

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 three sections: red abalone fishery-dependent data, red abalone fishery-independent data, and other relevant biological or environmental data. 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, 6) cost of survey (i.e. all associated costs except salary), and 7) number of full time employees required. 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 MARINE's intertidal plot survey they generate both red abalone count and length data, for a total cost of \$32,000. We will continue to update information as it is made available.

	Data Stream [Source/ Associated Survey]	Sampling Entity	Length of Data Set [# years]	Landing Sites Sampled [# sites]	Frequency of Sampling	Cost of Survey [per year]	FTE [full time employee]
RED ABALONE DATA [FISHERY-DEPENDENT]							
1	Catch [Report cards]	Divers	16	53	Annually	\$6,000 *	???
2	Catch [Telephone surveys]	CDFW	30	53	Sporadic (pre-2002); Annually (2002-2016)	\$10,000 **	???
3	Length [Creel Survey]	CDFW/ Divers	42	10	Annually (pre-2003); Every 2 years (2003 onward)	???	0.5 FTE (900 hrs/yr)

4	Catch [Creel Survey]	CDFW/ Citizen Scientists	42	10	Annually (pre-2003); Every 2 years (2003 onward)	???	0.5 FTE (900 hrs/yr)
5	Gonad index [Creel Survey]	CDFW	10	2	Every 2 years	Cost included in total survey estimate in Row 4	Included in FTE estimate in Row 4
6	Body condition [Creel Survey]	CDFW	3-4	10	Every 2 years	Cost included in total survey estimate in Row 4	Included in FTE estimate in Row 4
7	Sub-legal abalone mortality [Creel Survey]	CDFW/ Citizen Scientists	42	10	Annually (pre-2003); Every 2 years (2003 onward)	Cost included in total survey estimate in Row 4	Included in FTE estimate in Row 4
RED ABALONE DATA [FISHERY- INDEPENDENT]							
8	Abundance ^ [Subtidal survey]	CDFW	5-29	3-15 ^^	Sporadic (pre-2002); Every 3 to 4 years (2002-2018)	\$61,000 ***	0.7 FTE (1400 hrs/yr)
9	Abundance ^ [Subtidal survey]	Reef Check	13	15	Annually (since 2007)	\$30,000 ++	1 FTE plus part-time contractor +++
10	Abundance/ Counts [Intertidal plot survey]	MARINe/ PISCO UCSC	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	\$32,000 ^^	2 FTE
11	Abundance ^ [Intertidal swath survey]	MARINe/ PISCO UCSC	1-7	31	Every 3-5 years	\$49,600 ^^	2 FTE
12	Length [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 8	Included in FTE estimate in Row 8
13	Length [Subtidal survey]	Reef Check	3	20	Annually	Cost included in total survey estimate in Row 9	Included in FTE estimate in Row 9

14	Length [Intertidal plot survey]	MARINe/ PISCO UCSC	1-17	4-11	Annually (for 4 funded sites); Sporadic (7 additional)	Cost included in total survey estimate in Row 10	Included in FTE estimate in Row 10
15	Length [Intertidal swatch survey]	MARINe/ PISCO UCSC	1-7	31	Every 3-5 years	Cost included in total survey estimate in Row 12	Included in FTE estimate in Row 12
16	Recruitment module [Juvenile stage recruitment] +	CDFW	18	1	Annually	Cost included in total survey estimate in Row 8	Included in FTE estimate in Row 8
17	Recruitment [Plankton tow] +	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 8	Included in FTE estimate in Row 8
18	Recruitment [Boulder sampling] +	CDFW	10	2-3	Every 3 to 4 years (2002-2018)	Cost included in total survey estimate in Row 8	Included in FTE estimate in Row 8

OTHER BIOLOGICAL AND/OR ENVIRONMENTAL DATA

19	Kelp Abundance [Aerial survey]	CDFW	12	53	Sporadic (annually in 2008, 2014-2016)	\$250,000 **	???
20	Kelp Abundance ^ [Subtidal survey]	Reef Check	13	15	Annually (since 2007)	Cost included in total survey estimate in Row 9	Included in FTE estimate in Row 9
21	Pacific Decadal Oscillation	NOAA Fisheries	129	---	Annually	---	---
22	Urchin Abundance ^ [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 8	Included in FTE estimate in Row 8
23	Urchin Abundance ^ [Subtidal survey]	Reef Check	13	15	Annually (since 2007)	Cost Included in total survey estimate in Row 9	Included in FTE estimate in Row 9
24	Urchin Abundance/ Counts	MARINe/ PISCO UCSC	1-7	13	Annually (for 9 funded sites);	\$20,800 ^^	2 FTE

	[Intertidal Plot Survey]				Sporadic (4 additional)		
25	Urchin Size [Intertidal Plot Survey]	MARINe/ PISCO UCSC	1-7	13	Annually (for 9 funded sites); Sporadic (4 additional)	Cost included in total survey estimate in Row 24	Included in FTE estimate in Row 24
26	Water Temperature	CDFW	12	1	Annually	Cost included in total survey estimate in Row 8	Included in FTE estimate in Row 8
27	Water Temperature	Reef Check	2	~10	Every 15 min (Year round)	\$2,000	Included in FTE estimate in Row 13

??? Denotes estimates still forthcoming from sampling entity

* Cost is likely higher than listed amount; reflect cost of printing and maintenance of report cards in Abalone Landings Data System (ALDS) but does not account for costs associated with data entry and QA/QC

** Cost is likely higher than listed amount

*** 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)

+++ Reflects FTE for all data collected by Reef Check

^ Density is associated indicator

^^ Includes costs to survey all sites, travel, 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