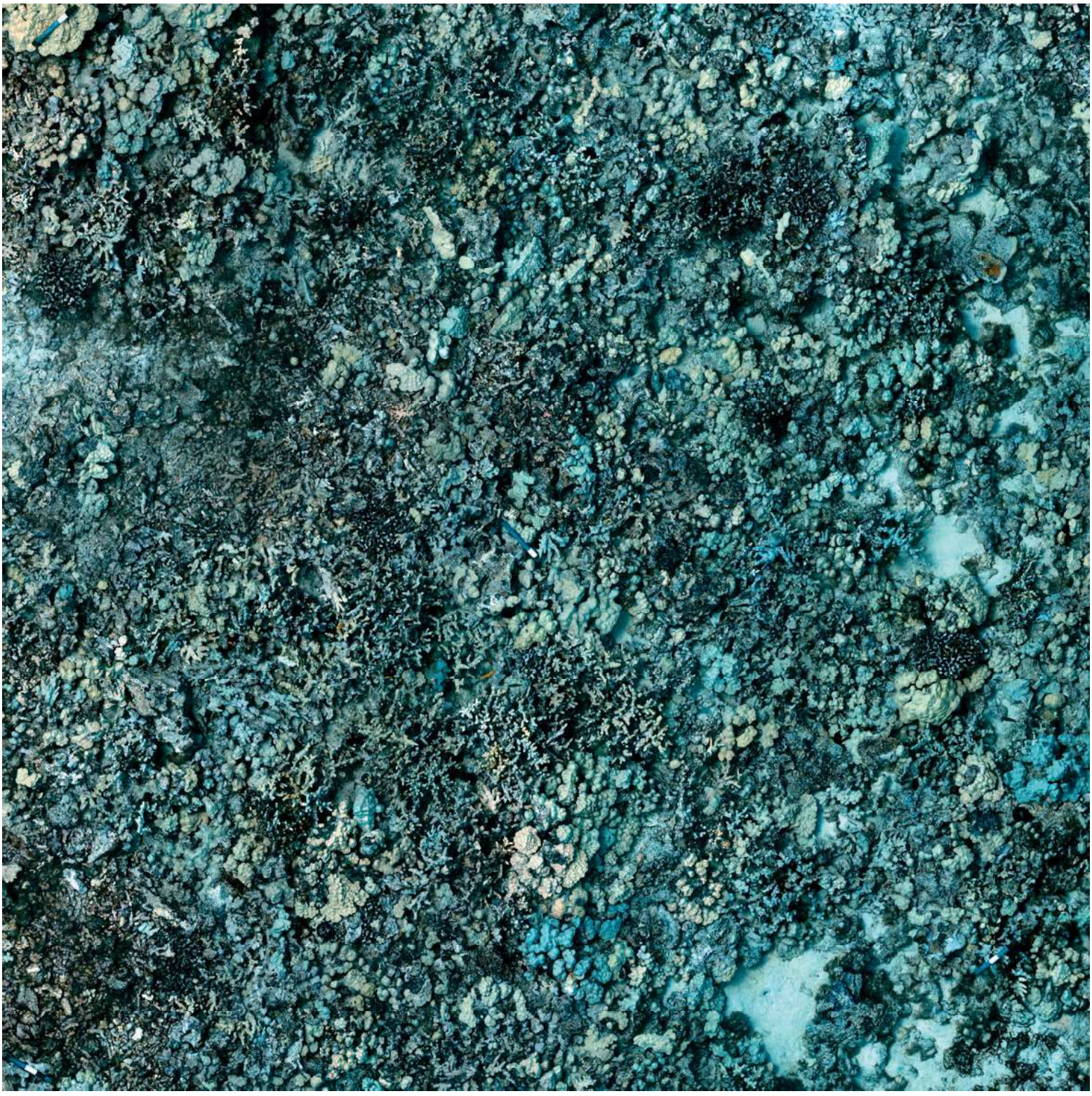


KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT C STATION 1 – BOULDER ZONE

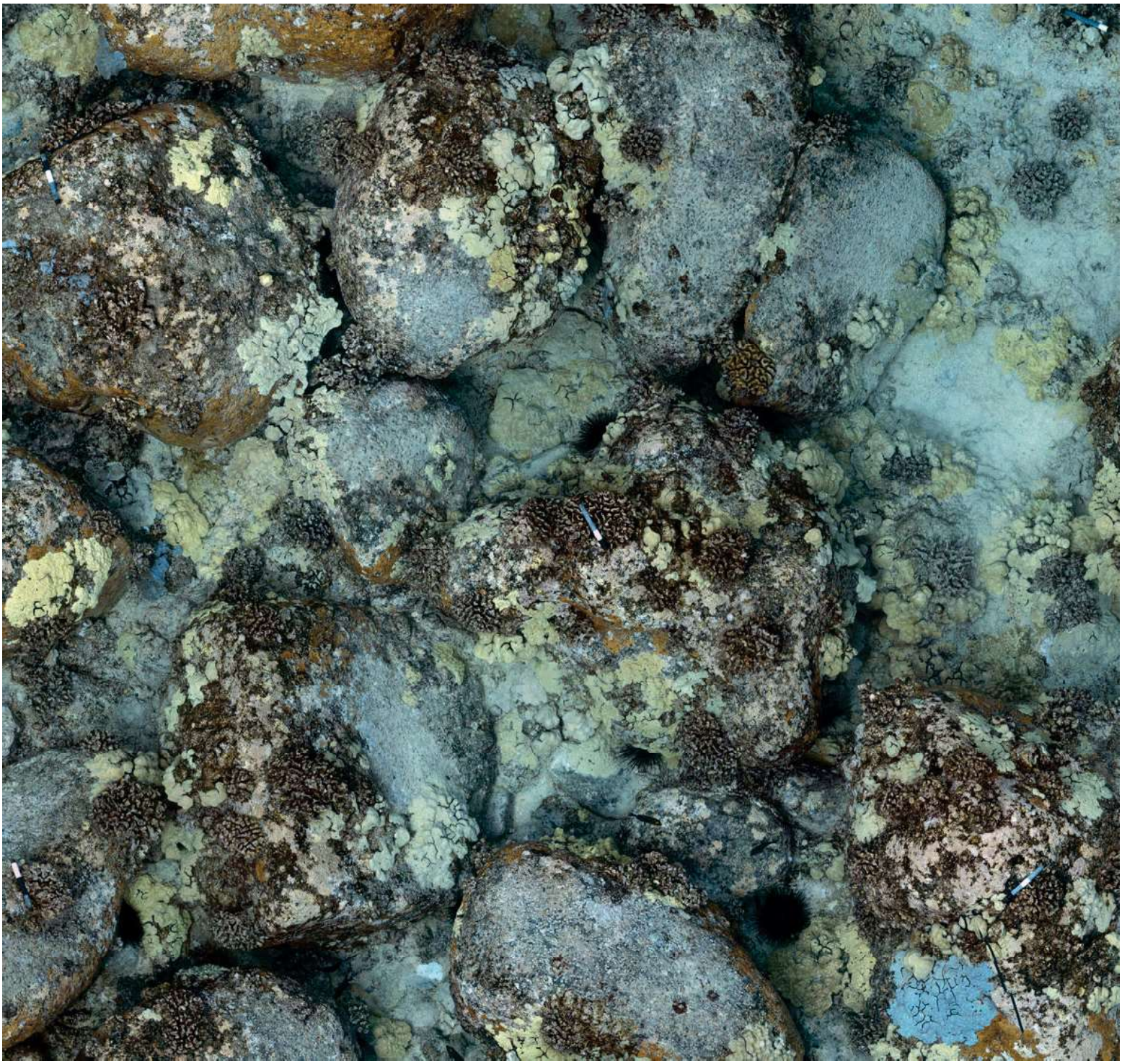
KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT C STATION 2 – PLATFORM ZONE



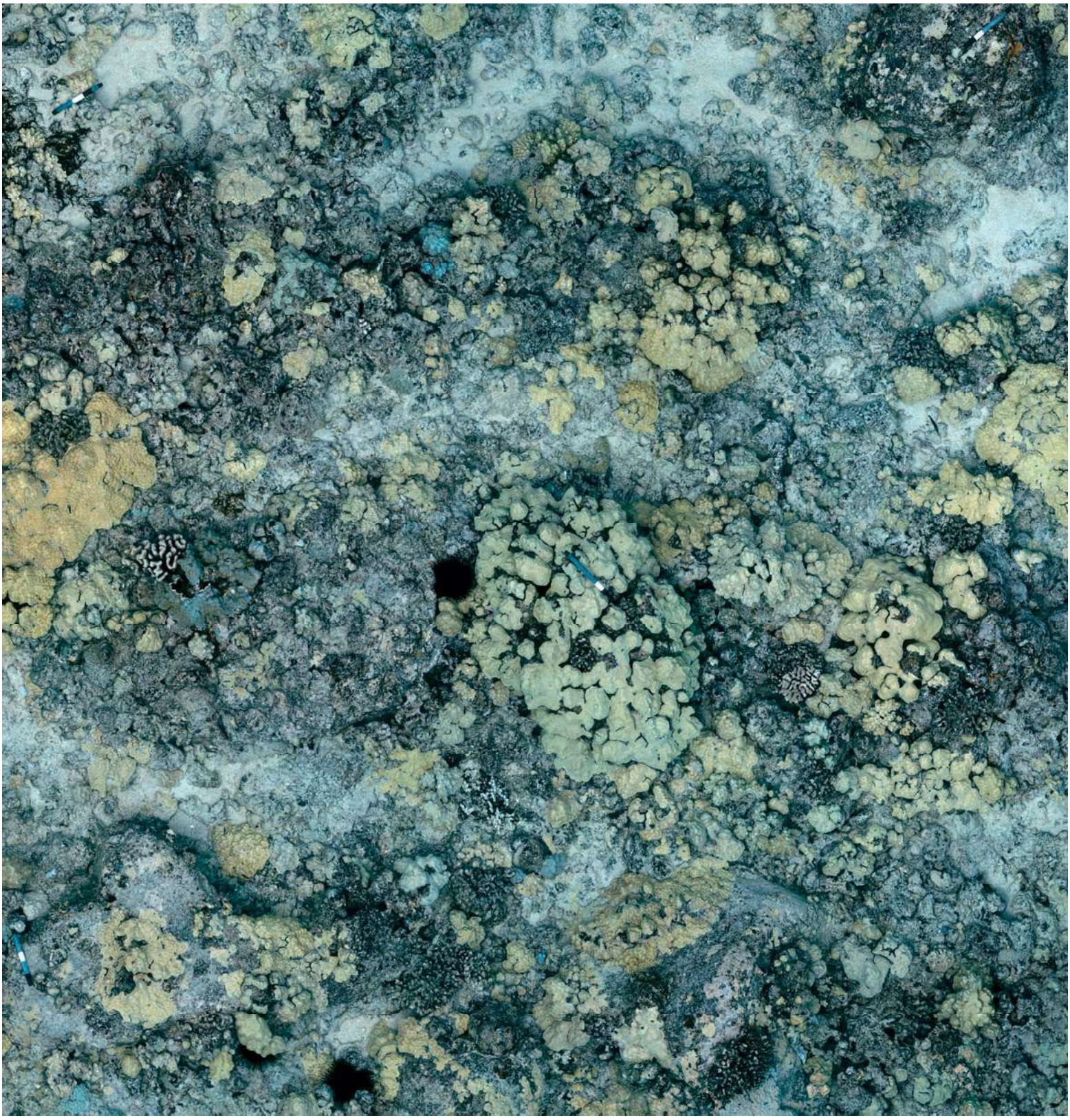
KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT C STATION 3 – SLOPE ZONE



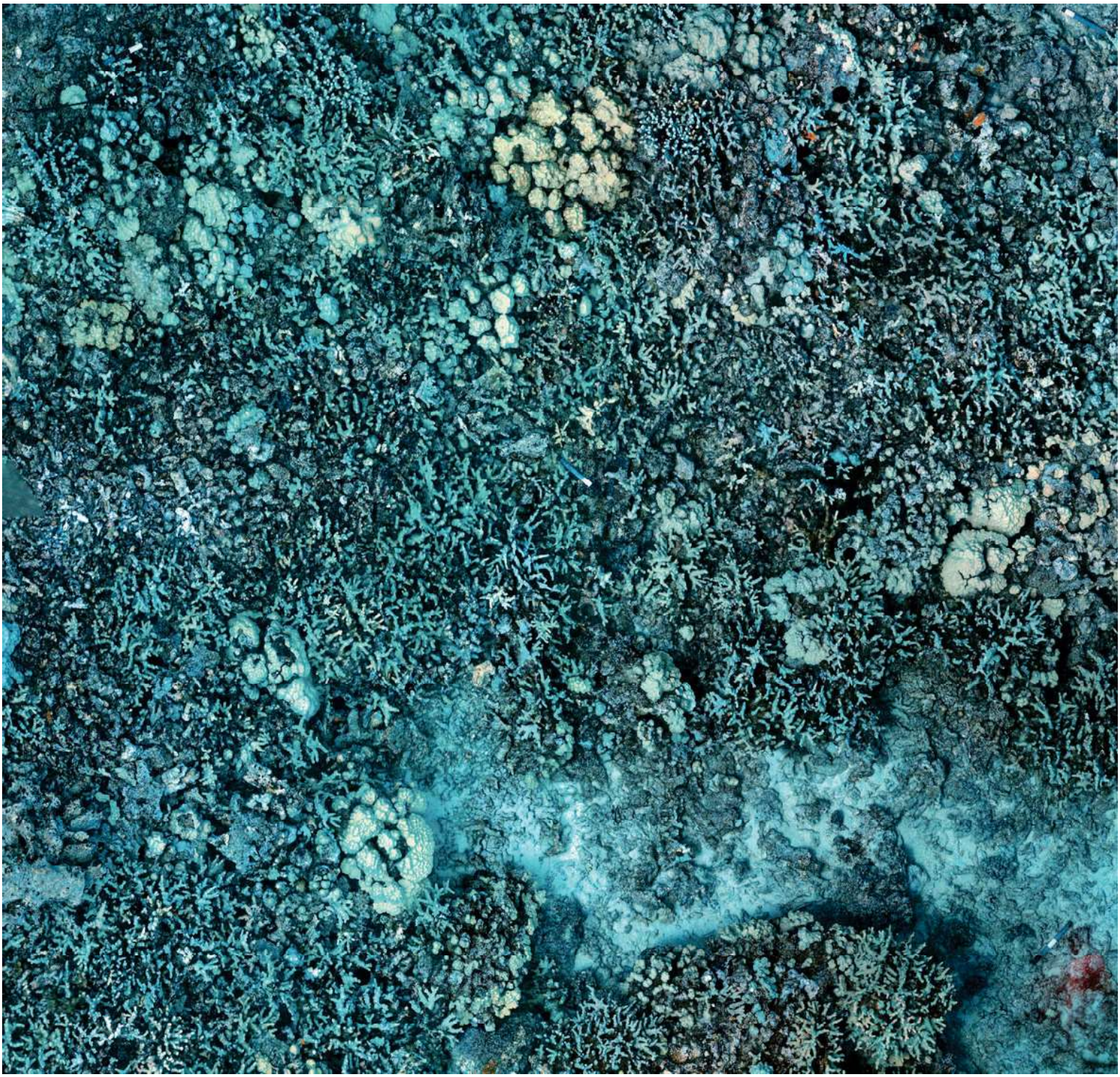
KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT D STATION 1 – BOULDER ZONE



KAU PULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT D STATION 2 – PLATFORM ZONE



KA UPULEHU DEVELOPMENT MARINE BIOTA SURVEY

8/6/2019 TRANSECT D STATION 3 – SLOPE ZONE

COUNTY OF HAWAI'I STATE OF HAWAI'I

ORDINANCE NO. 19 12 BILL NO. 1 (DRAFT 2)

AN ORDINANCE AMENDING ORDINANCE NO. 99 42 WHICH RECLASSIFIED LANDS FROM OPEN (O) TO PROJECT DISTRICT (PD) AT KAUPULEHU, NORTH KONA, HAWAI'I, COVERED BY TAX MAP KEY 7-2-003: PORTION OF 1.

BE IT ORDAINED BY THE COUNCIL OF THE COUNTY OF HAWAI'I:

SECTION 1. Section 3 of Ordinance No. 99 42 is amended as follows:

"SECTION 3. [~~This change in district classification is conditioned upon the following:~~] In accordance with Section 25-2-44, Hawai'i County Code 1983 (2016 Edition, as amended), the County Council finds the following conditions are:

(1) Necessary to prevent circumstances which may be adverse to the public health, safety and welfare; or

(2) Reasonably conceived to fulfill needs directly emanating from the land use proposed with respect to:

(A) Protection of the public from the potentially deleterious effects of the proposed use, or

(B) Fulfillment of the need for public service demands created by the proposed use.

A. The applicant, successors or assigns shall be responsible for complying with all of the stated conditions of approval.

B. This project area shall be called the Kaupulehu Project District. The development period for the Kaupulehu Project District will be 20 years from the effective date of approval of [~~the~~] this amended Project District Ordinance.

C. The Kaupulehu Project District shall consist of not more than 1,078.634 acres with 869.698 acres for Residential, golf course and ancillary related development; 197.936 acres for the "Urban" Coastal Planning Area and 11 acres for Commercial development. Any amendment to these acreages shall require an amendment to the Kaupulehu Project District Ordinance.

D. The maximum number of units to be allowed within the Kaupulehu Project District shall be 1,030 units. Any increase in the number of units shall require an amendment to the Kaupulehu Project District Ordinance.

E. There shall be no residential, commercial or similar type developments in the Coastal Planning Area other than those specified in the Integrated Resources Management Plan. The Coastal Planning Area shall be described by metes and bounds, and the restrictions shall be specified in the covenant(s) in the property deed. A copy of the metes and bounds, and proposed covenant(s) to be recorded with the Bureau of Conveyances shall be submitted to the Planning Director for review and approval prior to the issuance of Final Subdivision Approval or Final Plan Approval or land alteration activities, whichever occurs first. A copy of the approved covenant(s) shall be recited in an instrument executed by the applicant and the County and recorded with the Bureau of Conveyances prior to the issuance of Final Subdivision Approval or Final Plan Approval or land alteration activities, whichever occurs first.

F. The applicant shall disclose to all potential buyers of lots or units within the proposed project that internal infrastructure and community facilities shall be developed and maintained privately and that the County is not obligated to construct any public facilities within the project area.

G. The following permitted uses as defined in Chapter 25 (Zoning Code) Ordinance No. 96-160 are to be allowed in the Kaupulehu Project District within the 869.698 acres for

Residential, golf course and ancillary related development and the 11 acres for Commercial development:

1. Amusement and recreation facilities, indoor.
2. Art galleries, museums.
3. Automobile service stations.
4. Bars.
5. Business services.
6. Churches, temples and synagogues.
7. Day care centers.
8. Convenience stores.
9. Community buildings.
10. Display for products sold elsewhere
11. Dwellings, single-family.
12. Dwellings, double-family or duplex.
13. Dwellings, multiple-family.
14. Farmers Market.
15. Financial institutions.
16. Golf courses and related golf course uses, including golf driving ranges, golf maintenance buildings and golf club houses.
17. Home Occupations as permitted within Section 25-4-13 of the Zoning Code.
18. Major outdoor amusement and recreation facilities.
19. Medical clinics.
20. Meeting facilities.
21. Model homes.
22. Neighborhood parks, playgrounds, tennis courts, swimming pools, and similar neighborhood recreational areas and uses.
23. Offices.
24. Personal services.
25. Photography studios.

26. Public and private utility uses and structures.
27. Restaurants.
28. Retail establishments.
29. Schools.
30. Telecommunication antennas and towers as permitted under Section 25-4-12 of the Zoning Code.
31. Temporary real estate offices as permitted by Section 25-4-8 of the Zoning Code.
32. Theaters.
33. Time share units.
34. Utility substations, wastewater treatment plants, landscaping and vehicle maintenance service yards.
35. Visitor Information Center.
36. Any uses similar in nature to the above permitted uses shall be permitted upon submittal of a request by the applicant and approved by the Planning Director.
37. Buildings and uses normally considered directly accessory to the uses permitted in this section shall also be permitted.

H. The following design standards shall apply:

1. Landscaping for the development shall comply with the Planning Department's Rule No. 17, Landscaping Requirements.

2. The minimum building site area shall be 7,500 square feet which may include flag lots.

3. The maximum allowable height limit for Single Family Residential units shall be thirty-five feet.

4. The maximum allowable height limit for Multiple Family Residential and Commercial developments shall be 45 feet.

5. The minimum average lot widths shall be determined by the applicant in conjunction with its development plans.

6. The minimum yards in the Kaupulehu Project District shall be as follows:

   a. Residential Development

      (1) Front and rear yards, fifteen feet; and

      (2) Side yards, eight feet.

   b. Commercial Development

      (1) Front and rear yards, fifteen feet; and

      (2) Side yards, none, except where the adjoining building site is a residential development site, when the side yard adjoins the side yard of a residential development site, there shall be a minimum side yard of eight feet.

7. Exceptions to the regulations for the Project district regarding heights, building site areas, and yards, may be approved by the director within a planned unit development, or cluster plan development.

8. The minimum off-street parking and loading space requirements for the Kaupulehu Project District will comply with the minimum standards as required by the Zoning Code, including compliance with the American Disabilities Act (ADA) requirements.

I. Final Subdivision or Final Plan Approval, whichever is applicable, shall be secured from the Planning Director for any of the above uses prior to the issuance of any land alteration permits for any development phase in the Kaupulehu Project District.

J. Construction of the residential units, commercial development, golf course and other related improvements shall commence only after Final Subdivision Approval and Final Plan Approval has been secured.

K. The applicant shall provide assurance satisfactory to the Department of Water Supply and the Planning Director, upon consultation with the State Department of Health and Department of Land and Natural Resources, that water sources of sufficient quality and quantity has been established. Such satisfactory assurance can be met by the actual drilling and testing of a well site of the water source or by the submittal of a hydrological study certifying that a water sources of sufficient quality and quantity can be established at the designated locations.

L. Upon compliance with Condition K, the actual development of the water source and its water transmission and distribution system shall be developed in conjunction with the subdivision approval process. Final inspection to the residential structures shall not be issued until the approved water source is developed and its transmission and distribution system for such source to the subject property has been constructed. Residential building permits may be issued for model home complexes, provided that such model homes will not be occupied until the approved water source is developed.

M. The interior roadway requirements for the Kaupulehu Project District shall be designed to resort standards as allowed by the Subdivision Code and as represented in Section 3.3.1 of the applicant's Project District Application.

N. Access(es) to the project site shall meet with the approval of the Departments of Transportation-Highways Division and Public Works as follows:

1. If warranted, a fully channelized intersection improvements, including but not limited to traffic lights and/or an overpass or underpass, shall be provided meeting with the approval of the Department of Transportation prior to initial occupancy of residential units gaining access from the respective intersection. The cost of such improvements shall be borne by the applicant to the extent of the project's projected traffic impacts and may be credited to or deducted from the applicant's fair share contribution for road and traffic improvements, as required under Condition W.

2. A traffic monitoring program at the intersection of Queen Kaahumanu Highway shall be submitted to and approved by the State Department of Transportation, Highways Division, prior to receiving final plan approval for any portion of the proposed development. If additional intersection improvements such as a fully channelized intersection with acceleration/deceleration lanes, an under pass, or overpass, are required as determined by the findings of subsequent monitoring and analysis, the applicant shall provide the improvements to the extent of the project's projected traffic impacts in conformance with the requirements of the State Department of Transportation, Highways Division.

3. All internal roadways within the proposed development shall be constructed in accordance with the Resort Standards or other applicable provisions of the Zoning Code and the Subdivision Code.

4. A roadway connection to the adjacent property along the southwestern boundary shall be provided meeting with the approval of the Department of Public Works.

5. No lots shall have direct access from the Queen Kaahumanu Highway except through an access point approved by the State Department of Transportation.

6. The applicant shall provide an updated Traffic Impact Analysis Report (TIAR) and Traffic Signal Warrant Study if and when required by the State Department of Transportation.

O. A detailed drainage study shall be prepared and submitted for review and approval to the Department of Public Works prior to submittal of plans for Subdivision and/or Plan Approval review of the residential, commercial and golf courses subdivisions. The Study shall take into consideration the tile drainage system, retention basins and 'reduced turf' design to be incorporated into the golf courses. A drainage system for each phase of development in the project area shall be installed meeting with the approval of the Department of Public Works, prior to issuance of Final Subdivision Approval, a Certificate of Occupancy or golf course opening, whichever occurs first.

P. An Emergency Preparedness and Response Plan shall be submitted for review by the Planning Department in consultation with the Fire Department and the Civil Defense Agency prior to the issuance of a Certificate of Occupancy for any residential unit. The plan shall be limited to a review of the emergency roadway network and emergency contact people or association.

Q. A Solid Waste Management Plan shall be prepared meeting with the approval of the Department of Public Works prior to submitting plans for subdivision approval. Approved recommendations and mitigation measures shall be implemented in a manner meeting with the approval of the Department of Public Works.

R. A wastewater treatment system shall be constructed to service the residential and commercial developments meeting with the approval of the Department of Health.

S. A final comprehensive public access plan, to be developed in consultation with community groups and in accordance with applicable conditions of approval of the Land Use Commission Decision and Order (Docket No. A93-701), shall be submitted to the Planning Director and shall include mauka-makai and lateral shoreline accesses, description of trail width and surfacing, parking area(s), signage, emergency response considerations, restrictions on use (if any), provision of recreational and restroom facilities at appropriate locations, and related improvements. Implementation of the public access plan shall be completed [~~with the opening of the golf course.~~] within one year from the effective date of this amended Project District Ordinance.

T. To ensure that the goals and policies of the Housing Element of the General Plan are implemented, the applicant shall comply with the requirements of Chapter 11, Article 1, Hawaii County Code, relating to Affordable Housing. This requirement shall be approved by the County Housing Agency prior to Final Subdivision Approval of any portion of the residential area.

U. Integrated Resources Management Plan dated June 1998 or any amendments approved thereafter by affected agencies shall be made a part of this ordinance as Appendix A. The implementation recommendations and management guidelines shall govern the use of the Coastal Planning Area and other resources.

V. [~~Should any unidentified sites or remains such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings or walls be encountered, work in the immediate area shall cease and the State Department of Land and Natural Resources-Historic Preservation Division (DLNR-HPD) and the Hawaii Island Burial Council, if applicable, shall be immediately notified. Subsequent work shall proceed upon an archaeological clearance from the DLNR-HPD and/or the Burial Council when it is found that sufficient mitigative measures have been taken.~~] The applicant shall comply with mitigation and preservation plans approved by the Department of Land and Natural

Resources-State Historic Preservation Division. In the unlikely event that surface or subsurface historic resources, including human skeletal remains, structural remains (e.g. rock walls, terraces, platforms, etc.), cultural deposits, marine shell concentrations, sand deposits, or sink holes are identified during the demolition and/or construction work, cease work in the immediate vicinity of the find, protect the find from additional disturbance and contact the State Historic Preservation Division at (808) 933-7651.

W. [~~The applicant shall make its fair share contribution to mitigate potential regional impacts of the subject project with respect to roads, parks and recreation, fire, police and solid waste disposal facilities. The amount of the fair share contribution shall be the sum which is the product of multiplying the number of residential lots proposed to be subdivided by the amounts allocated hereinbelow for each such lot, and shall become due and payable prior to final subdivision approval for any portion of the subject property or its increments. If the subject property is subdivided in two or more increments, the amount of the fair share contribution due and payable prior to final subdivision approval of each increment shall be a sum calculated in the same manner according to the number of proposed residential lots in each such increment. The fair share contribution, in a form of cash, land, facilities or any combination thereof, acceptable to the director in consultation with the affected agencies, shall be determined by the County Council. The fair share contribution shall have a maximum combined value of **$4,645.29 per multiple-family residential unit and $7,239.16 per single-family residential unit.** Based upon the applicant's representation of intent to develop up to 1,030 residential units, the indicated total of fair share contribution for 500 multiple-family residential units is **$2,322,645.00** and 530 single-family residential units is **$3,836,754.80** whichever is applicable. However, the total amount shall be increased or reduced in proportion with the actual number of units according to the calculation .and payment provisions set forth in this Condition W. The fair share contribution shall be allocated as follows:~~

1. ~~$2,291.39 per multiple-family residential unit for an indicated total of **$1,145,695.00** and $3,490.85 per single-family residential unit for an indicated total of **$1,850,150.50** to the County to support park and recreational improvements and facilities;~~
2. ~~$72.42 per multiple-family residential unit for an indicated total of **$36,210.00** and $168.40 per single-family residential unit for an indicated total of **$89,252.00** to the County to support police facilities;~~
3. ~~$222.77 per multiple-family residential unit for an indicated total of **$111,385.00** and $332.61 per single-family residential unit for an indicated total of **$176,283.30** to the County to support fire facilities;~~
4. ~~$99.29 per multiple-family residential unit for an indicated total of **$49,645.00** and $145.62 per single-family residential unit for an indicated total of **$77,178.60** to the County to support solid waste facilities; and~~
5. ~~$1,959.42 per multiple-family residential unit for an indicated total of **$979,710.00** and $3,101.68 per single-family residential unit for an indicated total of **$1,643,890.40** to the State or County to support road and traffic improvements.~~

~~The fair share contributions described above shall be adjusted annually beginning three years after the effective date of the change of zone, based on the percentage change in the Honolulu Consumer Price Index (HCPI). In lieu of paying the fair share contribution, the applicant may construct and contribute improvements/facilities related to parks and recreation, fire, police, solid waste disposal facilities, and roads within the region impacted by the proposed development, subject to the approval of the director. The cost of providing and constructing the improvements required in Conditions M and N shall be credited against the sum specified in Condition W (5) for road and traffic improvements. For purposes of administering Condition W, the fair market value of land contributed or the cost of any improvements required or made in lieu of the fair share contribution shall be subject to review and approval of the director, upon consultation with the appropriate agencies.~~

~~Upon approval of the fair share contributions or in lieu contributions by the director, the director shall submit a final report to the Council for its information that identifies the specific approved fair share and/or in lieu contributions, as allocated, and further implementation requirements.~~]

The applicant shall make its fair share contribution to mitigate the potential regional impacts of the property with respect to parks and recreation, fire, police, solid waste disposal facilities and roads for the additional lots to be created. The fair share contribution shall become due and payable prior to receipt of Final Subdivision Approval. The fair share contribution shall be based on the actual number of additional lots created. The fair share contribution in a form of cash, land, facilities or any combination thereof shall be determined by the County Council. The fair share contribution may be adjusted annually beginning three years after the effective date of this amended Project District Ordinance, based on the percentage change in the Honolulu Consumer Price Index (HCPI). The fair share contribution shall have a combined value of **$9,195.34** per multiple family residential unit and **$14,329.89** per single family residential unit. The total amount shall be determined with the actual number of units according to the calculation and payment provisions set forth in this condition. The fair share contribution per single family residential unit and multiple family residential unit shall be allocated as follows:

1. **$4,535.80** per multiple family residential unit and **$6,910.13** per single family residential unit to the County to support park and recreational improvements and facilities;

2. **$143.36** per multiple family residential unit and **$333.35** per single family residential unit to the County to support police facilities;

3. **$440.97** per multiple family residential unit and **$658.40** per single family residential unit to the County to support fire facilities;

4. **$196.54** per multiple family residential unit and **$288.25** per single family residential unit to the County to support solid waste facilities; and

5. **$3,878.67** per multiple family residential unit and **$6,139.77** per single family residential unit to the County to support road and traffic improvements.

The cost of providing and constructing the improvements required in Conditions M and N shall be credited against the sum specified in Condition W (5) for road and traffic improvements. In lieu of paying the fair share contribution, the applicant(s) may contribute land and/or construct improvements/facilities related to parks and recreation, fire, police, solid waste disposal facilities and roads within the region impacted by the proposed development, subject to the review and recommendation of the Planning Director, upon consultation with the appropriate agencies and approval of the County Council.

X. Should the Council adopt a Unified Impact Fee Ordinance setting forth criteria for imposition of exactions or the assessment of impact fees, conditions included herein shall be credited towards the requirements of the Unified Impact Fee Ordinance.

Y. Comply with all other applicable laws, rules, regulations and requirements of affected agencies for approval of the proposed development within the subject property.

Z. The applicant shall comply with all other applicable requirements of the Land Use Commission conditions of approval and a copy of the written documentation of compliance with these conditions shall also be submitted to the Planning Director.

AA. An annual progress report shall be submitted to the Planning Director prior to each anniversary date of the approval of this Project District Ordinance. The report shall

address in detail the status of the development, the number of units constructed, the compliance with the conditions of approval of both this ordinance and the State Land Use Commission conditions. This condition shall remain in effect until all of the conditions of approval have been complied with and the Director acknowledges that further reports are not required.

BB. [~~Twenty (20) years from the effective date of the Kaupulehu Project District Ordinance, the applicant shall submit an overall status report of the project, including the percentage of the completed development. The Planning Director shall also provide an assessment of the development of the Project District and its compliance with conditions of approval for transmittal to the Planning Commission for their review and recommendation and then forwarded to the County Council for their review and action.~~] If the applicants should require an additional extension of time, the Planning Director shall submit the applicants' request to the Planning Commission and the Hawai'i County Council for appropriate action.

CC. Should any of the conditions not be met or substantially complied with in a timely fashion, the Director may initiate rezoning of the subject area to its original or more appropriate designation.

SECTION 2. Material to be repealed is bracketed and stricken. New material is underscored.

SECTION 3. Severability. If any provision of this ordinance, or the application thereof to any person or circumstance, is held invalid, the invalidity does not affect other provisions or applications of the ordinance which can be given effect without the invalid provision or application, and to this end the provisions of this ordinance are severable.

SECTION 4. This ordinance shall take effect upon its approval.

INTRODUCED BY:

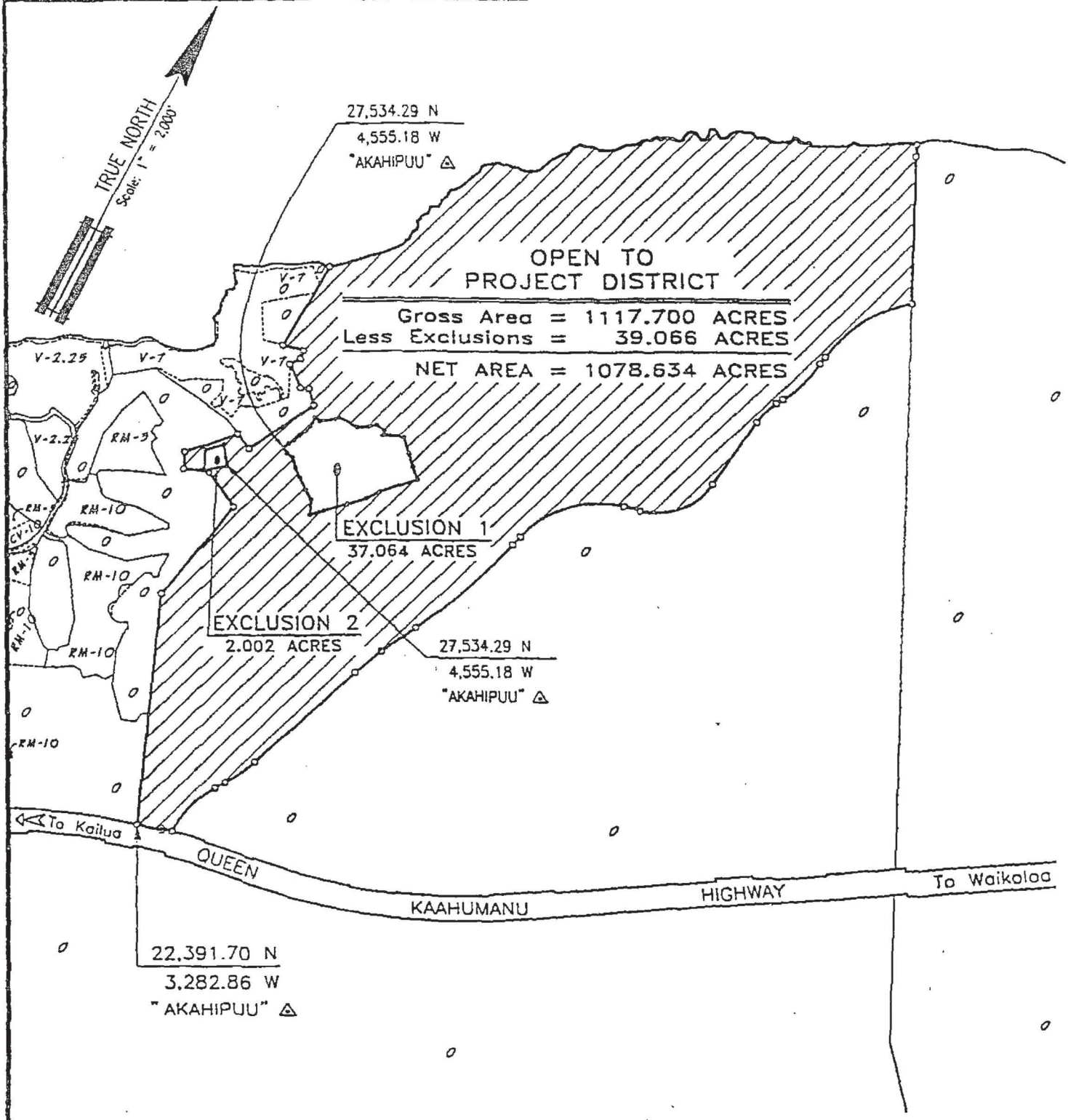
B/R

COUNCIL MEMBER, COUNTY OF HAWAI'I

Hilo, Hawai'i

Date of Introduction: January 23, 2019
Date of 1st Reading: January 23, 2019
Date of 2nd Reading: February 5, 2019
Effective Date: February 20, 2019

REFERENCE Comm. 13.5



AMENDMENT TO THE ZONING CODE

AMENDING SECTION 25-8-2 (NORTH AND SOUTH KONA DISTRICTS ZONE MAP) ARTICLE 8, CHAPTER 25, (ZONING CODE) OF THE HAWAII COUNTY CODE, BY CHANGING THE DISTRICT CLASSIFICATION FROM OPEN TO PROJECT DISTRICT AT KAUPULEHU, NORTH KONA, HAWAII.

PREPARED BY : PLANNING DEPARTMENT
COUNTY OF HAWAII

TMK : 7-2-03: PORTION OF 1

OCTOBER 14,

(KAUPULEHU DEVELOPM

EXHIBIT "A"

FOR REFERENCE ONLY

OFFICE OF THE COUNTY CLERK
County of Hawai'i
Hilo, Hawai'i

COUNTY CLERK
COUNTY OF HAWAII
2019 FEB 21 AM 9:41

(Draft 2)

Introduced By: Ashley L. Kierkiewicz (B/R)
Date Introduced: January 23, 2019
First Reading: January 23, 2019
Published: February 2, 2019

REMARKS:

Second Reading: February 5, 2019
To Mayor: February 13, 2019
Returned: February 21, 2019
Effective: February 20, 2019
Published: March 2, 2019

REMARKS:

ROLL CALL VOTE				
	AYES	NOES	ABS	EX
Chung			X	
David	X			
Eoff	X			
Kaneali'i-Kleinfelder	X			
Kierkiewicz	X			
Lee Loy	X			
Poindexter	X			
Richards	X			
Villegas	X			
	8	0	1	0

ROLL CALL VOTE				
	AYES	NOES	ABS	EX
Chung	X			
David	X			
Eoff	X			
Kaneali'i-Kleinfelder	X			
Kierkiewicz	X			
Lee Loy	X			
Poindexter	X			
Richards	X			
Villegas	X			
	9	0	0	0

I DO HEREBY CERTIFY that the foregoing BILL was adopted by the County Council published as indicated above.

COUNCIL CHAIRPERSON

COUNTY CLERK

Approved/Disapproved this 20th *day of* February, *20* 19.

MAYOR, COUNTY OF HAWAI'I

Bill No.: 1 (Draft 2)
Reference: C-13.5/PC-1
Ord No.: 19 12

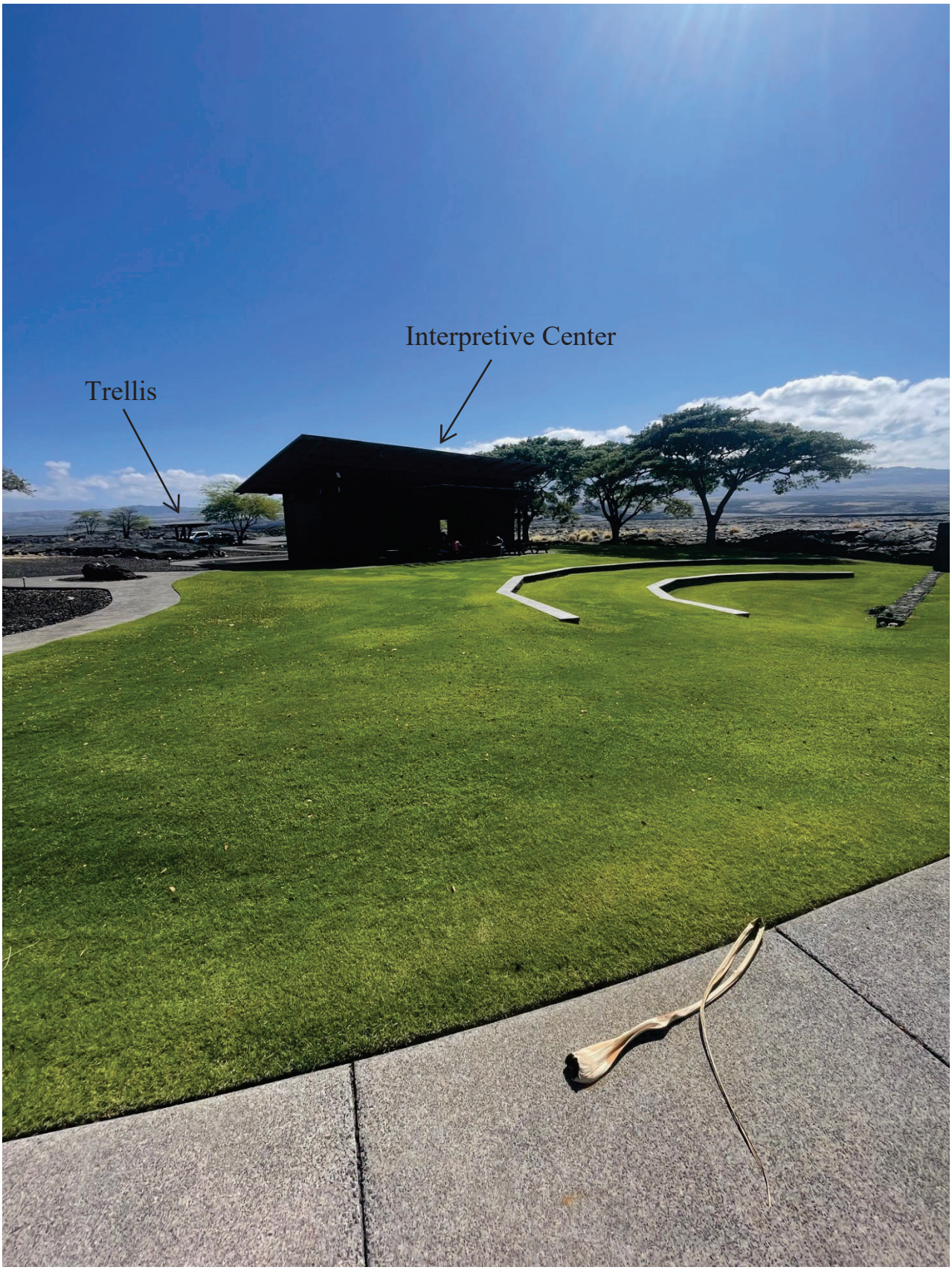


EXHIBIT C


KALAEMANŌ
CULTURAL RESERVE
Kalaemanō is part of the vast landscape of the ahupua'a of Ka'ūpūlehu, an ancient land division that sweeps down from the summit of Hualālai, through its forest, transitions into the grassy plains, and onto the lava fields. The historic and beloved area of Kalaemanō makes up the coastal section of this ahupua'a and is filled with many culturally important sites and resources.
Now that you are here, please proceed with humility and respect for the resources that have stood on this land for generations. The cultural sites and natural resources are invaluable and irreplaceable, and each of us must do our part to ensure that the generations to come may be able to experience this place.
The communities within the dryland forest and coastal areas affectionately referred to their homeland as Kekaha—a shortened version of the region's name, Kekaha-wai-'ole-o-nā-Kona—the waterless plains of the Konas.
1
OLA AKU LA KA 'ĀINA KAHA, UA PUA KA LEHUA I KE KAI
The natives of the Kaha lands have life when the lehua blossoms are upon the sea.
This 'ōlelo no'eau (poetical saying) tells of the seasonal living practices of the natives of the Kekaha region, who during the winter months moved from their coastal homes to the uplands to tend to their crops. When the fishing season arrived, the people came to the shore, where their fishing canoes could be seen floating upon the sea like lehua blossoms.
Traditionally, people came to Kalaemanō to fish and procure the snow-white salt that was made by adding seawater into natural and man-made salt pans. When their work was done and obligations elsewhere called, they left the area. As such, the habitation sites built here were intended for short stays and conveniently located near their work areas.
Ki'i pōhaku (petroglyphs) pecked into the smooth pāhoehoe lava also tell the story of the ancient people who came to Kalaemanō. These ki'i pōhaku likely reflect some of the traditional uses of this area, including travel, fishing, and voyaging.

EXHIBIT D


HĀLAU WA'A
Canoe House
This hālau wa'a (canoe house) is an active training center for navigators learning to use the stars to sail across the ocean to perpetuate the ancient practice of holo moana (open ocean navigation). This area is currently used by members of the non-profit organization Nā Kālai Wa'a.
As an active training center, we ask that you show respect by not entering the area.
To learn more about how you can support the efforts of Nā Kālai Wa'a, visit them at www.nakalaiwaa.org.
9
KALAEMANŌ CULTURAL RESERVE

EXHIBIT E


KOMOHANA
AKAU
Kona


Shoreline
Public Access
WARNING
OCEAN AND BEACH CONDITIONS MAY BE HAZARDOUS. PLEASE USE CAUTION
WARNING
NO BEACH EXISTS ALONG SHORELINE.
NO SAFE OCEAN ACCESS
STAY ON MARKED PATH.
SECURITY BRIEFING REQUIRED PRIOR TO ENTRY
PUBLIC SHORELINE ACCESS
CAUTION
IF IN DOUBT, DON'T GO OUT
KA'ŪPŪLEHU MARINE RESERVE
NO FISHING OR GATHERING
COMMUNITY RULES

EXHIBIT F

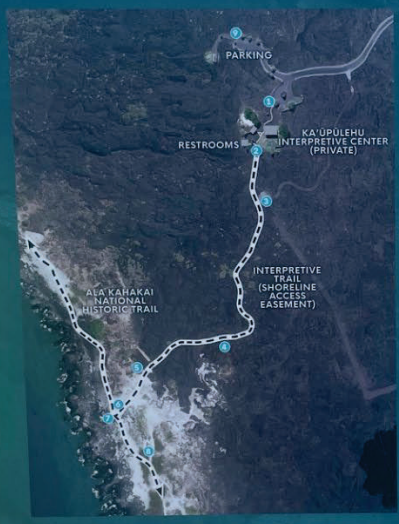

Shoreline
Public Access
COMMUNITY RULES
KA'ŪPŪLEHU
MARINE RESERVE
PUBLIC
SHORELINE ACCESS


KA'ŪPŪLEHU
MARINE RESERVE
NO FISHING OR
GATHERING
You are entering the Ka'ūpūlehu Marine Reserve, a protected marine area established in 2016 by lineal descendants and cultural practitioners of Ka'ūpūlehu with State Department of Land and Natural Resources support. The reserve was created to give declining reef fish populations a chance to recover. The reserve establishes a harvest kapu (restriction) on harvesting in the area from 2016-2026 while a plan for sustainable harvest is developed.
Honor the Kapu:
No fishing or gathering of marine resources (including fish, 'opihi, crabs, limu).
Respect the Rules:
Violations are punishable by fine, community service, forfeiture of gear, and possible imprisonment.
Report Violators:
Contact coastal volunteers, staff, or DOCARE at 808-643-DLNR to report violations. Provide a detailed description of the suspect, vehicle, gear, and incident.
Learn More:
To see the full marine reserve rules, go to:
dlnr.hawaii.gov/dar/administrative-rules/
PUBLIC
SHORELINE ACCESS
CAUTION
Any or all of these conditions may exist. Please use extreme caution. Enter at your own risk.
Dangerous Shorebreak
Warning No Lifeguard on Duty
Warning High Surf
Warning Waves on Ledge
Warning Strong Current
Caution Slippery Rocks
Caution Sudden Drop Off
Caution Rough and Uneven Terrain
IF IN DOUBT, DON'T GO OUT
This area is significant to the Hawaiian people. Please show respect and do not touch or remove any of the resources. PRESERVE HAWAII'S PAST FOR HAWAII'S FUTURE.
In the event of an emergency, call 911 immediately.
Report suspicious activities to Community Security:
808-325-4077

KALAEMANŌ

INTERPRETIVE TRAIL

This 0.31-mile-long trail will take you past several culturally significant sites and natural features. Interpretive signs containing QR (Quick Reader) codes have been placed at various points along the trail. Scan the QR code with your smartphone or tablet device to learn more about each of the sites. At the coast, the interpretive trail connects with the Ala Kahakai National Historic Trail. **Please stay on the marked path.**



Safety and Warnings

Any or all of these conditions may exist. Please use caution and enter at your own risk.

- Dangerous Shorebreak
- Warning No Lifeguard on Duty
- Warning High Surf
- Warning Waves on Ledge
- Warning Strong Current
- Caution Slippery Rocks
- Caution Sudden Drop Off
- Caution Rough and Uneven Terrain

E Mālama I Nā Kumu Waiwai

Help Care for the Resources

- Stay on marked path
- Fishing or collecting marine life within the Ka'ūpūlehu Marine Reserve is prohibited by law
- Do not stack stones
- Do not move or remove any resources including stones, sand, or plants
- No rubbings or molds of petroglyphs
- Refrain from rebuilding any cultural sites
- No stepping on or over walls and petroglyphs
- Take all trash when you leave

Reviewed from

RECEIVED
APR 14 2008
Kiki'o

Harry Kim
Mayor

Christopher J. Yuen
Director

Brad Kurokawa, ASLA
LEED® AP
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-4224
(808) 961-8288 • FAX (808) 961-8742

COPIES TO
KENN
CHRISTINE
STEVE LIM

April 9, 2008

Mr. Randy Mori
WB KD Acquisition, LLC
PO Box 5349
Kailua-Kona, HI 96740

Dear Mr. Mori:

SUBJECT: AFFORDABLE HOUSING REQUIREMENTS, KAUPULEHU DEVELOPMENT
TAX MAP KEY: 7-2-31:1-31; 7-2-32:1-12
ORDINANCE – 99-42, REZ – 936

The purpose of this letter is to make sure that the County of Hawai'i and the developer of the Kaupulehu Development have a mutual understanding concerning the development's compliance with the affordable housing requirements under the county rezoning ordinance and the LUC decision and order reclassifying the property. For the purposes of this letter, the "Kaupulehu Development" means the area reclassified by LUC No. A93-071, and rezoned by Ord. 99-42, except for "Lot 4B", which is discussed separately below.

Our conclusion is that the Kaupulehu Development has satisfied its affordable housing obligations for Increment 1 only, consisting of 80 single-family lots, but not for any additional lots or residential units which may be created within the development. To satisfy the affordable housing requirement for any additional units, Kaupulehu will have to comply with the requirements of Chap. 11, Hawai'i County Code, as they exist at the time, as it comes in for further subdivisions or for plan approval of multi-family units. Currently the basic requirement is to earn affordable housing credits equal to 20% of the market units developed. Credits can be earned in a number of ways spelled out in Chap. 11.

According to your December 12, 2006 progress report to the LUC, Kaupulehu may develop an Increment II consisting of an additional 370-500 lots and/or residential units.

Condition "T" of Ord. 99-42 provides as follows: "to ensure that the goals and policies of the Housing Element of the General Plan are implemented, the applicant shall comply with the requirements of Chapter 11, Article 1, Hawaii County Code, relating to Affordable Housing. This requirement shall be approved by the County Housing Agency prior to Final Subdivision Approval of any portion of the residential area."

The Hawai'i County Housing Agency approved Resolution No. 138, draft 2, on July 7, 2004. This approved a plan where Kaupulehu would satisfy its affordable housing requirement for 80 residential lots by developing 8 finished lots or residential units onsite or within a 30 mile distance from the property. The 8 units were based on the 10% affordable housing requirement in Chap. 11 at that time. We also have an "Assignment of Affordable Housing Credits", dated September 15, 2006, assigning 8 affordable housing credits from Seascape Development LLC to WD KB Acquisitions, LLC, to T.M.K. Nos. 7-2-10:23 and 24, and 7-2-32-9, 10, 11, and 12. This assignment of credits satisfied the 80 subdivided lots created by Sub. 7891 (Increment 1, Phase I), and Sub. 05-0066 (Increment I, Phase II), but not any further development.

A portion of the Kaupulehu development rezoned by Ord. 99-42 is being developed as part of the Hualalai Resort. This is the 238 acre portion referred to as "Lot 4B" (of Sub. 7571), further resubdivided by Sub. 7835. County Housing Agency Resolution No. 133, Draft 2, approved the concept that the affordable housing requirements for this Lot 4B area would be satisfied under the Hualalai Resort's affordable housing program. Thus, the Planning Department will treat development within Lot 4B under Hualalai Resort for affordable housing purposes.

The LUC condition basically requires satisfaction of county affordable housing conditions and does not impose any additional affordable housing requirement beyond what is required by the county.

The current requirements for the remainder of Kaupulehu Development (after Increment I) are contained in Chap. 11, Hawai'i County Code, as amended by Ord. 05-23 and 05-111. Pursuant to Haw. Cty. Code sec. 11-17, Kaupulehu had not "fully satisfied" the affordable housing requirements under the previous ordinance, so it must satisfy the current Chap. 11 for the remainder of development.

Please let us know in writing if your view is different from this letter. If you have any further questions, please make an appointment to discuss this with the Planning Director.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

CJY:pak
Wpwin60/Chris08/Randy Mori – WB KD Acquisition, LLC – Kaupulehu housing summary

cc: Mr. Tom Witten, PBR
OHCD
Mr. Ed Divita, Discovery Land
REZ 926
REZ 608
Administrative Permits Section
Planning Department – Kona
Corporation Counsel