

STATUS OF SEABIRDS ON SOUTHEAST FARALLON ISLAND DURING THE 2013 BREEDING SEASON



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INTRODUCTION

Point Blue (formerly PRBO Conservation Science) biologists, in partnership with USFWS and the Farallon National Wildlife Refuge, have monitored the population size and reproductive success of seabirds on Southeast Farallon Island (SEFI) continuously since 1971. We also collect information on survival, phenology (timing of breeding), chick growth, environmental conditions (weather and sea surface temperature) and prey use (diet composition). These long-term data give us a unique ability to examine trends over multiple time scales and look at variability in the context of long-term patterns and trends.

This status report contains general information on the reproductive performance and population trends of seabirds on Southeast Farallon Island (SEFI; Farallon National Wildlife Refuge) and West End Island (WEI), California, during 2013. We monitored twelve species: Ashy Storm-petrel, Double-crested Cormorant, Brandt's Cormorant, Pelagic Cormorant, Western Gull, California Gull, Black Oystercatcher, Common Murre, Pigeon Guillemot, Tufted Puffin, Rhinoceros Auklet, and Cassin's Auklet. We determined reproductive performance for nine of these species by monitoring nest sites from initiation until chick fledging. Productivity (number of chicks fledged per pair) was determined for first attempts and for all attempts (including first attempts, relays, and second-broods). We compared productivity for all attempts to values from the previous season as well as to the long-term average for each species. Due to inaccessibility of puffin crevices and California Gull nest sites and poor visibility of Double-crested Cormorant nesting areas, no reproductive data were collected for these species.

WEATHER AND OCEAN

Oceanic conditions during 2013 were generally cool and productive. The mean seasonal SST from March to August was approximately equal to 2012 and 0.64°C cooler than the long-term mean for these months. Likewise, monthly values were close to or below the mean for five of the six months, being slightly warmer only during the month of August. Strong northwest winds throughout the spring coupled with the cooler water resulted in generally high ocean productivity and a good breeding season for all seabirds.

Juvenile rockfish were abundant in chick diet throughout the chick rearing period and were the dominant prey items for Common Murres, Pigeon Guillemots and Rhinoceros Auklet. The majority of the juvenile rockfish encountered were Shortbelly Rockfish (*Sebastes jordanii*). The Shortbelly Rockfish were the main species encountered in seabird diet during the 70's and 80's but have generally been less dominant in recent decades when a more varied species assemblage (including Yellowtail, Widow, Blue and Black Rockfish) has been more common. A high proportion of rockfish in the diet typically correlates with high productivity and likely contributed to the high breeding success observed for most species this season. In addition, feeding rates were higher this year for all species studied and the total number of feedings observed during murre diet watches was approximately 76% greater than last season. This suggests that it was easy for foraging adults to locate nearby prey and they were able to make shorter foraging trips when provisioning dependent offspring.

Anchovies were the most important component of chick feedings for murre and auklets between 2002 and 2008 and were also a major component of Brandt's cormorant diet during years of high reproductive success. This important prey has all but disappeared from the diet of Farallon seabirds since 2009. During 2013, anchovies accounted for less than 2% of the diet. Sculpins, lingcod, saury, smelt, octopus and squid were other important components of the diet this season. Cormorant pellets were collected from breeding colonies in August but have not yet been analyzed.

The National Marine Fisheries Service conducts mid-water trawls during May of each year to assess the abundance and distribution of important forage fishes, including juvenile rockfish, anchovy and squid. The NMFS surveys during 2013 indicated the highest abundance of young of the year rockfish in the history of the survey with shortbelly rockfish being the dominant species. In addition, there continues to be a high abundance of squid and very few anchovy or sardines encountered during the surveys (K. Sakuma pers. com.). These results are very similar to what we observed in the seabird diet.

Productivity:

The 2013 seabird breeding season was a very productive year for all species (Fig. 1) with Brandt's Cormorants, Pelagic Cormorants and Cassin's Auklets exhibiting exceptionally high breeding success. Ashy Storm-Petrels, Common Murres, Rhinoceros Auklets and Pigeon Guillemots also had productive years with higher productivity than last season and also above the long-term mean. Western Gulls rebounded from four straight years of very poor breeding success and fledged chicks at a rate equivalent to the long-term mean. Black Oystercatchers were the only species which had slightly lower average reproductive success in 2013. There were also fewer breeding sites and the overall number of chicks produced was lower than last season. We have included the 80% confidence limits (dashed horizontal lines) on the long-term productivity graphs (Fig. 1) to help illustrate the signals in the annual mean productivity and to highlight the extreme years (i.e. those years that fall into the upper or lower 10% of the distribution). Note that strong El Niño years (1983, 1992, and 1998) fall below this range for most species. During 2013, Cassin's Auklets productivity was above the upper 80% confidence interval, indicating exceptionally high reproductive performance. Likewise, Brandt's Cormorant and Pelagic Cormorant also exceeded the upper confidence interval, indicating especially high productivity for these species. No species were below the lower confidence interval for average productivity this season (Fig. 1).

Cassin's Auklets, though declining slightly from 2012, continued to exhibit exceptionally high productivity with the 2013 productivity value within the top five years since studies began in 1972. This marks the fourth consecutive year of exceptional reproductive performance for Cassin's Auklets. Auklet success was once again driven by abundant prey resources (primarily euphausiids) and a high rate of successful double brooding. Cassin's Auklets are the only alcid capable of successfully fledging two broods in the same season, and they only do this in the southern portion of their range. Although the overall rate of double brooding was greater than during 2012, the proportion of those second broods that were successful was lower. This decrease in the proportion of successful second broods resulted in the small decline in productivity observed in 2013, relative to last season. First brood success rates continued to be high.

Reproductive success of Common Murres was also higher than 2012 as well as being above the long-term mean for this species. Murres seemed to thrive once again on a high abundance of juvenile rockfish in the chick diet. Feeding rates were high, chicks grew quickly and fledging success was high. In most seasons, the Upper Shubrick study plot has the highest productivity of the four study plots followed on the island, but in 2013, the Upper Upper plot had slightly higher success. This may be due in part to a reduction in egg and chick loss from Western Gull predation. With gulls able to find alternative prey resources, there was a proportionally smaller impact on murres.

Rhinoceros Auklets and Pigeon Guillemots also exhibited increased breeding success. Overall productivity for these species was above the long-term mean, but within the normal range of interannual variation. The increased success was likely due to the greater abundance of juvenile rockfish available for chick diet. Guillemots in particular seemed to thrive with more sites able to fledge two chicks than in previous years.

Brandt's Cormorants achieved high reproductive success in 2013 with greater than two chicks fledged per breeding pair. This is the highest breeding success since 1999 and the first since 2007 to exceed the long-term mean (Fig. 1). In contrast to the previous five seasons, hatching success and fledging success were high and there was a low rate of nest abandonment. Reasons for this abrupt turnaround are as yet unclear. Although cormorant diet samples have not yet been analyzed for this season, anchovies and other large forage fishes continued to be scarce in the diet of murres and auklets. Juvenile rockfish, particularly Shortbelly Rockfish, were abundant this year and may have provided a suitable substitute. After suffering complete breeding failure in 2012, Pelagic Cormorants also rebounded this season with their highest breeding success since 2004. Like the Brandt's Cormorants, fledging success was high and there was a low rate of abandonment. Pelagic Cormorants are more reliant on rockfishes and other nearshore species and likely benefited from the overall abundance of these prey items this season.

Western Gulls had their most productive season since 2007. After four consecutive years of extremely poor breeding success, 2013 seemed like a banner year, though overall productivity was roughly equal to the long-term mean for this species (Fig. 1). There was an

overall increase in breeding effort by established pairs and a large influx of first time breeders in all study plots. Intraspecific predation continued to be the single greatest cause of mortality, but the need to prey on chicks appeared to be mitigated by a greater availability of other prey resources such as juvenile rockfish and squid. Over the past few seasons, rockfish has been abundant in the diet of other species, but may not have been available to surface feeders like the Western Gulls.

Populations:

Breeding population sizes were higher than the 2012 estimates for all species except Black Oystercatcher. Population increases ranged from approximately 6% for Pigeon Guillemots to 645% for California Gulls when compared to last season, while Black Oystercatchers were down 10%.

Historically, the Common Murre population on the Farallones was estimated to be between 400,000 and 1 million birds, but egg collecting, oiling, gill net entanglement and human disturbance drastically reduced these numbers. Murre populations were beginning to recover in the late 1970's and early 1980's (Figure 2), but were then decimated by a series of oil spills and high adult mortality in gill net fisheries. Favorable oceanographic conditions and abundant prey, relatively strong reproductive success, and elevated juvenile survival, coupled with likely immigration from northern murre colonies, led to rapid population growth over the last decade. While we no longer census the entire island due to difficulting in counting massive numbers of birds packed tightly in large breeding colonies, we have continued to track murre population trends using our index plots. Index plot counts indicated a 13% increase in murre numbers this year when compared to 2012 and a 25% increase relative to the last full island census in 2006. In addition, there were a greater number of breeding sites in all followed plots this season. This apparent increase is likely driven by an influx of new breeders taking advantage of favorable prey resources this season. It should be noted that although we believe that overall index plot trend reflects the population trend for the island, much of the change may be driven by differences in only a few of the index plots, particularly on WEI and by the Cormorant Blind. Other plots have remained stable or changed in opposition to the overall

trend. The relative ability to detect changes in murre numbers is related to the level of saturation in a plot. Plots that are already very dense would not have the power to detect population growth because there is simply no room for more birds to breed in these areas. Conversely plots that are sparse have plenty of area for more birds to colonize but would not necessarily detect declines. Therefore, we believe that by combining the data from all of the plots we get a representative sample for the colony as a whole.

Farallon Cassin's Auklets declined considerably since the early 1970's (Fig. 2), and remain at less than one-third of the population estimate made in 1972. Unfortunately, no information is available on population numbers between 1972 and 1989. This population suffered substantial mortality during the strong 1997/1998 El Niño event and reached its lowest abundance in 1998. Between 2001 and 2004, the population was increasing rapidly. However, the breeding population declined again during 2005 and 2006, coinciding with reduced breeding effort and lower reproductive success. Since 2007, the population has been slowly rebounding. The burrow counts for 2013 were 15% higher than in 2012 and the highest since 2004. This is the third consecutive year of increasing population, coinciding with greater reproductive success and higher ocean productivity (Fig 2). The recent growth trend contradicts the longer term declines in burrow density in our index plots indicating an overall population decline of 2.4% per year since 1991 (Point Blue unpublished data). It is worth noting though there have been varying periods of growth and decline throughout this period and it is too early to tell if this population is truly increasing or if this is contrary to the long-term trend.

Pigeon Guillemots are censused by counting the number of birds rafting on the water in the early season prior to the initiation of breeding. These raft counts most likely reflect the total population attending the colony during the pre-breeding period, but may not represent the proportion of the population that breeds. During 2013, Guillemot numbers increased by approximately 6%, relative to 2012, continuing the positive growth trend observed in this population since 2002. Occupancy of monitored PIGU crevices was approximately 72% during 2013, up approximately 10% from last season. This suggests that, in addition to more birds present at the island, there was also a greater breeding effort this season.

Tufted Puffins are surveyed during two surveys, one week long survey in May during the pre-breeding and early egg laying period and a second two week survey during August when puffins are feeding chicks. Population estimates are based on the overall number of active sites observed during these surveys. The Farallon population was exhibiting an increasing trend during the early part of the decade, but declined substantially following the 2004 season. Since 2008, we have seen rapid growth and 2013 set a new high for the number of active nest sites observed for this species on the Farallones.

Approximately 50% of the world population of Ashy Storm-petrels breeds on the Farallones, but little is known about their true population status. Ashy Storm-petrels are difficult to census, but appear to be stable or increasing at the Farallones in recent years based on a number of birds banded each season and capture rates during our mist netting effort. The mean standardized capture rate (number of birds caught per hour of effort) during 2013 was approximately equal to 2012 with 26. Evaluating catch per unit effort is useful for determining a coarse trend but does not consider the proportion of birds caught that are non breeders, or potential changes in recapture probabilities through time and as such cannot be used to estimate the true population. However, knowing if a population is increasing, decreasing or stable is still extremely important for management. Recent analysis of CPUE data has been used to generate a new population index for storm-petrels at the Farallones which shows varying trends throughout the time series. There was a declining trend 1992 to 2001, followed by increases in storm-petrel captures between 2001 and 2007, and a declining trend from 2007 to the present. The reversal of the trend starting in 2007, resulting in decline, is associated with observations of high Burrowing Owl abundance and high predation on storm-petrels in the most recent years, suggesting further evidence of the impacts of increased Burrowing Owl abundance and predation on storm-petrels. Assuming recent conditions continue into the near future, the SEFI storm-petrel population is expected to continue to decline.

Brandt's Cormorant breeding population expanded rapidly from 1999 to 2007, but crashed following the 2007 season and has not yet recovered. It is likely that some of the apparent decline was a result of birds either skipping breeding due to unfavorable conditions or moving to a different colony. However, the continued low breeding population, despite a

return to more favorable ocean conditions during the last few years, indicates that there was likely significant adult mortality during this period. In contrast to this recent decline, the 2013 breeding population was more than double the number of breeding birds observed in 2012. While it remains at only about 1/3 of the population observed before the crash, it is a step towards recovery. The increase observed this season was likely driven by an influx of first time breeders, including many that bred on parts of the island not formerly occupied by this species. The Pelagic Cormorant breeding population peaked in 2004. However, the population crashed following that season and has been slow to recover. Breeding populations were extremely low through 2007 but have been slowly increasing over the past six years. During 2013, the population was slightly higher than last season, but still much reduced compared to pre-2005 populations.

SUMMARY

In summary, 2013 was a very good year for Farallon seabirds with higher breeding populations and increased productivity for most species. Cassin's Auklets were again able to take advantage of high zooplankton production and fledge many chicks. Likewise, murrelets, guillemots, auklets, gulls and cormorants were able to capitalize on a high abundance of rockfish throughout the early season to achieve greater breeding success. Anchovies continue to be largely absent from seabird diet, but it would appear that the birds were able to compensate this season with other prey items. The high productivity of cormorants and gulls in 2013 is encouraging after several years of very poor productivity, but we remain concerned about the long term outlook for these species in the face of changing ocean climate and increasing unpredictability of prey resources.

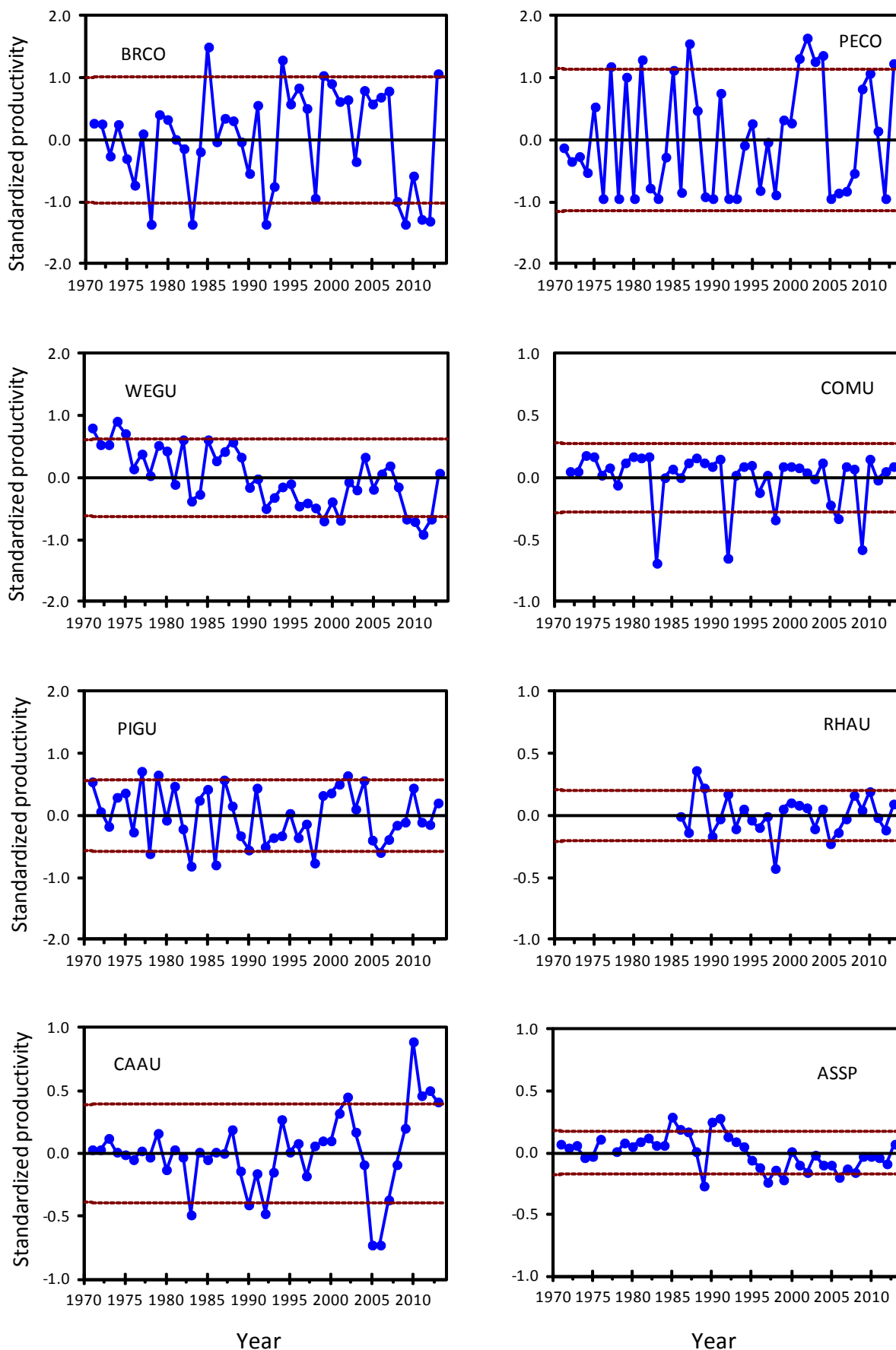


Fig. 1 Standardized productivity anomalies (annual productivity - long term mean) for 8 species of seabirds on SEFI, 1971-2012. The dashed lines represent the 80% confidence interval for the long term mean.

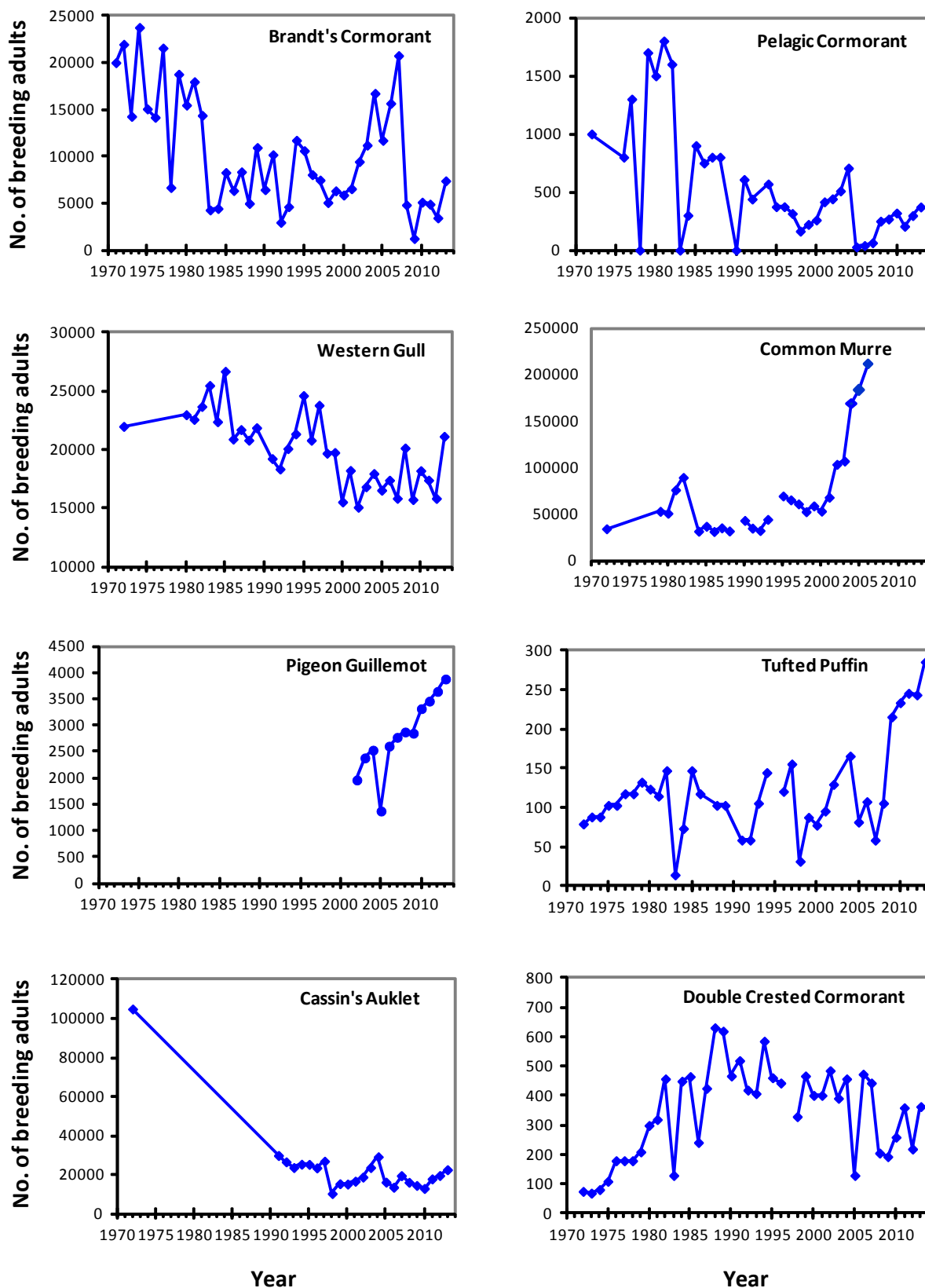


Fig. 2 Population trends for 8 species of seabirds on Southeast Farallon Island, 1972-2013. Populations were determined by counting either individuals or nests on all visible areas on SEFI and West End. Please note the different scales on the Y-axis. PIGU evening raft counts done prior to 2002 are not comparable to current methods and are not displayed. COMU whole colony estimates not made after 2006 (see text).