

Appendix 2. Detailed description of observations used to assign nest fate for Marbled Murrelet nests monitored 2004–2008 in northwestern Washington and southwestern British Columbia.

Year	Bird ID (radio tag frequency)	Sex of radio tagged parent	Site name	Nest fate	Cause of nest failure	Limb diameter at nest (cm)	Tree diameter at breast height (DBH; 1.4 m above ground) (cm)	Video monitored?	Data logger?	Summary of observations used to determine cause of nest failure
2006	122	Male	Hemmingsen Creek	Failed - nestling	Chick fell out of nest	18.0	128.0	Yes	Yes	The nestling fell out of the nest while being fed by an adult 30 days after hatching and this was observed on video. The remains of the dead chick were found on the ground below the nest the next day.
2005	302	Female	South Fork Hoh	Failed - nestling	Chick died of non-predatory factors	24.0	219.0	No	No	An intact, dead chick was found in nest when nest tree was climbed after the nesting season. There was one uneaten fish in the nest. The body of another fish was in the chick's bill. Necropsy showed that the body of the fish filled the lumen of the upper esophagus of the chick. There were no other significant gross findings. Histology of the liver, lung, heart, gizzard showed no evidence of inflammation or bacterial infection.
2005	619	Male	Rica Canyon	Failed - nestling	Chick died of non-predatory factors	19.0	107.0	Yes	No	Egg hatched on 17 June. The chick became inactive 5 July and died ~7 July, or at ~20 days post-hatching. This was observed on video. Ultimate cause of death unknown, but likely health-related, or starvation. The adult male brought a total of 21 fish in 18.5 days of video monitoring (11 at dawn, 10 at dusk, mean total of per day = 1.1) and the adult female brought 15 (5 at dawn, 10 at dusk, mean total of per day = 0.8). On 5 and 6 July, flies were observed in nest and walking on chick. Adult male visited nest on the morning of 7 July and did not feed nestling. Adult female visited at dusk 7 July and chick was unresponsive and presumed dead. A Steller's Jay visited this nest during the day on 7 July but the chick was unresponsive and presumed dead during the jay's visit. The jay did not attempt to scavenge or touch the chick. A Steller's Jay was seen at the nest again eight days later (15 July) and picked at the pile of feathers. Chick remains were partially decomposed when retrieved ten days after nest failure, on 17 July. Necropsy showed no damage to long bones; no other information could be obtained from necropsy.
2004	983	Female	Boulder Creek	Failed - incubation	Egg failed to hatch, and adults then stopped incubation	27.5	135.0	Yes	No	The egg failed to hatch after 35 days and then was abandoned. This was observed on video. At least one adult continued visiting the nest at dawn for ten more days. After 45 days, no adult visits were detected (the camera recorded for an additional six days). A Douglas' squirrel (<i>Tamiasciurus douglasii</i>) visited the nest on the afternoon of day nine that the egg was unattended (the day before the murrelet(s) final visit) and rolled the unhatched egg off of the limb using its head. We assume that the disappearance of the egg is the reason why the murrelet(s) stopped visiting the nest. Fragments of eggshell were retrieved from the ground below the nest when the camera was removed.
2007	382	Male	Sombrio	Failed - incubation	Egg failed to hatch, and adults then stopped incubation	22.0	79.0	Yes	Yes	The egg failed to hatch after 40 days and after that point the adults stopped incubation and showed up at the nest only briefly at dawn. This was observed on video. Seven days later, the radio tagged adult could not be detected on our telemetry flights and may have left the study area. This same day (at day 47) a Steller's jay visited the nest but did not peck the abandoned egg. We retrieved the abandoned egg and removed the camera equipment seven days afterwards.
2005	141	Male	Duckabush	Failed - incubation	Egg was abandoned	52.0	121.0	No	No	When the nest tree was climbed after the breeding season, the nest depression contained an intact and undamaged egg. Necropsy showed that the embryo inside the egg was fully developed. The bill was under the right wing and turned toward the blunt end of the egg. The yolk sac was large and still outside the chick. Bacteriology of the yolk sac and histology revealed no inflammation and no evidence of bacterial infection.
2007	520	Male	North Fork Sol Duc Cliff	Failed - nestling	Unknown - possibly chick was grounded while attempting to fledge	Not applicable - cliff nest	Not applicable - cliff nest	No	No	When the nest area was visited after the breeding season, the partially decomposed remains of a dead nestling were found at base of cliff. Carcass was feathered with juvenile contour and flight feathers. Some feathers were offset from carcass ~10 cm. The body was intact, though decomposed. The cliff was not climbed and so the nest depression was not seen. Cause of nest failure is unknown but seems likely grounding during fledging due to the chick being covered in juvenile plumage, rather than nestling down, and the body cavity was not torn apart as if by a predator. Necropsy revealed no obvious external injury and no fractures of long bones (including skull; one wing with corresponding humerus, radius and ulna; one femur; vertebra and ribs). Remains were too decomposed for histology.
2007	161	Male	Lillian River	Failed - incubation	Unknown	35.0	100.0	No	No	When the nest tree was climbed after the breeding season, a murrelet egg with 1 small hole (2-4 mm diameter) was found in the nest depression. It is not known whether the egg was depredated while alive or scavenged after death. Cause of nest failure is unknown.
2007	211	Male	Hughes Creek	Failed - incubation	Unknown	60.0	193.0	No	No	When the nest tree was climbed after the breeding season, the nest depression was empty with no feces. Based on telemetry data, the radio tagged adult did not tend the nest long enough to have hatched an egg. Cause of nest failure unknown.
2004	562	Male	Morse Creek	Failed - nestling	Unknown	30.3	144	No	No	When the nest tree was climbed after the breeding season, the nest depression was empty with no feces. Based on telemetry data, the radio tagged adult tended nest long enough to have hatched an egg. Cause of nest failure unknown.
2005	844	Female	Cullite Creek	Failed - nestling	Unknown	21.0	100.0	No	No	When the nest tree was climbed after the breeding season, the nest depression was surrounded by a light fecal ring and the remains of a nestling murrelet were found on ground below nest. Likely scenarios include the chick fell from the platform, starved and fell after death, or was killed and dropped at the base of the nest tree by a predator or scavenger. Cause of nest failure is unknown.
2008	346	Male	North Fork Sol Duc Tree	Failed - nestling	Unknown	17.0	86.0	No	Yes	When the nest tree was climbed after the breeding season, the remains of an old nestling were found in the nest (chick had a combination of down and juvenile flight feathers). Likely scenarios include chick was killed but not consumed by a predator, starved in the nest, or died from disease. Cause of nest failure is unknown. Necropsy showed that chick had no damage to long bones although no other information could be obtained from necropsy because chick was in advanced decay and partially mummified when submitted for necropsy.

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2005	070	Male	Dosewallips	Failed - incubation	Unknown	40.0	170.0	No	No	Cause of failure is unknown because nest limb was not found.
2005	212	Female	Logan Creek	Failed - incubation	Unknown	Unknown - nest platform not found	170.0	No	No	Cause of failure is unknown because nest limb was not found.
2007	295	Male	Cat Creek	Failed - incubation	Unknown	Unknown - nest platform not found	98.0	No	No	Cause of failure is unknown because nest limb was not found.
2005	853	Female	Hayes River	Failed - incubation	Unknown	Unknown - nest tree not found	Unknown - nest tree not found	No	No	Cause of failure is unknown because nest tree was not found before the nest failed.
2004	021	Male	Lake Mills	Successful	NA	26.7	106.5	No	No	A solid fecal ring was found at the nest when nest tree was climbed post-breeding.
2005	932	Male	Upper Hoh	Successful	NA	21.0	104.0	No	No	A solid fecal ring was found at the nest when nest tree was climbed post-breeding.
2008	258	Male	Sunday Creek	Successful	NA	40.0	248.0	No	Yes	A solid fecal ring was found at the nest when nest tree was climbed post-breeding.
2006	232	Female	Fairy Creek	Successful	NA	Unknown - nest tree not found	Unknown - nest tree not found	No	Yes	The radio-tagged adult visited this nest for a long enough period to indicate success although the nest tree was not located before the nest fledged.