

Data Stream Comparison Table for Red Abalone FMP

This Data Stream Comparison Table will serve as a reference to inform ongoing Red Abalone FMP Project Team discussions regarding trade-offs associated with evaluating which data streams to use in managing the North Coast recreational fishery. It is imperative to consider which combination of data streams will result in appropriate spatial and temporal coverage, as well as be scientifically robust and cost-effective to ensure long-term, sustainable management of the red abalone resource.

The following table is subdivided into four sections: red abalone fishery variables, red abalone population variables, red abalone body condition variables, and environmental variables. For each data stream within each section, we provide information on - 1) the data source, 2) sampling entity (e.g., government, NGO, academic, industry), 3) length of data set, 4) number of landing sites sampled, 5) frequency of sampling, and 6) total cost of survey (i.e. all associated survey costs including salary). Additionally, **please note that in some instances survey costs are reflected in aggregate**, as sampling entities can simultaneously collect multiple data streams on the same survey. For instance, during CDFW's creel survey they generate body condition and length data, for a total cost of \$11,100. We will continue to update information as it is made available.

	Data Stream [Source/ Associated Survey]	Sampling Entity	Length of Data Set [# years]	CDFW Landing Sites Sampled [# sites out of 56 total]	Frequency of Sampling	Total Cost of Survey [\$ per year]
RED ABALONE FISHERY-DEPENDENT DATA						
1	Catch [Report cards]	CDFW	16-30	53	Sporadic (pre-2002); Annually (2002-2016)	\$26,400
2	Catch [Creel Survey]	CDFW/ Citizen Scientists	42	10	Annually (pre-2003); Every 2 years (2003 onward)	\$11,100
3	Length [Creel Survey]	CDFW/ Divers	42	10	Annually (pre-2003); Every 2 years (2003 onward)	Cost included in total survey estimate in Row 2

RED ABALONE POPULATION DATA						
4	Length [Subtidal survey]	CDFW	5-29	3-15 ^{^^^}	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	\$125,000 *
5	Length [Subtidal survey]	MPA Monitoring [Reef Check]	13	15	Annually	\$110,000 ⁺⁺
6	Length [Random Swimming]	Reef Check	3	20	Annually	Cost included in total survey estimate in Row 5
7	Length [Subtidal survey]	MPA Monitoring (HSU, MARINe)	3-6	11	Annually	\$123,000 ⁺⁺⁺
8	Length [Intertidal plot survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	\$32,000 ^{^^}
9	Length [Intertidal swath survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-7	31	Every 3-5 years	\$49,600 ^{^^}
10	Density [^] [Subtidal survey]	CDFW	5-29	3-15 ^{^^^}	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
11	Density [Subtidal survey]	MPA Monitoring (HSU, MARINe)	3-6	11	Annually	Cost included in total survey estimate in Row 7
12	Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
13	Density/ Counts [Intertidal plot survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	Cost included in total survey estimate in Row 8

14	Density [Intertidal swath survey]	MPA Monitoring (MARINE/ PISCO UCSC)	1-7	31	Every 3-5 years	Cost included in total survey estimate in Row 9
15	Recruitment module [Juvenile stage recruitment] +	CDFW	18	1	Annually	Cost included in total survey estimate in Row 4
16	Recruitment [Plankton tow] +	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
17	Recruitment [Boulder sampling] +	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 4
RED ABALONE BODY CONDITION DATA						
18	Gonad index [Creel Survey]	CDFW	10	2	Every 2 years	Cost included in total survey estimate in Row 2
19	Body condition [Creel Survey]	CDFW	3-4	10	Every 2 years	Cost included in total survey estimate in Row 2
ENVIRONMENTAL DATA						
20	Kelp Density [Aerial survey]	CDFW	12	53	Sporadic (annually in 2008, 2014-2016)	\$250,000 **
21	Kelp Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
22	Kelp Density [Subtidal Survey]	MPA Monitoring [HSU, MARINE]	2-6	11	Annually	Cost included in total survey estimate in Row 7
23	Pacific Decadal Oscillation	NOAA Fisheries	129	---	Annually	---

24	Urchin Density [Subtidal survey]	CDFW	5-29	3-15 ^{^^^}	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	Cost Included in total survey estimate in Row 4
25	Urchin Density [Subtidal survey]	MPA Monitoring (Reef Check)	13	15	Annually	Cost included in total survey estimate in Row 5
26	Urchin Density/ Counts [Intertidal Plot Survey]	MPA Monitoring (MARINe/ PISCO UCSC)	1-7	13	Annually (for 9 funded sites); Sporadic (4 additional)	\$20,800 ^{^^}
27	Water Temperature	CDFW	12	1	Annually	Cost included in total survey estimate in Row 4
28	Water Temperature	Reef Check	2	~10	Every 15 min (Year round)	\$2,000

* Includes costs for various permanent and temporary staff salaries and factoring in pre-survey preparation, conducting surveys, and post survey data processing and QA/QC. This is an annual cost estimate for three weeks of survey on the North Coast.

** Cost is likely higher than listed amount; reflects the current cost for a contract to provide aerial survey and post processing of data for GIS use.

*** Cost likely higher than listed amount; reflect transect survey costs (e.g. survey operations and staff compensation beyond regular work hours) but does not account for costs associated with data entry and QA/QC

+ Data streams under development

++ Includes costs for all data collected by Reef Check (including length [i.e. "random swimming"] and density survey for kelp forest community), as well as staff time for Reef Check staff and part-time contractor

+++ Includes costs for all data collected by HSU (including length and density survey for kelp forest community), as well as staff time for HSU including travel, benefits, and boat usage

^^ Includes costs to survey all sites, travel, salary and benefits, overhead, and database support.

^^^ CDFW can either run the rapid assessments (i.e., 10 index sites per year) or the regular index site survey (i.e., 3 index sites per year) under this cost and FTE