

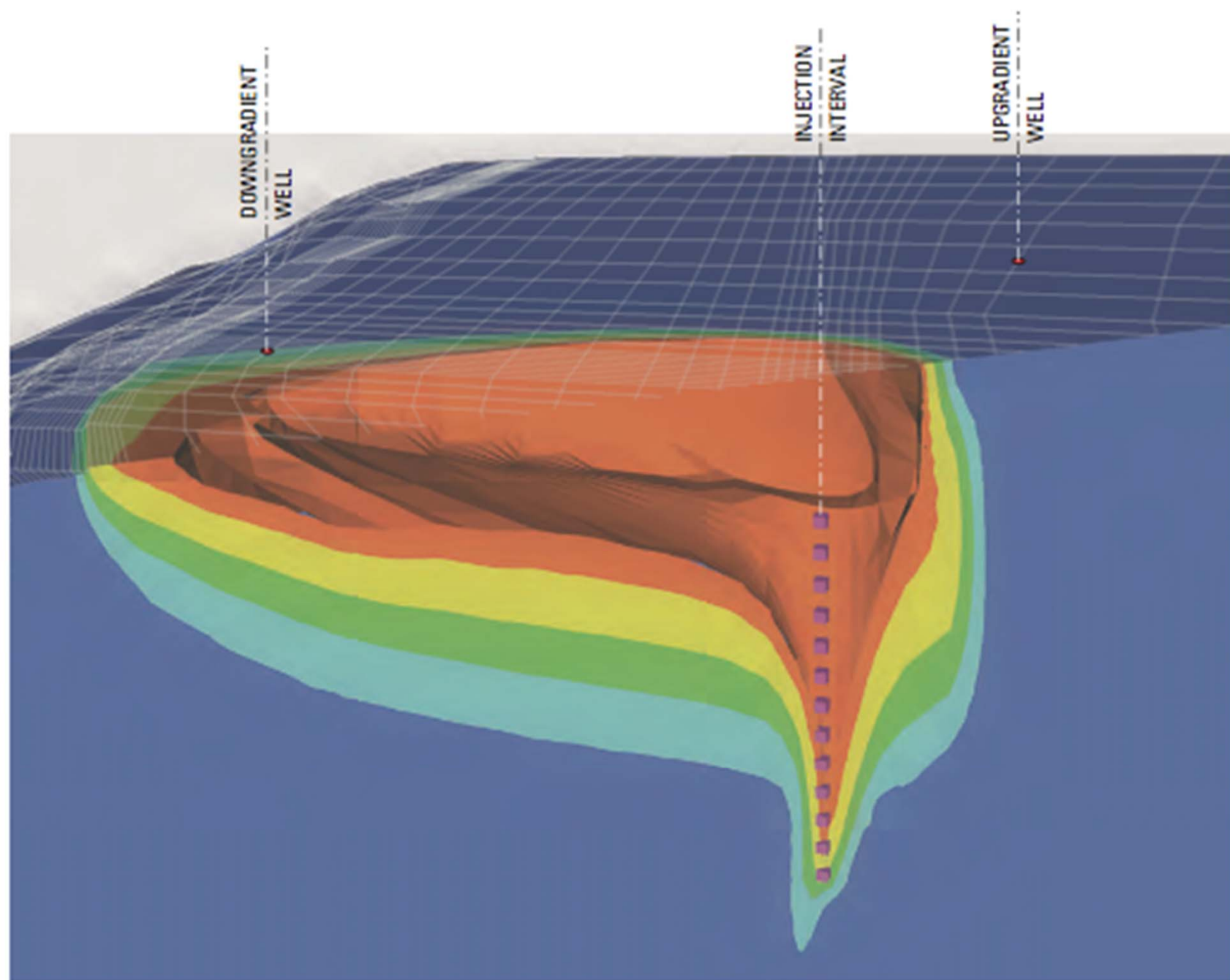
REEF POWER



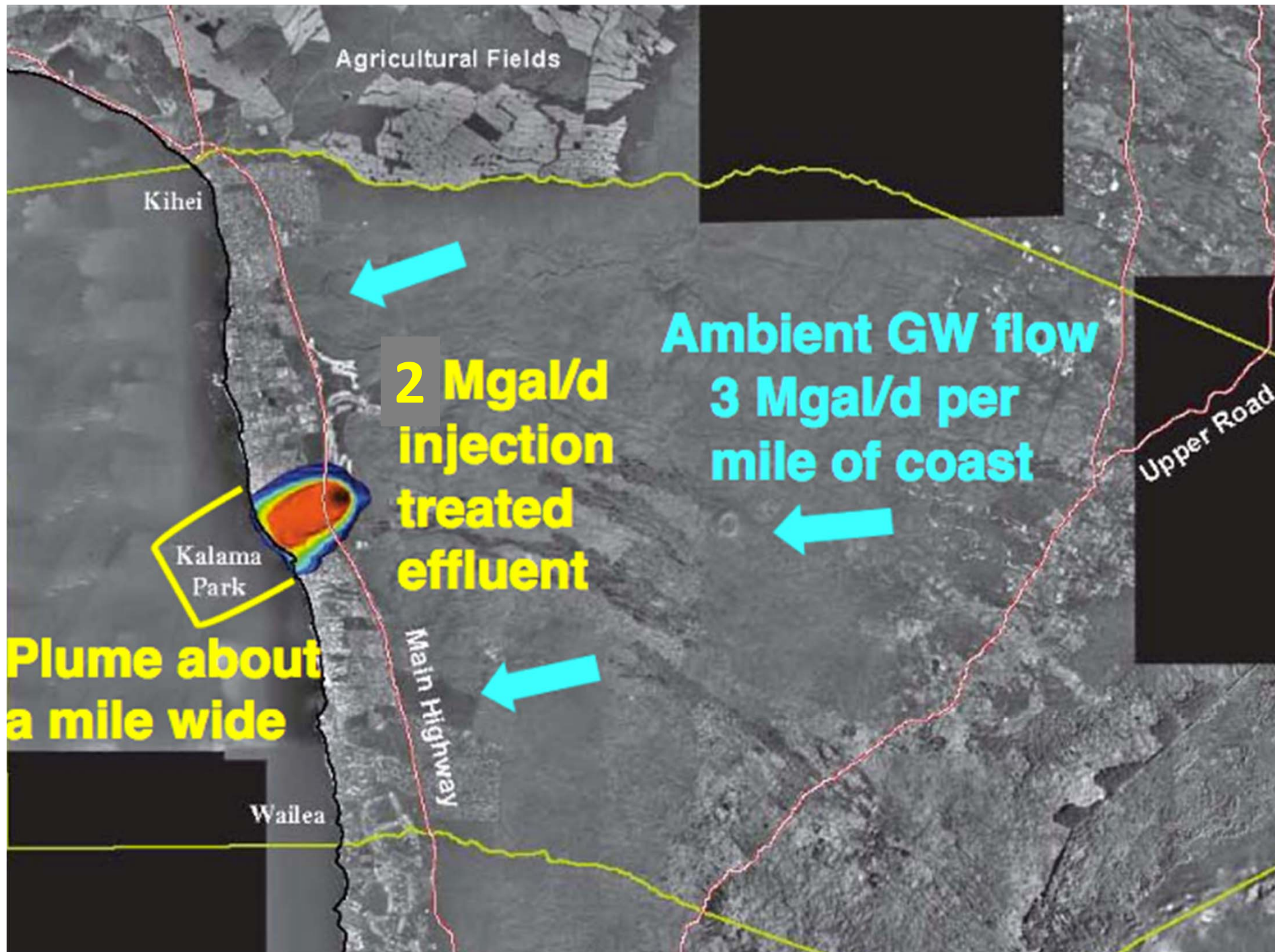
RECEIVED AT EACP MEETING ON 11/5/19 from Travis Liggett

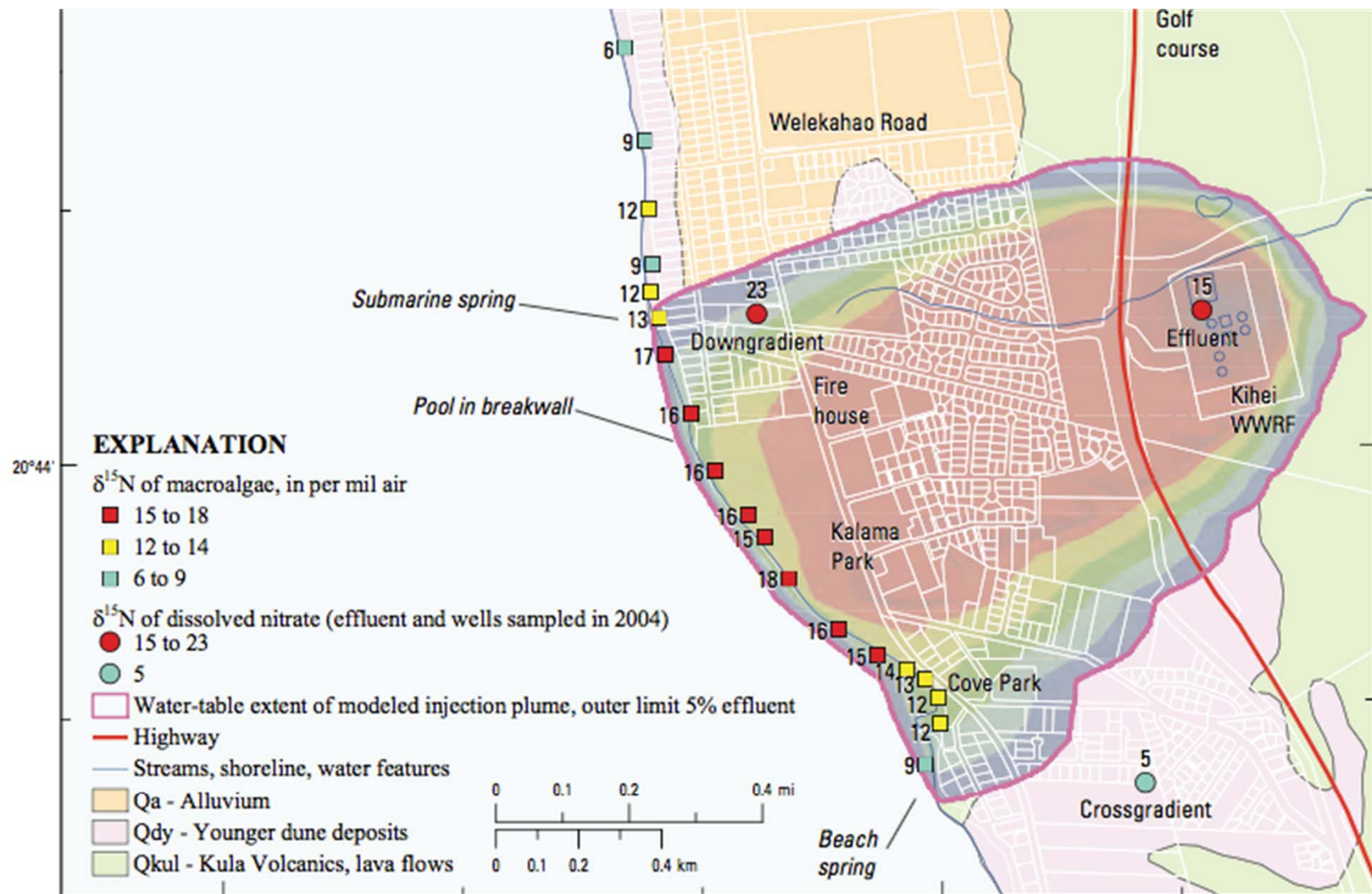






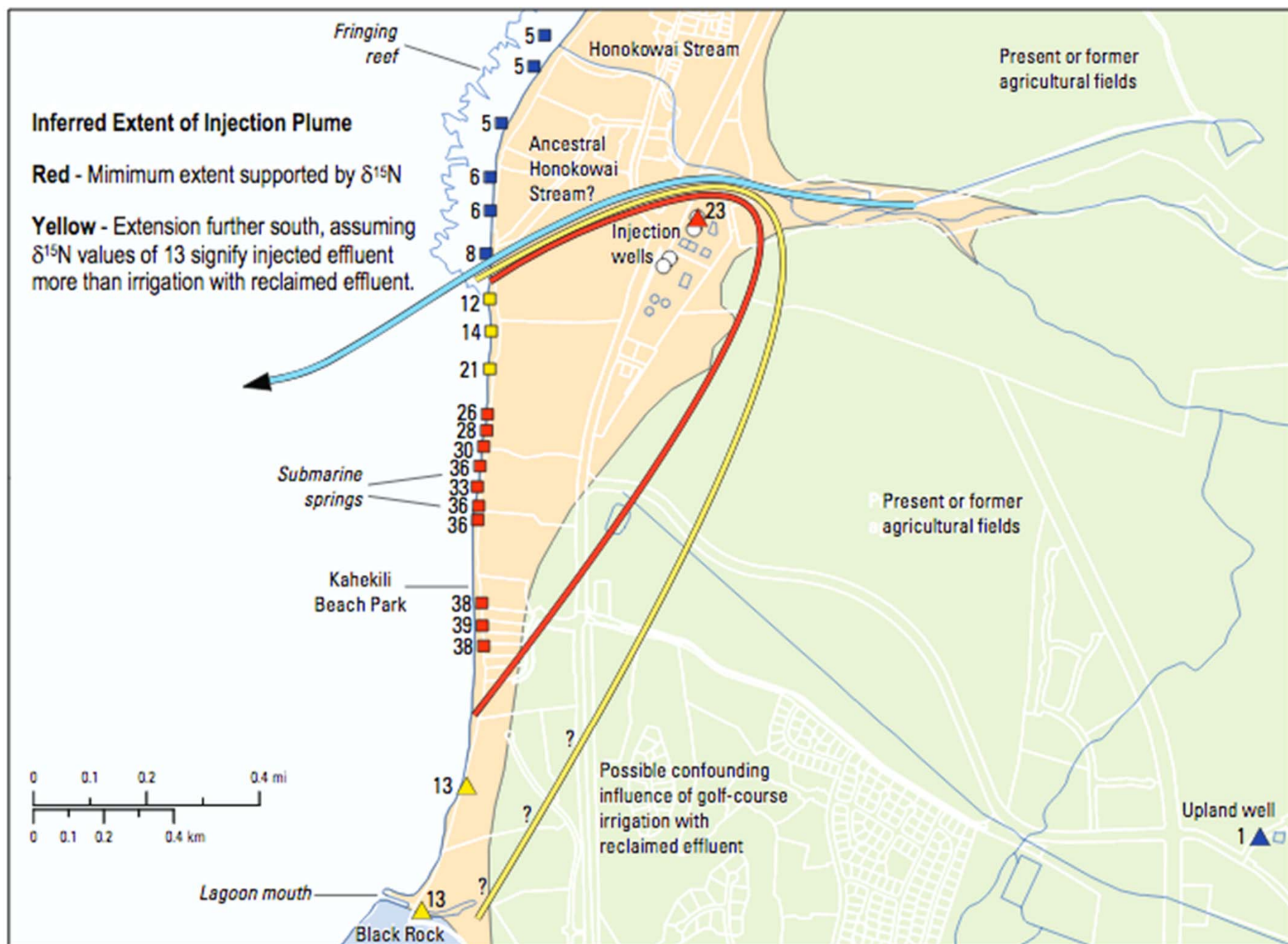
VERTICAL EXAGGERATION 20X





Base from U.S. Geological Survey digital data (2004) at 1:24,000 scale, UTM Zone 4, NAD83 datum. Street and property boundaries are from Hawaii State Office of Planning tax maps (2008). Geology is from Stearns and Macdonald (1942) and Sherrod and others (2007).

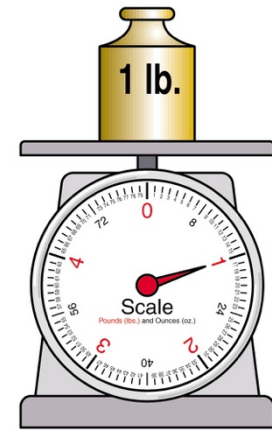
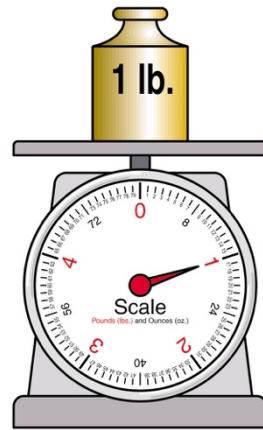
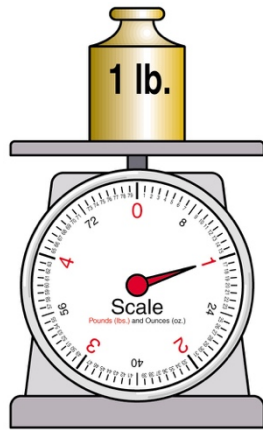
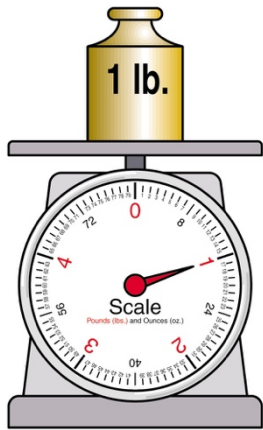
Map showing $\delta^{15}\text{N}$ isotopic composition of macroalgae at Kihei, Hawaii.



317,000 lbs nutrients = 14 dump trucks full
into the ocean
yearly



Kahului / Kihei / Lahaina averages
4 lbs nutrients into the ocean
per person every year

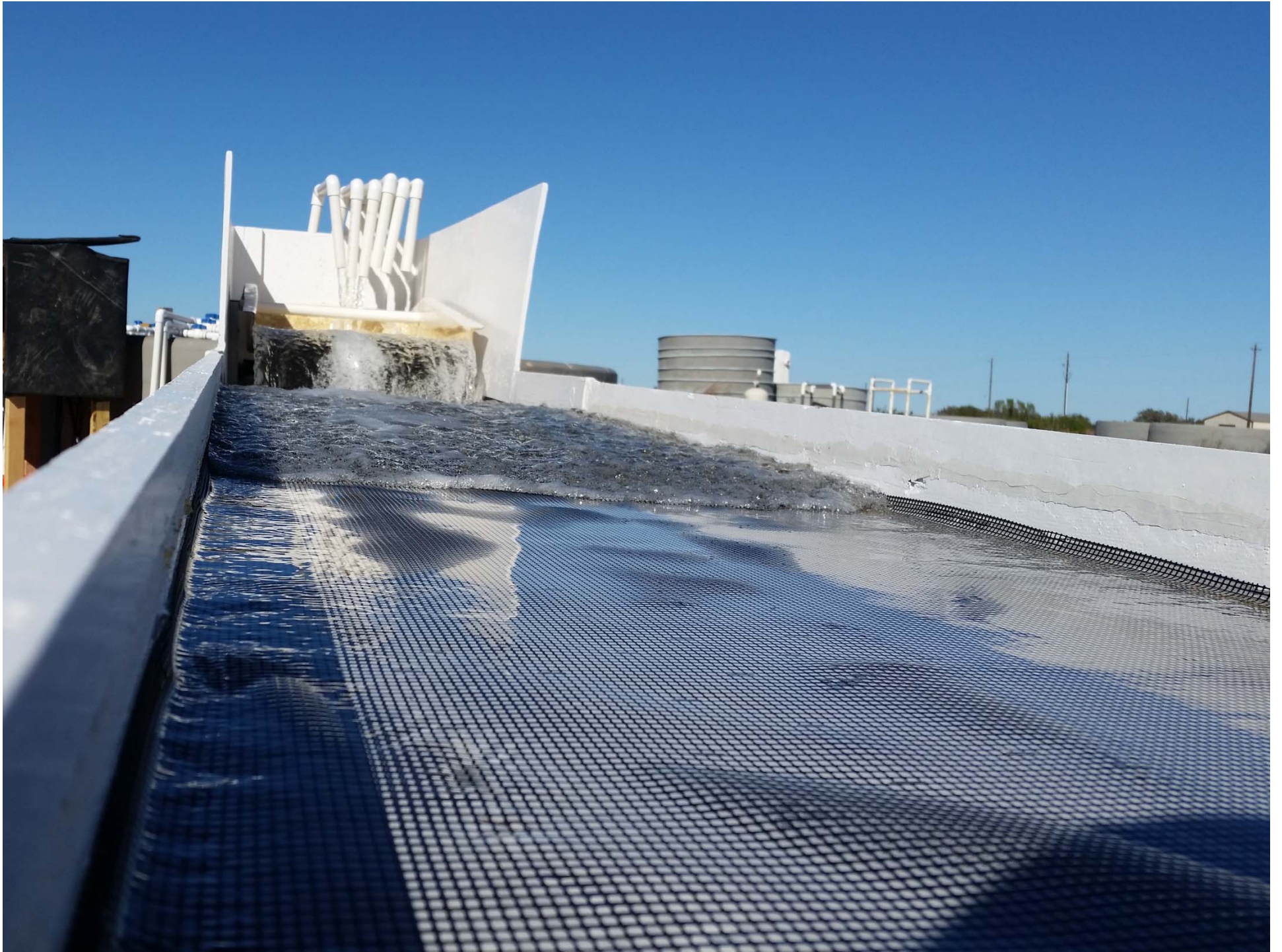


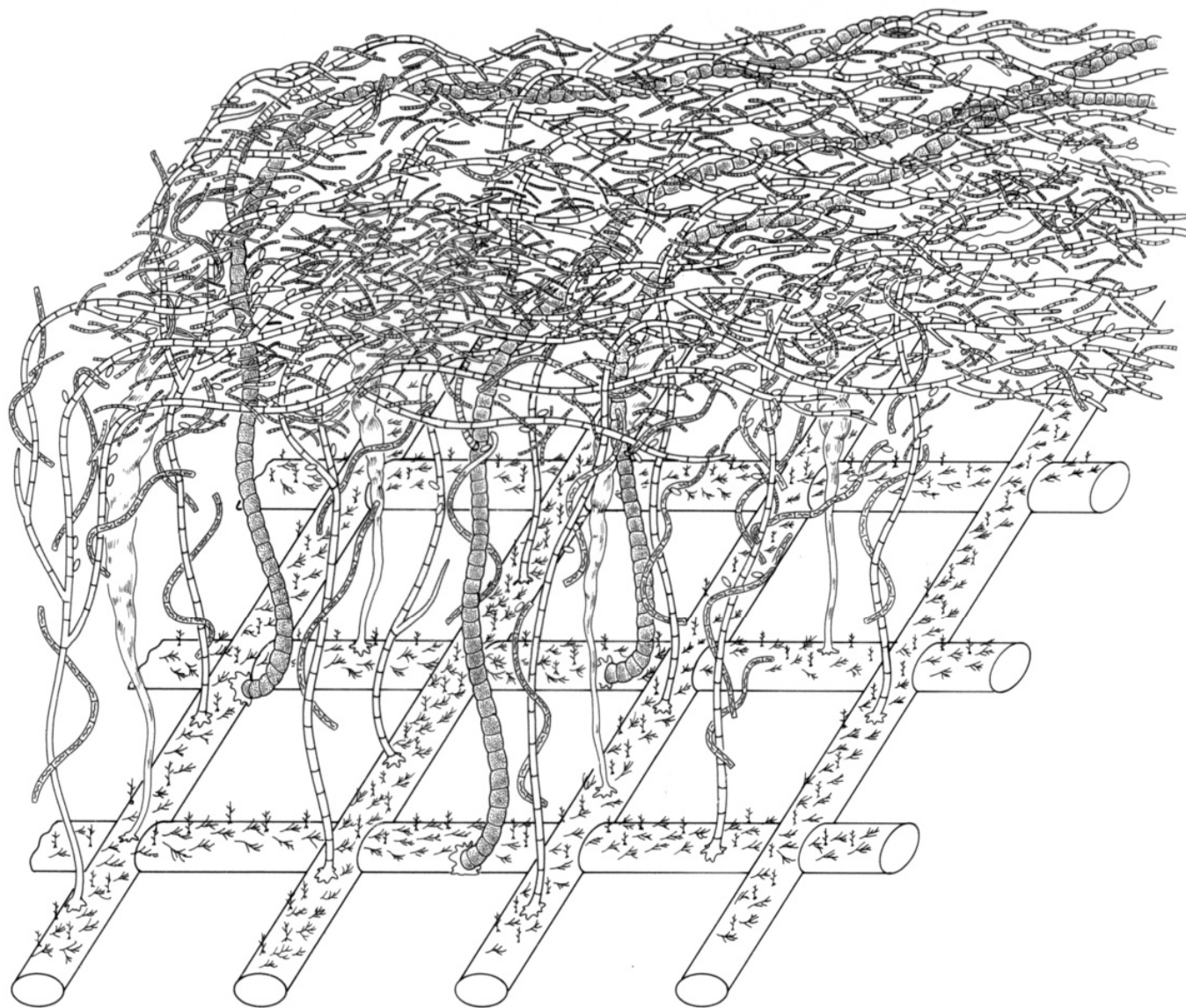












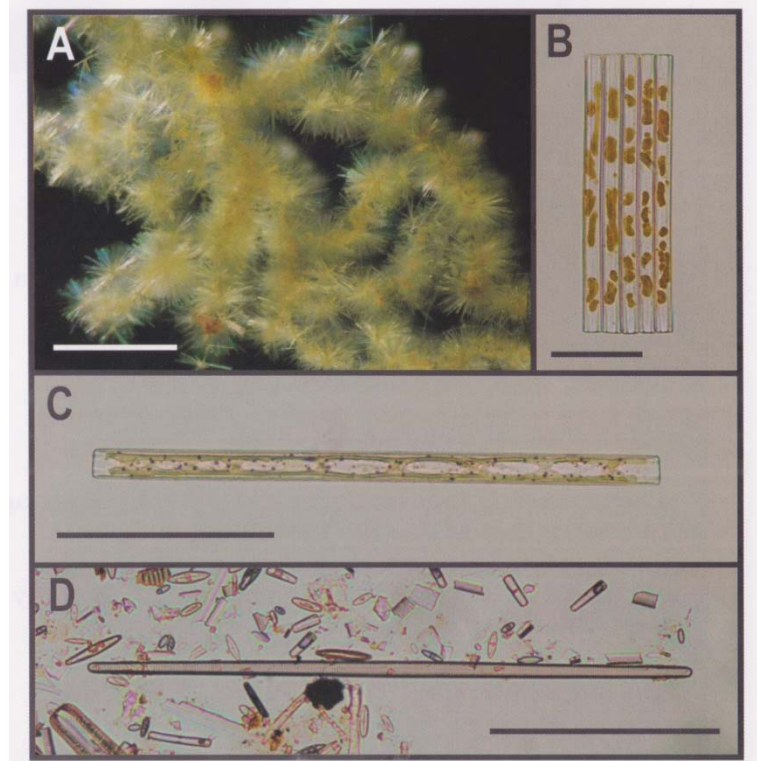
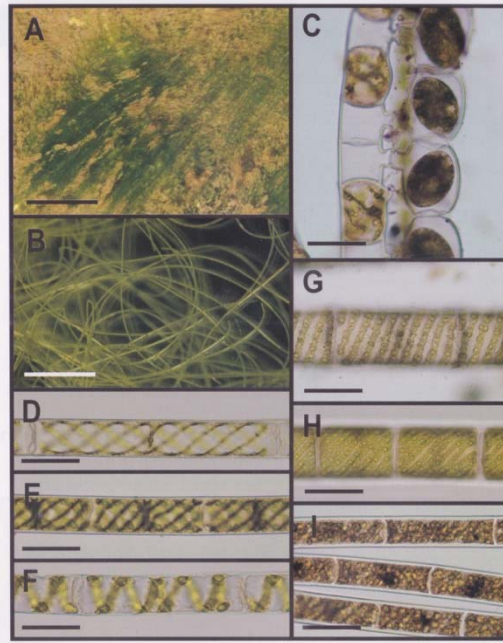
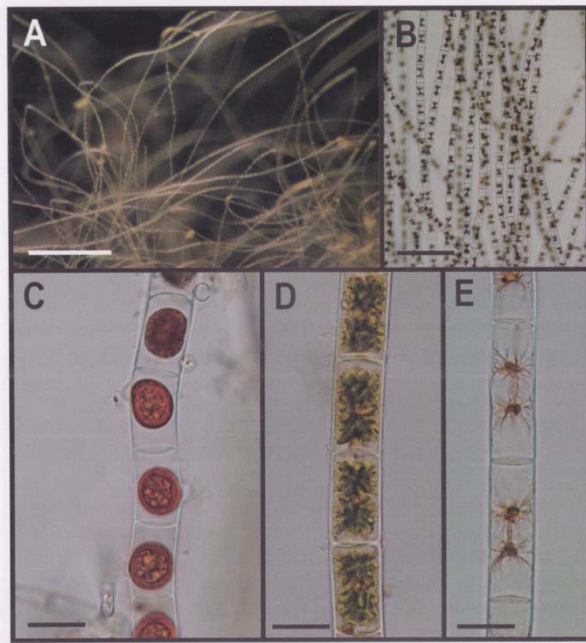
all
cells
photosynthetic

applied energy
as
↔
oscillating flow
(surge)

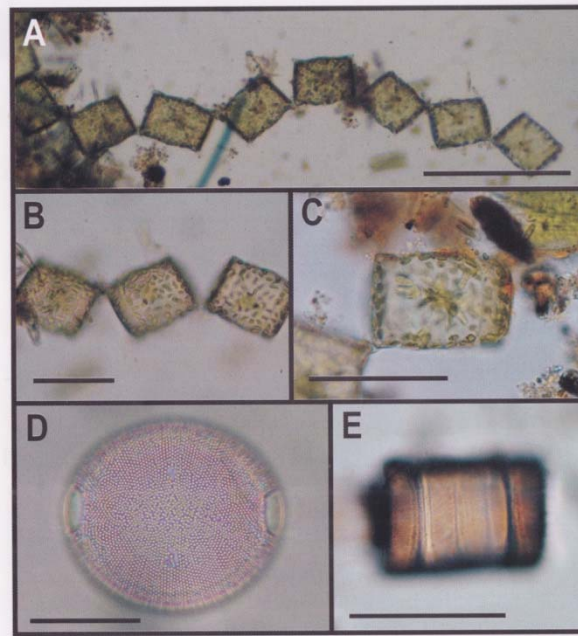
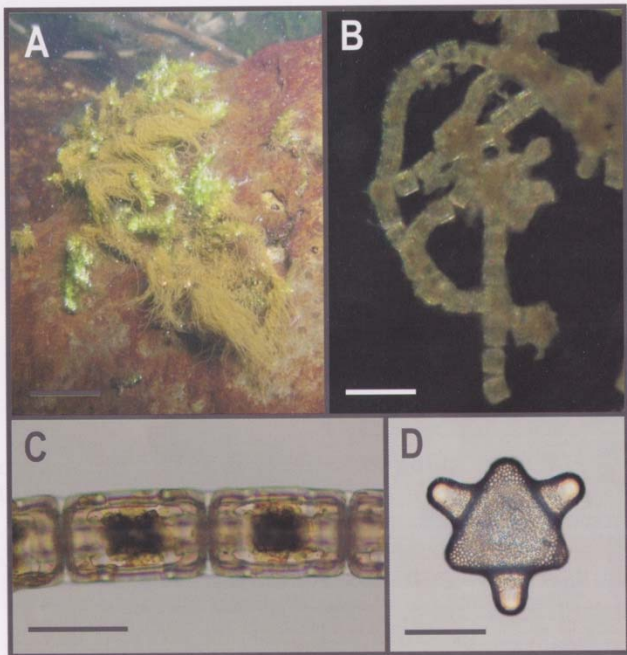
boundary layer breaking
light flashing
high productivity



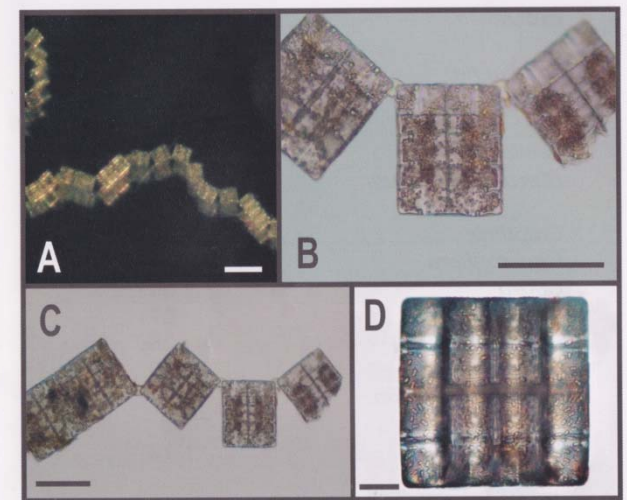




Hawaii Department of Natural Resources Technical Report 04-02 "Stream macroalgae of Hawai'i: An identification guide to the common genera"



Clockwise from upper left: ,
Stigleoclonium, Spirogyra, Synedra,
Terpsinoe, Pleurosia, Hydrosera







Kihei scaled ATS 10 acres or less

acres

Target

12

Maui Mall

21

Queen K Center

42



Soil made from composted algae grows well



100%
Composted algae

50 / 50%

100%
Peat moss



KIHEI FOREST ACRES ESTIMATES

	Upper Hana equivalent rain	Lower Hana equivalent rain	10 mm evapo- transpiration /day	Low nutrient uptake (115 lbs/acre/year)	High nutrient uptake (400 lbs/acre/year)	Reference Sites
rain equivalent	400"/yr	79"/yr	144"/yr			
acres / 2 MGD	66	335	187			
acres / 20 tons N+P (current R1)				313	90	
acres / 2 tons N+P (w/ATS)				35	7	
Maui Nui Golf Course						89
Maui Meadows						415

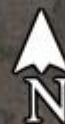


Google Earth

© 2018 Google

FOREST

ATS



4000 ft



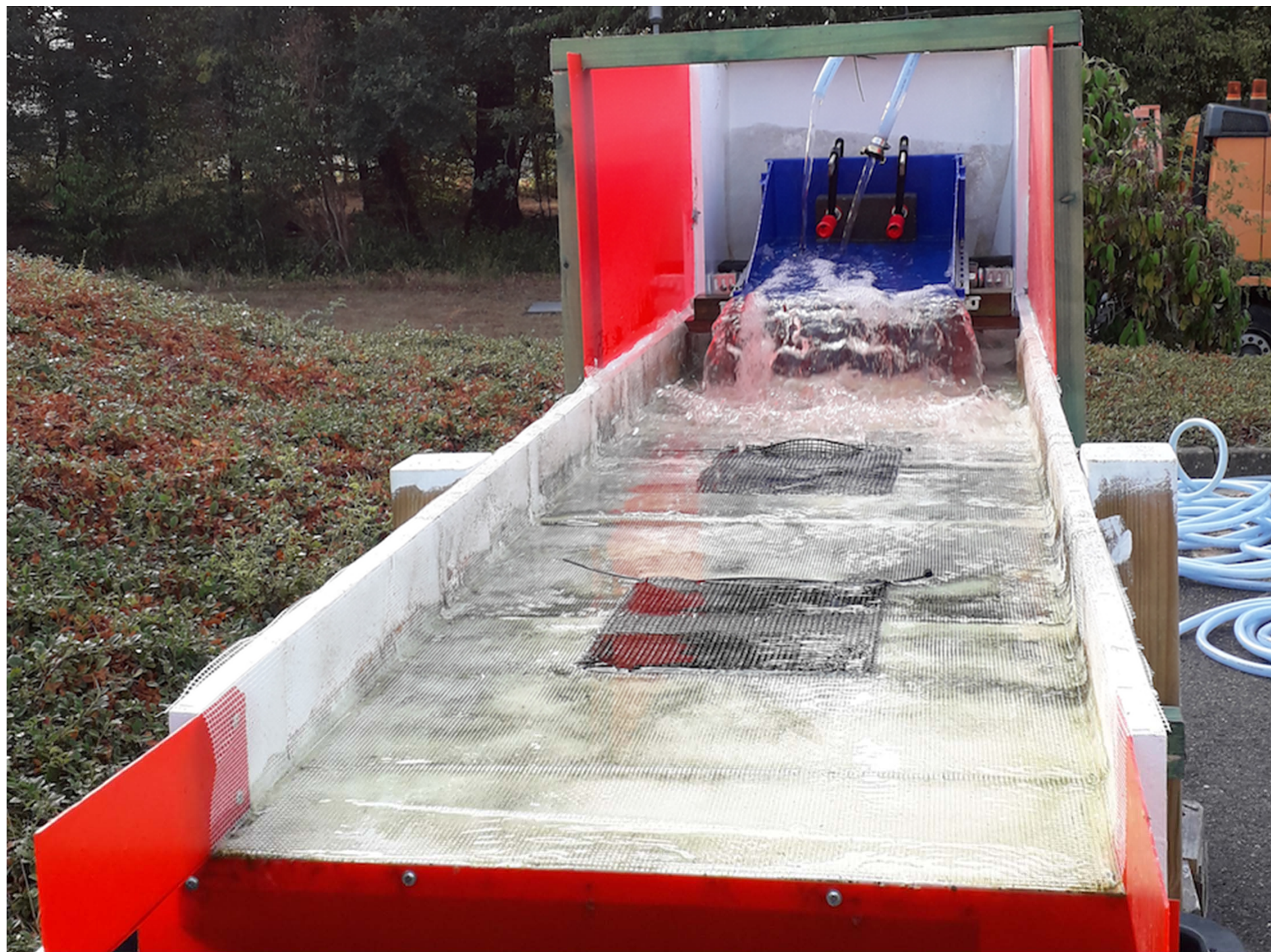
Google Earth

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Data SOEST/UHM
Data USGS

2 mi

COST TO ELIMINATE MAUI INJECTION

0	Lahaina ENR upgrades
16,000,000	Lahaina ATS + 30 years operations
7,000,000	Lahaina forest
0	Kihei ENR upgrades
16,000,000	Kihei ATS + 30 years operations
7,000,000	Kihei forest
15,000,000	Kahului R1 upgrades (from Maui Co.)
32,000,000	Kahului ATS + 30 years operations
<u>14,000,000</u>	<u>Kahului forest</u>
\$107,000,000	TOTAL
11,248,368	\$ / year amortized 10 years, 1% interest
3,000,000	visitors per year
\$3.75	"flush fee" per visitor for 10 years



“nutrient neutral”

REEF POWER



@reefpowermaui