

## Marine Conservation: The Farallon Islands Example

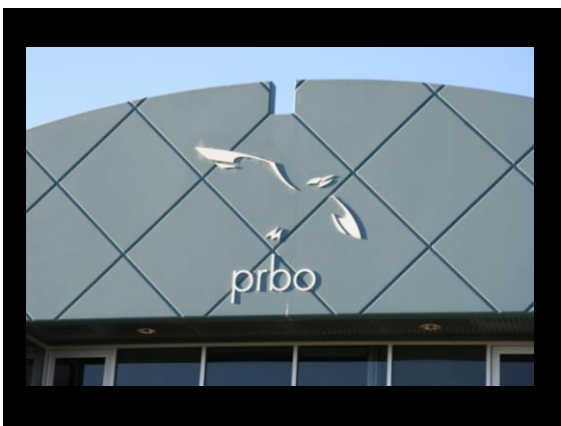
### Some Historical and Current Perspectives

## Major Threats to Populations

- Ocean currents, upwelling
- Changes in water temperature
- Chemical contamination (e.g. hydrocarbons, etc)
- Oil pollution
- Gill-netting
- Disturbance at breeding areas
- Disturbance along migration (e.g. stop-over locations)

## Case History

- The Farallon Islands, California



## Location of island



## Distant photo of island



## It's known for



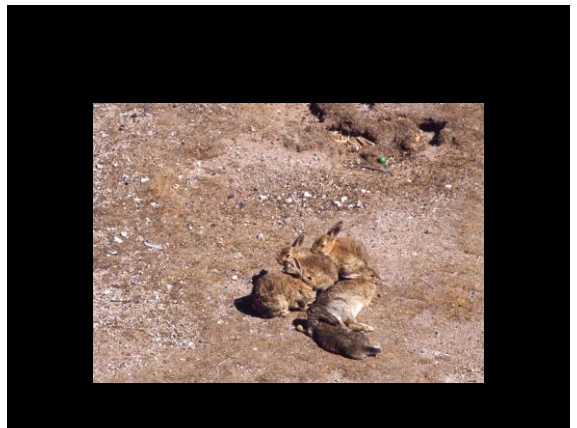
Orca attacking Great white shark

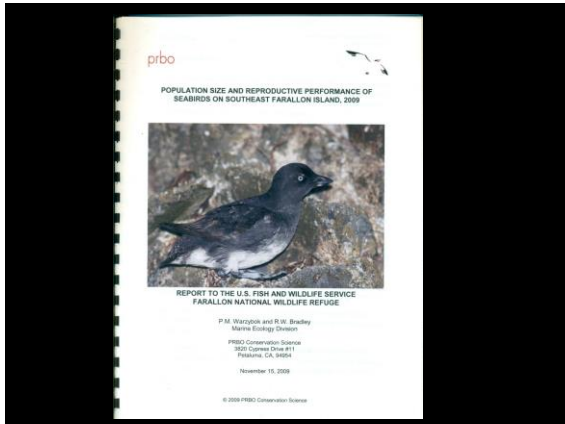
## Important Historical facts

- Once had very large northern fur seal population; now extinct (overharvested by Russians & Americans)
- In mid 19<sup>th</sup> century had 1 million Common Murres
- Eggging during and after the Gold Rush eliminated most of the murres
- Coast Guard occupied the island 1855-1971
- Now protected via various designations, including being part of the National Wildlife Refuge System





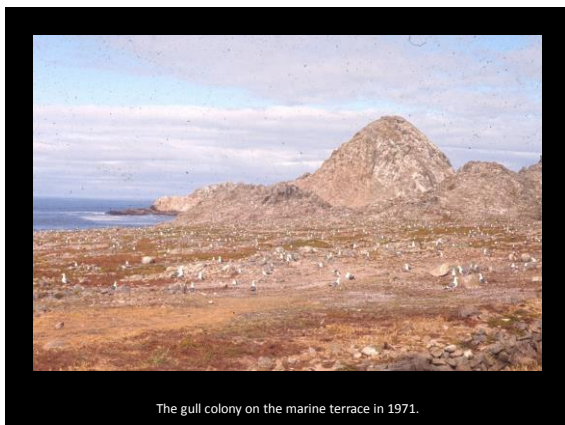
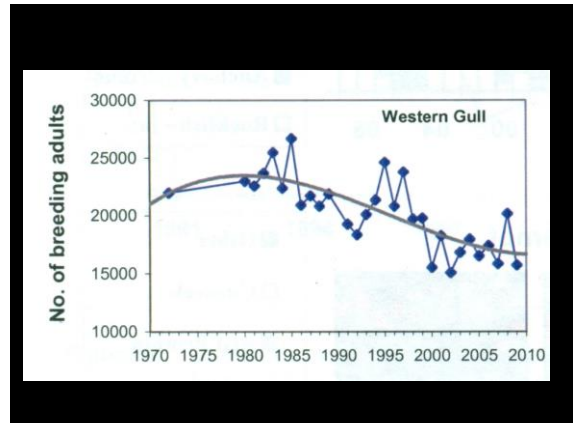
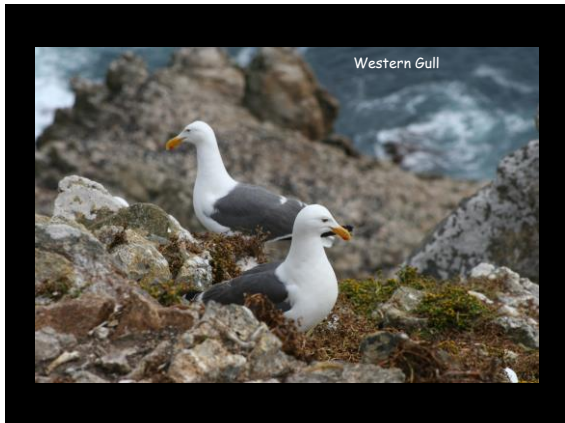




**Table 2.** Breeding population size estimates of seabird species on the South Farallon Islands, 1998-2009. Estimates include Southeast and West End Islands unless otherwise noted.

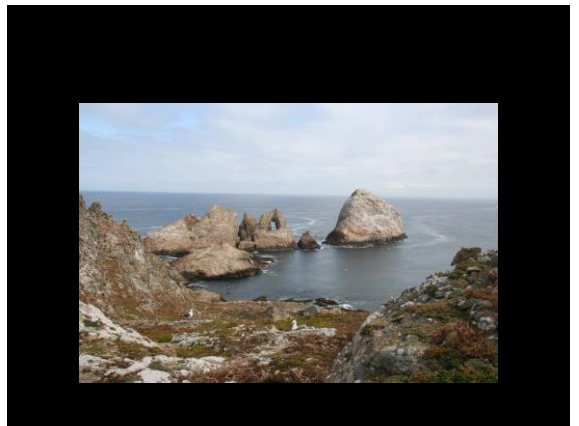
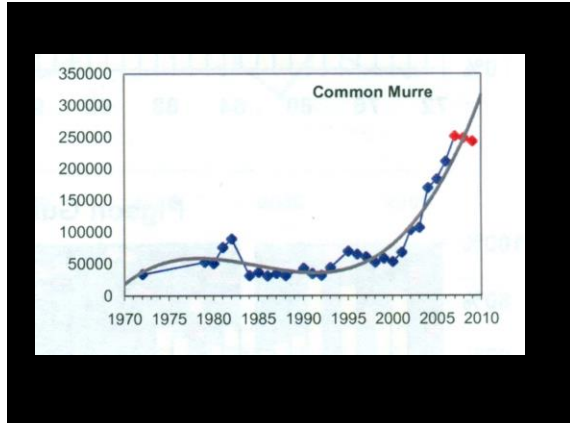
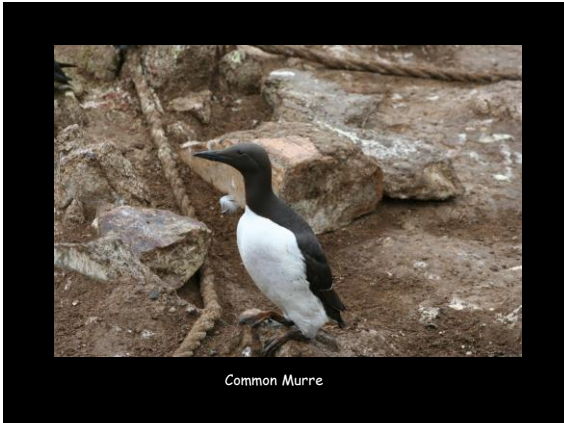
Species	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998-2007 average
DCCO	194	206	444	474	130	458	392	486	402	402	468	386
BRCO	1,248	4,840	20,788	15,692	11,732	16,754	11,222	9,466	6,570	5,896	6,345	10,931
PECO	268	250	64	40	28	706	510	442	416	260	222	294
WEGU	15,747	20,152	15,852	17,399	16,547	17,969	16,838	15,095	18,235	15,544	19,767	17,340
BLDY	38	40	42	36	30	26	26	22	30	26	30	31
COMU	242,759	248,321 <sup>a</sup>	250,032 <sup>b</sup>	211,355	183,092	169,079	107,105	103,588	68,194	53,301	58,878 <sup>c</sup>	127,959
PIGU <sup>d</sup>	2,851	2,875	2,774	2,607	1,375	2,530	2,343	1,964	?	?	?	2,359
TIPU <sup>e</sup>	216	106	59	108	82	166	?	130	96	78	89	101
CAAU <sup>f</sup>	18,319	18,120	19,540	13,597	16,202	29,229	23,692	18,807	16,690	15,225	15,388	18,449

<sup>a</sup> Estimate for Southeast Farallon Island only.  
<sup>b</sup> Amendment to the 1999 COMU population estimate.  
<sup>c</sup> TIPU population estimates were recalculated in 2008 to correct for unequal survey effort in previous seasons (see text)  
<sup>d</sup> Estimates derived from morning raft counts. Evening counts used prior to 2002 and are considerably lower (see text).  
<sup>e</sup> No complete census done. Estimated population based on percent change in Index Plot counts (see text).



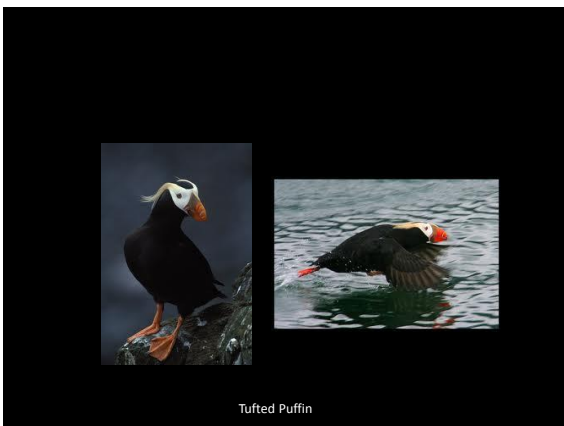
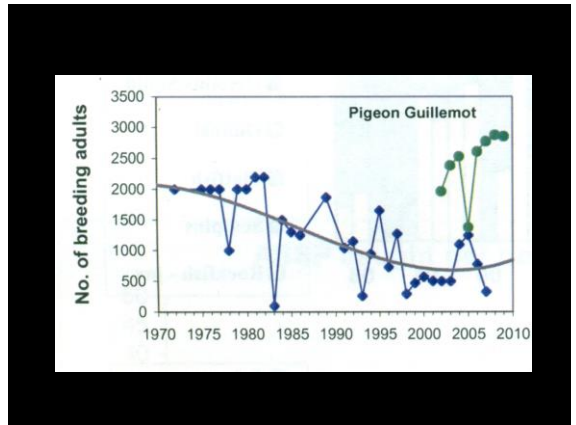
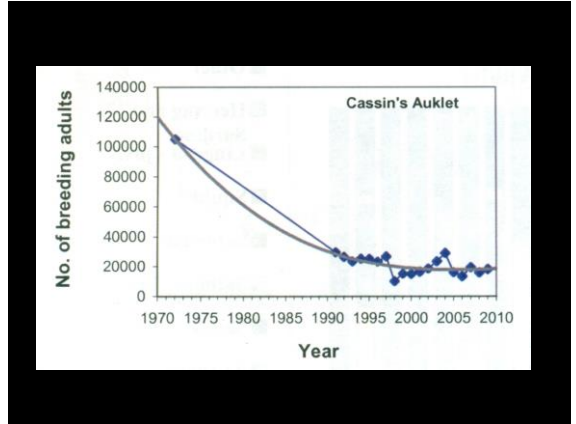
The gull colony on the marine terrace in 1971.



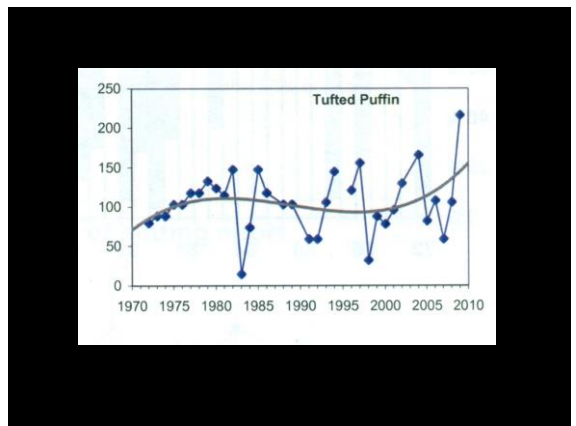




Cassin's Auklet



Tufted Puffin







Rhinoceros Auklet



Ashy and Leach's Storm Petrels

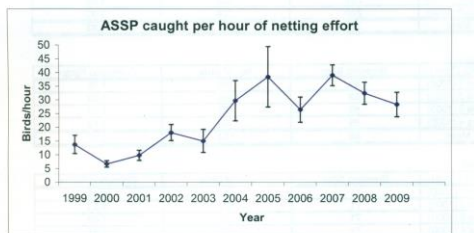


Figure 10. Mean number of Ashy Storm-petrels caught per hour of netting effort on SEFI from 1999 to 2009. Error bars represent the standard error for the mean calculated from all capture sessions in a given season.



Black Oystercatcher

## Conservation Measures

- Protect breeding and staging areas
- Reduce chemical contaminants
- Reduce plastic particle pollution
- Reduce effects of gillnetting
- Protect prey fish populations
- Educate the public

