Western Purple Martin Recovery Status in BC (and Puget Sound, WA) - 2008

Bruce Cousens, M.Sc., R.P.Bio., (Feb. 2009)

Summary: The recent growth surge of the western Purple Martin (*Progne subis arboricola*[*]) population in British Columbia, for which we have reliable population-wide monitoring data for abundance, nesting success and fledgling production since 1997, peaked at ~650 nesting pairs in 2007 and declined to ~570 pairs in 2008. The forecast from our population growth modeling study indicates abundance will decline further to ~450-500 pairs in 2009 due to low subadult recruitment (Fig. 1). The population trend thereafter depends largely on weather conditions during the 2009 nesting season.

Details: The unprecedented tripling of the population from ~200 pairs to ~650 pairs between 2003 and 2006 was due to unusually high nesting success and fledgling production (~3.5 young/active nest) in 2003-05, which was the result of unusually warm dry late spring and summer weather with abundant food for nestlings in three consecutive years, producing high levels of recruitment in 2004-06.

Conversely, the decline in abundance of nesting pairs observed in 2008 was primarily the result of the prolonged record cold spring with snow in mid-April and abnormally cold weather extending to mid-June, which presumably delayed spring emergence of normal flying insect food supplies. This resulted in most birds abandoning their nesting colonies in mid-late May (after nest building had begun), likely in search of food elsewhere. The survivors returned to their colonies and completed or partially completed nests as the weather finally warmed to seasonal norms in mid-June. We estimate at least 100 adult pairs (~15%) were lost to starvation by this point in the season and did not survive to nest, the first time we have observed significant spring adult mortality during the 12-year monitoring study, though such losses are well documented in eastern populations with more severe spring weather. Losses were most severe on the Lower Mainland and south Vancouver Is. (and greater further south in Puget Sound), though losses occurred in more northerly colonies as well.

As a result, early nesting (a hedging strategy against unpredictable periods of adverse weather during the nesting season in this single-brooded species) was delayed by 3-4 weeks, with only rare local exceptions. Early subadult (SY) arrival was also delayed by 3-4 weeks, with none arriving before mid-June (these first-time nesters, fledged the previous season, would normally begin to arrive in mid-late May). Thus almost all nesting timing was synchronized and confined to the latter portion of the season with little variation, eliminating the usual advantage of variable nesting timing to avoid stochastic adverse weather events. This unfortunately proved to have severely negative consequences.

The predicted further population decline to 450-500 pairs in 2009 (25-30% below the 2007 peak) is the direct result of a period of 6-7 days of windy, cold and wet weather at the end of July and in early August, during the peak of the nestling rearing period for almost all nests. This weather restricted or temporarily eliminated available food supplies, greatly reducing foraging success and resulting in unusually severe losses of nestlings and some parent birds. We estimate that 700-800 of a possible ~2000 nestlings (~40%) were lost to starvation, with <1200 fledging successfully, some of which may have also experienced below average post-fledging survival. Overall average fledging success was only 2.0 young/nest, well below the ~2.5 young/nest required to offset normal annual post-breeding mortality during migration, over winter and the following spring to provide sufficient recruitment to maintain a stable breeding population. As a result, a predicted further population decline to 450-500 pairs in 2009 seems inevitable without exceptional post-breeding survival.

[*] A separate subspecies genetically isolated from the eastern martin, *P. s. subis* – Baker et al, 2008)

The population trend thereafter is largely dependent on the success of the 2009 nesting season, which is highly weather dependent, though it now seems very unlikely that the interim Population Management Objective of 800 pairs by 2010, as established by the Western Purple Martin Working Group (2005), can now be met, assuming historic average production and survival rates. This objective appeared readily achievable prior to the 2008 nesting season. Figure 1 indicates recent progress of population growth and recovery since the start of the monitoring program in 1998, with the forecast return for 2009.

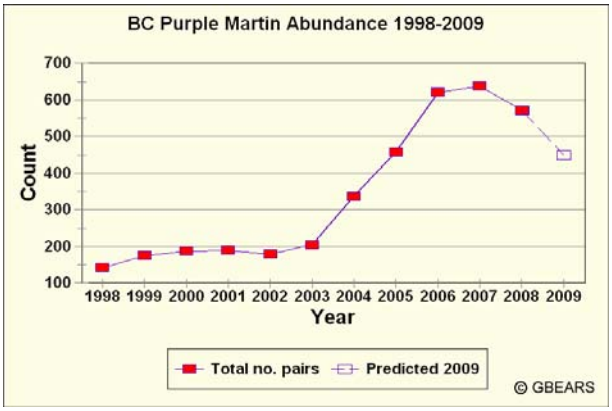

Figure 1. Recent and predicted Purple Martin abundance.

It is noteworthy from results of our ongoing nestling colour banding and band reading program, which allows identification of individual birds to natal year class based on band colour, leg and band code (as well as monitoring of migration, dispersal, recruitment and longevity), that the proportion of subadult recruits in the population has declined steadily from ~60% at the start of rapid population growth in 2004 to ~20% in 2008 and will likely be no greater than 10-15% in 2009, mainly due to recent low productivity and recruitment. As a result, the large older year classes that may be more likely to die out due to aging form an increasingly larger proportion of the population. A successful nesting season with good fledgling production (>3 young/nest) would reverse this trend and restore a higher proportion of young birds. However, in the continued absence of such nesting success, it's possible that the population could experience accelerated decline due to continued loss of these large older age classes without sufficient recruitment of young birds for replacement.

Puget Sound: This pattern of rapid growth and recent decline also holds true for the once larger contiguous western Purple Martin population using nest boxes in Puget Sound, WA, for which we have limited monitoring data from a sample of 12-15 colonies (<20%, vs. 43 of the current 44 active colonies in BC, representing >90% of the population). A recent overall population estimate for Puget Sound or WA is not available. However, in 2006 and 2008 the Puget Sound population experienced far more severe losses due to adverse weather than in BC, with fledging success of only ~1 young/nest in both years (and 2.1 young/nest in 2007), so this population has apparently been in substantial decline since 2006 and will also decline further and likely to a greater extent than in BC in 2009.

Other swallows: Based on a limited number of nest box checks at martin colonies and anecdotal observations of relative abundance in recent years, Violet-green and Tree Swallows have experienced similar losses and low breeding success due to starvation with food supplies depressed by adverse weather in these years. Their populations also appear to be at recent low levels and in temporary decline due to low recruitment. This would explain their recent apparently reduced abundance and relatively high nest box vacancy rates, which will likely continue in 2009.

References Cited:

Baker, A.J., A.Greenslade, L. Darling and J. Finlay. 2008. High genetic diversity in the blue-listed BC population of the Purple Martin maintained by multiple sources of immigrants. Conserv. Genetics 9(3): 495-505.

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Bruce Cousens, Program Coordinator, BC Purple Martin Stewardship and Recovery Program – Feb., 2009