

CALIFORNIA CONDORS IN NORTHWESTERN NORTH AMERICA

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ABSTRACT-The distribution of California Condors *Gymnogyps californianus* in northwestern North America is compiled, mapped, and tabulated by month and season. During the 19th century, records were concentrated in the mid and lower Columbia River basin and in the Umpqua Mountains, with smaller numbers in the Snake River in Idaho, coastal and interior British Columbia as far as 52 degrees north latitude, and east of the Rockies in Alberta and Montana. A small population of condors persisted in Oregon and Washington in the Cascade and Umpqua Mountains into the mid-20th century. Condors occurred throughout the year, with a greater than expected number in September. Condors were known by native American tribes in the Northwest, but not in Arizona. Year-round occurrence of condors and testimony of chicks kept in native villages imply nesting in the region.

Keywords: California Condor, *Gymnogyps californianus*, status, distribution, Pacific Northwest

Most of what is known about California Condors pertains to the California population (Harris 1941; Koford 1953; Wilbur 1973, 1978; Snyder and Snyder 2000), which, by the

1930s was thought to be confined to a last refuge north of Los Angeles. Research and management failed to prevent the decline of the California population, due primarily to excessive mortality caused by poisoning (Snyder and Snyder 2000). In 1985 a decision was made to capture all remaining wild condors for their own protection, and in 1987 when the last wild bird was captured, the world population consisted of 27 birds. A breeding population in Baja California persisted until the 1930s (Anthony 1895; Grinnell 1928; Scott 1936; Hill and Wiggins 1948; Wilbur and Kiff 1980). In Arizona there are 6 known occurrences of condors, all from the 19th century (Brown 1899; Rea 1981; Snyder and Rea 1998); these were considered unimpressive by Swarth (1914), and by Emslie (1987) the result of a condor reinvasion of the southwest in response to the new food supply provided by the Euro-American introduction of cattle. Before that, condors nested in the Grand Canyon in the Pleistocene, with known ages of remains found in caves between 9,600 and 22,000 years BP (n=18) (Emslie 1987).

In the Northwest, fossilized bones of condors are known from 2 middens (archaeological sites) (Miller 1942; Miller 1957). In the 19th and early 20th century native Americans, explorers, fur trappers, naturalists, pioneers, and ranchers observed live condors in the Northwest (Lewis and Clark 1990; Gass 1904; Ordway 1916; Coues 1897; Ross 1956; Scouler 1905; Douglas 1829; Douglas 1959; Fleming 1924; Townsend 1848; Putnam 1928; Cassin 1858; Wilcox 1918; Schaeffer 1951). Wilbur (1973) stated that "Records from the Pacific NW indicate condors may have been as plentiful in winter as at any time of year" and that "the Pacific Northwest condors were permanent residents with a long history there." After 1904, condors received little further attention and were presumed extinct in the Northwest (Peck 1904; Finley 1908; Hall 1933, 1934; Harris 1941; Gabrielson and Jewett 1970; Jewett and others 1953; Campbell and others 1990; Gilligan and others 1994; Marshall and others 2003). Jewett alone considered the possibility of more recent occurrences, which were unconfirmed.

The California Condor Recovery Plan (U.S. Fish and Wildlife Service 1996b p 2) incorrectly

stated that "by the time of the arrival of European man in western North America, California Condors occurred only in a narrow Pacific coastal strip...", their "recent range was restricted to ... habitats in southern and central California...", and "California condors were observed until the mid-1800's in the northern portion of the Pacific Coast region (Columbia River Gorge)." However, it was well-known that condor-occupied habitats north of California included more than the Columbia River, and sightings of condors occurred later than the mid-1800s.

Beginning in 1992 captive-reared condors have been reintroduced in California, Arizona, and Baja California. Restoration of condors to the Pacific Northwest was not considered by the Condor Recovery Team and state and federal agencies (U.S. Fish and Wildlife Service 1996a p 5), perhaps because the extent to which condors occurred in the Northwest was not realized and not fully known.

The purpose of this paper is to compile, analyze, and provide a new synthesis of existing and new information on the status and distribution of condors in the Northwest.

METHODS

"Northwest" in this study is defined as Oregon, Washington, Idaho, and Montana in the United States, and British Columbia and Alberta in Canada. Reports of possible condor observations were compiled, reviewed, and analyzed from a close reading of published journals, letters, and reports of explorers, fur traders, early naturalists, missionaries, and pioneers. In addition, from 2004-2008, I investigated possible 20th century records of condors from personal communications with anthropologists, authors, field workers, researchers, and native peoples.

In the 1800s the term "'vulture' usually referred to the California condor" (Wilbur 1978 p 19), or condors were often called "California vultures" (Snyder and Snyder 2000; pers.

obs.). However, I conservatively considered observations of “vultures” or “buzzards” insufficient without other distinguishing details. Criteria for deciding whether sightings were condors included: birds seen well and close range (for example, several records used in this study were of birds within gunshot range) (“at close range, cannot be mistaken for any other species” [Snyder and Schmitt 2002 p 3]); relative size (for example, several fur-traders distinguished between both small and large vultures); shape (for example, long neck, ruff, wing angle), coloration (of head and neck, extent of white in wings); behavior (appropriating or moving large game shot by hunters, see below); the familiarity of the observer with Northwest raptors with which condors could be confused (Bald Eagles *Haliaeetus leucocephalus*, Golden Eagles *Aquila chrysaetos*, and Turkey Vultures *Cathartes aura*); location and time of year (the seasonal and geographical distribution of condors and Turkey Vultures differ: see below [Kirk and Mossman 1998; Snyder and Schmitt 2002]); and/or whether an observation was corroborated by other observations (at the same time or in the same vicinity). Observations usually contained a combination of the above criteria. Appendix A provides the criteria for all individual records used in this study. A small number of records (<8) lacked details; these are identified in the text and separately on the map, so they can be evaluated in the context of all observations.

Regarding behavior (above), there are instances in the literature of condors appropriating freshly killed deer from hunters (Lewis and Clark 1990; Harris 1941 p 32) but none of *Cathartes* doing so (Kirk and Mossman 1998). For the Lewis and Clark (1990) record in Idaho (see text and Appendix A), this behavioral criterion was used in combination with the geographical absence of *Cathartes* to identify the record as probable condor.

Nineteenth century observations of (large) “vultures” in northern Oregon or Idaho in winter, or in northern interior British Columbia at any season, for example Ross (1956) and De Smet (1978) is an indication, in the absence of Turkey Vultures, that the record may pertain to condors. In such cases, the probability of out-of-range Turkey Vultures was evaluated. The limits of breeding and winter ranges, migration dates, and occurrence of

vagrant Turkey Vultures were reviewed in both the literature (Munroe and McTaggart-Cowan 1947; Jewett et al. 1953; Gabrielson and Jewett 1970; Lewis and Clark 1990; Campbell et al. 1990; Gilligan and others 1994; Kirk and Mossman 1998; Marshall and others 2003), and among Pacific Northwest birders (H Nehls, Oregon Rare Bird Alert, pers. comm.; W Weber British Columbia birder, pers. comm.; J Bowling, British Columbia birder, pers. comm.; personal observations 1974-2008). Migratory western populations of *Cathartes* are virtually absent in winter in the Pacific Northwest (Kirk and Mossman op. cit. pp 5,7). Climate amelioration has allowed *Cathartes* to extend its range northward in the late 20th century, but this is not relevant to the 19th century records being considered in this study. In Oregon in the past few years [after global warming], there have been occasional winter records, " mostly from the southwestern part of the state" (Marshall and others 2003; Gilligan and others 1994; H Nehls, Oregon Rare Bird Alert, pers. comm.). In British Columbia, Turkey vultures in the breeding season occur in the extreme south of the province along the coast and in the interior, with one extra-limital sighting in August in the interior before 1990 (Campbell and others 1990; Munroe and McTaggart-Cowan 1947). In interior British Columbia Turkey Vultures have also extended their range northward recently (W Weber British Columbia birder, pers. comm.; J Bowling, British Columbia birder, pers. comm.), but are still accidental beyond the southern part of the province, and they have not been observed in the Canoe River (area of greatest concern). Lastly, I located no records of Turkey Vultures in winter in the early 1800s, but several of condors (this study). The probability of *Cathartes* being present at those particular locations and seasons was found to be highly improbable.

Data on geographical location and time of occurrence was extracted from each accepted record. Geographical locations were mapped to the nearest minute of latitude and longitude, using Google Earth (www.google.earth.com) and United States Geological Survey quadrangles. Records with imprecise locations and 20th century records are identified separately on the map. All other observations lacking usable geographical or seasonal data were disregarded except insofar as they provided context for the usable data. Records with

dates were tabulated by month and by season, with “winter”, “spring”, “summer”, and “fall” defined as Dec-Feb, Mar-May, Jun-Aug, and Sep-Nov, respectively. Chi-square (Steel and Torrie 1960) was used to test whether observations were greater or less than expected in any month or season. The “expected” chi-square statistic was derived by dividing the total numbers of monthly or seasonal observations by 12 or 4, respectively. Details of all records with geographical location and time of occurrence, including identification criteria and sources, are provided in Appendix A.

Evidence obtained from native sources directly or from anthropologists included place names, sight observations, oral history, basketry, petroglyphs, and linguistics. Identifiable place names possibly denote observations of real condors, roosts, or even nesting, but explanatory details were usually unavailable to me, or might be completely lost; such place names were not mapped, though they often provide context for time- and place- specific sightings. Native oral history contains valid information which is useful as corroborating evidence of condor occurrence provided by the detailed observations. The existence of names for “condor” in the vocabularies of northwest tribes was inferred as evidence of familiarity with the species. It would be possible to overlay the available linguistic data on a map of condor occurrence, except for the difficulty of mapping complex tribal foraging territories which changed seasonally. Therefore, these data, which provide context for the mappable data from individual location-specific sightings, is mentioned only in the text. It was also necessary to use caution in distinguishing between condors as biological entity and as supernatural, mythical incarnation, or “thunderbird”, which sometimes overlap (Gene Hunn, University of Washington Anthropology Professor and ornithologist, pers. comm.), but sometimes clearly distinguished, as in the case of the Pyallup-Nisqually (Smith 1940 pp 69, 70; Turner 1976 p 52).

RESULTS

The database of Northwest condors contains 93 records, 77 with locations and 63 with dates. Available details are given in Appendix A. Twenty-six records had locations but no dates. Some locations were imprecise and are identified as such on the map (Figure 3). Types of include fossils (3) (one new), specimens (13) (informing several subsequent sight records by Lewis and Clark and D Douglas), sight records at close range, with descriptions and profiles more consistent with condors than other species, or with comparative data on size; Tolmie (1963), for example, after arriving at the Columbia River in 1833, explicitly referred to both "small" and "large" vultures, and other fur-traders, A Henry (Coues 1897) and A Ross (1956), did so implicitly. The database contains only 2 records of condors seen at a distance (Peck, Charley) (Appendix A), a potential source of misidentification that was negligible in this study; one of them, by Peck, noted his previous experience identifying condors in flight in California. Some sightings were corroborated by similar sightings by other observers in the same vicinity or at the same time (Brown, Smith, Krussow); Brown's 1930 sightings, for example, involved conferring with colleagues. Nine records were general, provided no specific information on time or place, and could not be mapped or tabulated (for example Wallulatum, Townsend, Demers) (Appendix A); these are included because they contain information useful to understanding the distribution, ecology, or possible local nesting of this population.

Of the total of 77 locations mapped (Figure 3), 8 records lacked descriptive details (Peck--southern Oregon coast; Lord, Rhoads--mouth of Fraser River; and 5 native American sources--Big Eagle, Rides at the Door, Nez Perce, Fraser, and Cook) (Appendix A), including time of occurrence. These obviously could not be included in the monthly or seasonal graphs (Figures 1 and 2); they are identified separately in the map (Figure 3).

Four records of "vultures" with little or no physical description of the birds (Lewis and Clark in Idaho, Ross, Ogden, De Smet) (Appendix A) did contain sufficient location, date, context, circumstance, or independent source of evidence to support a determination of probable

condor rather than eagle species or *Cathartes*. In part this had to do with non-overlapping geographical distributions of *Cathartes* and *Gymnogyps*, as outlined in Methods. Regarding that criterion, Northwest data show that in the period 1805-1830, approximately 21 credible, conclusive records exist of condors between October and March (including 9 specimens), and that there were no records of Turkey Vultures during those same months, only 3 sightings of Turkey Vultures in April, May, and September. Furthermore, on 9 April 1806 Lewis and Clark (1990 vol. 7, p 97-98) wrote that they "saw some turkey buzzards this morning of the species common to the United states which are the first we have seen on this side the rocky mountains", indicating conclusively that all their previous observations of "vultures" between October 1805 and April 1806 were condors; those previous individual identifications were also supported by specimens and descriptions.

Archaeological Evidence of condors in the Pacific Northwest--The history of condors in the Pacific Northwest consists of condor fossils from three native middens (refuse disposal sites). At Five Mile Rapids, Oregon, a midden excavated before it was flooded by the construction of The Dalles Dam on the Columbia River, bones of a minimum of 63 condors were recovered (Miller 1957). These fossils dated from 8770 +/-230 to 8470 +/-190 years B.P., some with cut marks made by native implements on the distal end of wingbones, an indication of ceremonial use of the feathers (Hansel-Kuehn 2003). A radius found north of Brookings, coastal Oregon, pre-dated native contact with Caucasians (Miller 1942). In 2006 a condor metatarsus was newly unearthed at the site of a native village on Pender Island, British Columbia, with a radiocarbon age of 2900 years (R Wigen, University of Victoria, Canada, pers. comm.), and has not been previously reported. No condor remains were found in 9 middens in the Puget Sound (Miller 1960a).

Specimens--The number of records of dead condors in the Northwest is 19, all but one from the 1800s. They include 13 collected birds, 1 poisoned, and 3 skins or other feather parts reported by native Americans (Appendix A). The birds collected were either described

in detail or by reference to previously described specimens, and provide incontrovertible evidence of the validity of both the specimen and sight records. The whereabouts of only 1 of 13 condors collected is known, a dismal number (Wilbur 1978 p 72; this study). It is unclear but doubtful whether any of the 5 condors collected by the Lewis and Clark company were prepared as specimens or reached the east coast. According to a journal annotation added in 1810 probably by Biddle (Lewis and Clark 1990 vol. 6 p 66), the head of the condor collected 18 Nov 1805 reached Peale's Museum in Philadelphia, and this may have been the only partial specimen. Peale's museum was sold in 1849-1850, but the sale catalogue did not mention condors or vultures (Sellers 1980); and of the museums to which the Peale collection was dispersed, the Peabody does not have any condors now. None of Douglas' 5 specimens are extant: 1 spoiled specimen was discarded, another may have been lost in the Santiam River, and it is known that 2 were sent to the Royal Horticultural Society in London, to be transferred to the Zoological Society Museum (Douglas 1829). That was broken up in 1855 and the collection sold off (M Palmer, archivist, Zoological Society, pers. comm.). Hall tried to track down Douglas' specimens when preparing his 1934 paper, with no success (R Prys-Jones, Natural History Museum, Head, Bird Group, pers. comm.).

The condor collected by Townsend (1848) on the Willamette River near Oregon City in April 1835, which he gave or sold to JJ Audubon, who in turn presented it to S Baird, Secretary of the Smithsonian, is in the US National Museum (#78005) the location mislabeled "the Columbia" (C Angle, curator, Smithsonian pers. comm.) and referred to as "mouth of the Columbia" in Baird and others (1858). J Nisbet (pers. comm.) suggested that there was a second Townsend specimen, but I could not confirm this; Townsend (1848) himself said that he collected only one. A vulture shot September 1817 in interior British Columbia (Ross 1956) and the condor with a measured wingspan documented by R Putnam (1928) were probably simply discarded (Ross ate the bald eagle he shot at the same time). The whereabouts of Scouler's 1825 specimen is unknown; a "Specimen from the Oregon [Columbia River], the second known in any collection" seen in London by Bonaparte (1827), was at first thought by Harris (1941) to have perhaps been Scouler's (Harris changed his

mind). A condor in the Paris Museum obtained from the St. Petersburg Museum (Russia), “probably” collected along the “Nord-Ouest Cote d’Amerique” (Harris 1941 p 19), could have been collected outside the study area--Russian settlements extended south to Point Reyes, California--and the location was not included in this study. The whereabouts of condor feathers and skin reported by native Americans (Schaeffer 1951), or photographed by Curtis (Hines 1991), are unknown.

Seasonal Distribution--Records with dates (n=63) (Appendix A) show that condors occurred year-round in the Pacific Northwest. By month, chi-square was significant (chi-square 25.308, $P < 0.01$ df=11), with a larger than expected number of records in September and no observations in July and August (Figure 1). Condors were more abundant in fall than at other seasons (chi-square 7.921, df=3, $P < 0.05$) (Figure 2).

Relative Abundance--Lewis and Clark saw or collected condors on 10 occasions, including “some fiew” at the mouth of the Wind River in October (Appendix A; Lewis and Clark 1990 vol. 5 p 356). Douglas traveled extensively throughout the Northwest and saw condors on many occasions: “During the summer [condors] are seen *in great numbers*...from the ocean to the mountains [of Snake River] four hundred miles in the interior. In winter they are less abundant” (Douglas 1959 p 241, my emphasis), “but nowhere as abundantly as in the Columbian valley between the Grand Rapids and the sea” (Douglas 1829). The largest number he saw was “nine in one flock” on 3 October 1826 in the Willamette Valley, and less credibly “great numbers on the Umpqua river” (Douglas 1959 p 216, 241). Douglas' somewhat quantitative statements of the abundance of condors on the Columbia River are corroborated in this study: 24 of 77 observations (almost 1/3) were from the mid- or lower Columbia River (Figure 3). In 1835, Townsend said that he found condors “in abundance” in spring and summer on the Columbia River, and “I constantly found the Vultures at all points where the Salmon was cast upon the shores” (Townsend 1848); his main complaint

was that he couldn't get near enough to shoot one. Several observers (Henry, Tolmie, Peck) referred to vultures plural or in flocks, others (Sculer, Cooper, Merriam) as single birds (Appendix A). In the 1900s, there have been sightings of 3 birds (Smith, Krussow); one sighting of 9 birds (Smith); sightings in successive years (Brown; Smith); and a series of daily sightings for four successive months, perhaps 80 sightings in all (Krussow) (Appendix A). Other sightings in the 20th century (Brown, Cook, Smartlowit, Fraser) were of single birds (Appendix A).

Comparing the periods 1800-1899 and 1900-1990, the average numbers of condor sightings per decade were 6.1 and 2.5, respectively. These approximations are suggestive of a decline (62%). Thirteen condors were collected on the Columbia River between 1805 and 1835, an average of 0.42 birds/year (Wilbur 1978; this study). Tolmie's observations of 2 groups of condors at deserted Indian villages in 1833 indicate that the spate of early collecting did not result in condors' disappearance from the Columbia River, as Wilbur (1973) thought might be the case.

Geographical Distribution--Records of condors in the Pacific Northwest with geographical locations (Appendix A) are mapped in Figure 3 (n=77). They include 3 archaeological sites, 15 birds collected, shot, or poisoned, at least 3 wings or skins from native sources, and sight records. A large proportion of specimen and sight records were from the Columbia River watershed from its estuary to its headwaters in British Columbia, including the Columbia's tributaries, especially the Willamette River (Figure 3). Condors were reported more than 52 degrees north latitude in coastal and interior British Columbia, inland to the lower Snake River and its tributaries in Idaho, and east of the Rocky Mountains in Alberta and Montana. Lewis and Clark encountered condors on 10 occasions, 9 along the Columbia River in 1805-06 and an intriguing sighting of probable condors in the Rocky Mountains of Idaho on 13 June 1806 (Appendix A). D Douglas traveled widely and encountered condors

at numerous locations in the 1820s, including some not specific enough to be mapped, as far north as the Canadian border (Douglas 1829) and as far south as the southern Willamette valley and the Umpqua River (Appendix A). He collected five specimens, 1 on a journey to the Umpqua (lost), 2 at Fort Vancouver (one head-shot and discarded) and 2, probably in September 1825 (Appendix A), on an Indian-escorted excursion to Larch Mountain; details of that excursion were related to me in astonishing detail, including a description of the route Douglas followed, obtained from native oral history (K Smith, aka Katchia, Wasco elder, Corbett, OR, pers. comm. 2006).

British Columbia—Four sight records exist along the coast from the 1800s, 3 provided by a Hudson's Bay chief surgeon, a museum curator, and naturalist/author (Tolmie 1963, Fannin 1891, Rhoads 1893); details are lacking for the 4th (Lord 1866) (identified separately in Figure 3). That condors occurred in interior British Columbia was stated without further elaboration by Lord (ibid.), without details, perhaps based on (and duplicating) early reports. Those included 2 reports of "vultures" in interior British Columbia in September: Ross (1956) shot "2 grizzlies and a bird of the vulture tribe" somewhere northwest of the Canoe River in north-central B.C., between 52 and 53 degrees latitude on 17 Sept 1817. And De Smet (1978), a Catholic missionary, observed "vultures", wolves, and grizzly bears at "the source of the Columbia", 52.07 degrees latitude on 4 Sept 1845. Locations of both encounters with "vultures" were north of the range of Turkey Vultures (see Methods, text above, and Appendix A). Douglas (1829), familiar with condors on numerous previous occasions, stated that condors were found on the upper Columbia north to the Canadian border at 49 degrees latitude (Appendix A). A native Sto:lo Salish observer sighted a possible condor on the Fraser River near Spuzzum in 1935 (S McHalsie, Sto:lo tribal biologist, pers. comm.), 1 of 8 records that lack detail (identified as such in Figure 3).

According to Brooks and Swarth (1925) the British Columbia records lacked "conclusive

evidence", and Campbell and others (1990) listed the condor as "hypothetical" in the province. However, the several sight records were made either by competent observers, or in parts of British Columbia where *Cathartes* does not occur. The condor's place in British Columbia ornithology was firmly established by the excavation already referred to of the condor tarsometatarsus at a village site in 2006 (R Wigen pers. comm. 2006). Bringhurst (2001) complained that indigenous sources of information on condors were not consulted by Campbell and others.

Idaho--The evidence from Idaho consists of 5 sightings from Euro-American sources in the 1800s (Lewis and Clark 1990 vol. 8 p 22-23; [McKenzie in] Ross 1956; Douglas 1959; Wilcox 1918), the latter well-described near Boise; Nez Perce oral history of condors in the Hells Canyon-Seven Devils wilderness (Josiah Pinkham, Nez Perce tribal member, pers. comm.); Nez Perce and Shoshone-Bannock linguistic evidence on the Snake River (D Walker pers. comm.); and anthropological data which indicate that the lower Snake and Boise Rivers were the center of not-recent native observations (ibid.). The native observations support Wilcox's definitive record and the imprecisely located 2 McKenzie observations. I found no reports of petroglyphs of condors in the Snake River watershed (M Pavesic, Archaeologist, Boise State University, pers. comm.; Jim Braga, amateur petroglyph hunter, pers. comm.).

Records East of the Continental Divide--In September, 1896, museum curator Fannin (1897) observed two "fine" condors in the Bow River valley between Calgary and the Rocky Mountains, and stated, "I was not aware that this bird was found east of the Rocky Mountains, or so far north." East of the Rockies in western Alberta and in western Montana, approximately 19 possible condor observations of varying plausibility were obtained from Blackfeet and Cree informants by Schaeffer (1951), 11 of which were precise and mapped in Figure 3.

Anthropological Evidence of Condors in the Pacific Northwest-- Most of the northwest tribes along the Columbia River, its tributaries, including the Snake River, and rivers flowing into Puget Sound, have names for the mythical thunderbird and for the condor as a biological entity. This list, not complete, includes the Snoqualmie, Puget Sound Salish, Washington, *Hed-e-libsh* or "broke down the weirs", distinguished from Turkey Vulture *c'ika'wd* ("red", or "bay") (Turner 1976); lower Columbia Chinook-Wasco *Ha'-ness* (Gill 1909; Ken Smith pers. comm. 2004), or *iakessit'nos* or "sharp beak", distinguished from *hem-letet* = "stinkhead" for Turkey Vulture (T Johnson, Grande Ronde Tribe Cultural Affairs Program, pers. comm.; Demers and others 1956; K Smith pers. comm.); Sahaptan Wasco, Toppenish, and nearby tribes, Columbia River east of the Cascades *pach'annahúy* (G Hunn pers. comm.); Warm Springs Wasco *k'unwakshun*, compare *q'shpa-li'*=Turkey Vulture (K Smith pers. comm.; Wasco language program, Warm Springs Reservation OR); Colville-Okanagan Salish, upper Columbia River, eastern Washington *s-?ítwn* (Hunn pers. comm.); coastal Salish Sto:lo, of inland Fraser River, British Columbia, *sxwe-xwo:s* or "opening his eyes" (Sonny McHalsie pers. comm.); Yakama *patsami hu'u* or "rough or crooked beak" (Lavina Wilkins, Yakama Cultural Center pers. comm.; Nisbet 2003); Nez Perce in eastern Washington and along the Snake River in Idaho, *qu'nes*, differentiated from *q'ispa'laya*=Turkey Vulture by "the bent shape of the [latter's] wings" (J Pinkham, Nez Perce, pers. comm; D Walker pers. comm. 2006); Shoshone-Paiute-Bannock, Snake River inland *quana* (ibid.); and Blackfoot (western Montana, southwestern Alberta) *omaxsapitau* or "big golden eagle" (Schaeffer 1951). That native peoples in the Pacific Northwest recognized condors as a presence in their environment is implied by their need for names. In British Columbia (despite an observation of a condor at Bella Bella in 1827 [Tolmie 1963]), the condor was "unknown" to the Haida (Swanton 1898) except as a supernatural creature (Gill 1928; Bringhurst 2001). "Thunderbirds" were also described only in mythical terms by the Porteur Indians near Fort Alexander, Fraser River (Demers and others 1956 p

164). This mythology at or beyond the northern edge of the condors' range seems to mark their geographical limit as biological entity, which has been delineated by the traditional scientific evidence of sightings and specimens (this study).

Condors were a motif in Wasco basketry from the Columbia River in the 1800s and early 1900s, usually depicted with characteristically outstretched wings and long necks (Schlick 1994). I also observed Columbia River baskets in an exhibition in Oregon Art Museum, Portland, OR in 2005, and in Maryhill Museum, WA, in 2006. Keyser (1992) contains no photographs or drawings of petroglyphs with condor motifs, but there are said to be petroglyphs depicting condors at sites undisclosed, to prevent desecration, along the Columbia River (Ken Smith pers. comm. 2006; David Moen, Portland State University, pers. comm.). Petroglyphs and basketry showing condors are presumptive evidence of the presence of condors in a locale, though it is probable that Wasco baskets were traded some limited distance up and down river.

A number of native place names refer to thunderbirds. Near Orting, near Tacoma, Washington, a rocky face with alcoves, perhaps a nesting place, was called "tsiyaqwadi altu" or "Thunderbird's House" (D Buerge, historian, pers. comm. 2005). Near Lake City in the Seattle area of Puget Sound is a ridge called "Xwi-yah-qwa-di-A'lt", "Thunderbird's House", said to be where thunderbirds nested in trees (Waterman 1922). Along the Fraser River, near Hope, British Columbia, a cave near the head of Pitt Lake was called by the Sto:lo "xwexwo'sawtxw", home of the thunderbird (Carlson 2001). A variety of locations in eastern Washington refer to condors (Gene Hunn pers. comm. 2005). And in coastal Oregon, a number of names on US Geological Survey quadrangles in the area of the Umpqua River were tantalizing. There is, however, considerable difficulty assessing the significance of these place names, and they were not mapped.

To summarize, the above data are evidence of a wealth of linguistic and artistic information on condors from northwestern tribes.

Anthropological Evidence of Condors in the Southwest—In contrast, native tribes in the desert of the American Southwest--Pima, Pueblo, Paiute, Navaho, and Apache--do not have oral histories, basketry motifs, petroglyphs, and names for condors (A Ferg, Arizona State Museum, Tucson; D Zimmerman, Arizona State University, Flagstaff; G Rice, Arizona State University, Tempe; K Hays-Gilpin, C Downum, and R Riner, Northern Arizona University, Flagstaff; R Johnson, Navajo cultural specialist, J Mead, Palaeontologist, Grand Canyon National Park, pers. comms. 2004). Only the Hopi have a name for the condor, "kwaatoko", or "big eagle" (Turkey Vulture is "wisoko"), but without accompanying oral history, and the name might even have been of recent origin (M Yeatts, Hopi Cultural Office, pers. comm.). When the first captive-reared condors were to be released in the Grand Canyon of Arizona, Navajo elders who gathered around were obliged to create a name for them, "jisho tsoh", or "big buzzard" (R Johnson pers. comm.).

Native tribes in Arizona were unfamiliar with condors before Euro-American contact. Rea (1981) was apparently not aware of and did not consider this unfamiliarity and lack of contact between southwest tribes and condors. The hiatus of almost 10,000 years between the Pleistocene records and the 6 historical records (from the late 1800s) has not been reported, and has been a major omission in the understanding of the scientific status of the Arizona condor population (U.S. Fish and Wildlife Service 1996b; Snyder and Rea 1998; Snyder and Snyder 2000).

Twentieth Century Records, in Oregon and Washington--Most records of condors (n= 65) were from or prior to the 19th century, and before this study, the last generally-accepted records were from Drain in western Oregon in 1903 and 1904 (Peck 1904; Finley 1908; Wilbur 1973). However, approximately 23 twentieth-century records of condors have recently come to light (this study). Several of these were seen at close range, are well-described, and convincing. Two (Fraser, Cook) lack descriptive details (Appendix A), and

were mapped separately.

The number of observations by decade are: 1900s-5, 1910s-1, 1920s-1, 1930s-5, 1940s-1, 1950s-5, 1960s-4, 1970s-0, 1980s-1. A significant proportion of the 20th century observations were from the Cascade Mountains of Oregon and Washington, in areas of de facto wilderness, and only 1 was from the Columbia River which in the 1800s had been the center of condor abundance in the Pacific Northwest (Figure 3). In the 1920s and 1940s condors were observed by Yakama natives in the vicinity of Mount Adams (M Schlick pers. comm.; C Mack, Gifford Pinchot National Forest archaeologist, pers. comm.; G Hunn pers. comm.). In the period 1930-35 single condors were observed several times over 6 successive years by B Brown at 4 forest fire lookouts (3 of them mapped) adjacent to the Umpqua National Forest; his observations were shared with other fire-lookouts at the time (J Nisbet pers. comm.). In the 1930s J Cook (pers. comm.) told me her father, a rancher, saw a condor on the Columbia River on the Colville Reservation in eastern Washington when the Grand Coulee dam was under construction (this record lacked any descriptive details). Condors were observed at Celilo Falls on the Columbia River; at very close range on the east slope of Mt Jefferson on the Warm Springs Indian Reservation feeding on winter-killed elk; at very close range on the Upper Clackamas River; near Gresham, OR; and near Centralia, WA in the 1950s and 1960s (Spilyay 2001; Aguilar 2005; K Smith pers. comm.). Between December 1964 and April 1965, a Forest Service road survey crew observed 3 condors at close range on dozens of occasions on the upper Collowash River, and were also known to loggers in the vicinity at the time (J Krussow, road surveyor, Mt. Hood National Forest, Hood River, OR, pers. comm. 2006). The rebuilding of the logging road washed out in 1964 involved dynamiting rock below the roost to obtain road fill, which put an end to roosting by condors at that location. In the mid-1980s, the most recent record of a possible condor is the sighting of a very large bird (size compared to adjacent vegetation) on the ground eating a dead animal, on the Warm Springs Indian Reservation, east of Mt Jefferson, (Appendix A); this was seen at a distance of ¼ mile, but the observer stated he was familiar with eagles and Turkey Vultures, the bird he saw was much larger, and something he had

never seen before in his life (R Charley pers. comm.). Details of all 20th century records are in Appendix A.

DISCUSSION

The available data on condors in the Northwest have not been individually mapped or quantitatively tabulated before (Koford 1953; Wilbur 1973, 1978; and Snyder and Snyder 2000). The number of condor records with usable geographical or seasonal data in this study (93) is larger than previously available. However, the number of records are probably a minimum, having been collected over a period of only 4 years. From the fact that more records were discovered from the best covered geographical area in this study (Cascade wildernesses and the upper Clackamas watershed), it seems likely that additional condor records remain to be discovered in parts of the Pacific Northwest not as well searched. D Moen (unpublished) uncovered records from the 20th century along the Columbia River at Celilo Falls and in the Umpqua area which had not come to my attention, though I have other condor records from those areas; Moen's records augment the number of records reported in this study but do not change the distribution shown in Figure 3. The wealth of evidence from native linguistics, oral history, place names, petroglyphs, and basketry would have been difficult to map, and with a few exceptions, that evidence was utilized only as context, though it augments inferences and conclusions drawn from the more traditional, scientific data. The native tribal evidence from the Northwest was also compared with the same kind of native tribal evidence from Arizona.

Validity and Context of 20th century observations—There are difficulties and challenges in evaluating sight records, including possible confusion with other species. For both recent and all records, a determination was made in each case of the probability of the record

being valid or invalid. At one end of the spectrum were records conclusive "beyond a reasonable doubt", the standard used in criminal cases, and at the other end, records with no credibility which were discarded. All records met or exceeded the standard of the "preponderance of the evidence." Condors "at close range, cannot be mistaken for any other species" [Snyder and Schmitt 2002 p 3]), and most of the records from the 20th century (Krussow, Smith, Brown) were seen at close range, as were the historical sightings. Three of 23 20th century records were based on meager details, and these records were not as substantiated as one would like where rarities are concerned; however, condors were not as rare in the Pacific Northwest, even in the 1900s as people thought. The Appendix provides details for each record, and the reader can evaluate them according to his or her own standard of proof. The handful of records with meager details, 3 of 23 from the 20th century, are identified in Figure 3. There is no non-arbitrary reason to exclude them.

I was at first skeptical of statements I came across of possible condors in the Northwest in the mid-20th century: the first such record was isolated and seemed improbable. However, the unearthing of additional 20th century sightings, ultimately more than 20, began to provide a cumulative context for records which had stood alone. There are too many 20th century sightings to disregard. Patterns became visible in the record, and it could also be seen that individual records, evaluated already on their individual merits, related to each other in time or space. Context provides another criterion legitimate to be considered in a determination of validity.

The repeated sightings of single condors between 1930 and 1935 at fire lookouts in the Umpqua foothills by Bill Brown seemed strange and dubious at first, but in fact were the latest in a sequence of observations over a period of 110 years in that vicinity. In October and November 1826 Douglas and McLeod of Hudson's Bay Company had reported "great numbers [of condors]...on the Umpqua river, and south of it" (Douglas 1959 p 241). Titian Peale, ornithologist with the Wilkes expedition, had seen 2 condors in the mountains between the Umpqua and Rogue rivers in September 1841 (Peale 1957). In 1852 Roselle

Putnam, wife of Charles Putnam, the first homesteaders at Yoncalla in the upper Umpqua River, wrote that "the largest wild bird...is the vulture, which is only an overgrown buzzard. I saw one measured [with a wingspan of] 10 to 11 feet" (Putnam 1928). And George Peck and his son Henry, familiar with condors in California, saw condors near Drain, only 7 miles from Yoncalla often at close range in June and July 1903 and March 1904 (Peck 1904; Finley 1908)(Appendix A). Brown's observations were therefore not isolated, but were both shared with his associates and can also be seen as a continuation of an historical series of condor observations in that vicinity.

The Krussow record of 3 condors roosting on cliffs overlooking the Collowash River from December 1964 to April 1965, seen at close range, well-described, seen daily over a period of weeks, is similarly compelling, not only on the merits of the observations per se, but because of its relationship to other records by K Smith in the vicinity (unknown to Krussow and vice versa). Krussow noted that after leaving the roost the condors flew off to the southeast in the direction of Mt Jefferson, where 3 condors (possibly even the same birds, or birds from the same population) were observed by Smith at very close range (<40 meters), and were well-seen among ravens and eagles at a winter-killed elk in a melting snow bank on the Warm Springs Indian reservation on the east slope of Mt Jefferson in early summer in the 1950s or 1960s (Appendix A). The distance between Krussow's and Smith's observations (35 kilometers) is a typical commuting distance between roosting and foraging sites in California (Koford 1953). Further corroboration of Krussow's report is that Smith also observed condors regularly on boulders in the streambed of the upper Clackamas River (to which Collowash is tributary) in the 1950s, where he often fished for salmon as a young man (K Smith pers. comm.) Condors were also known to frequent the upper Clackamas River, a tribal berry-picking and salmon-fishing area before the Clackamas was dammed and before road-building and logging penetrated the area beyond Bagby and Austin hot springs in the 1950s (Taylor 1999; Ken Smith, Wasco oral history, pers. comm., 2006).

Fannin's (1897) observation in 1896 of "two fine condors" near Calgary, rejected by Macoun and Macoun (1909) for lack of a specimen, thought "startling" by Harris (1941), and "disputed" by Wilbur (1978), is provided context by multiple (19) native observations of the *omaxsapitau* (literally "big eagle" = condor) accumulated during centuries of Blackfoot and Cree occupation in Alberta and Montana (Schaeffer 1951). Fannin's 1896 observation also gains support in particular from the winter observation of an *omaxsapitau* near Browning, northwestern Montana in 1897, "the year that Big Crow saw the *omaxsapitau*" (ibid.). Because of Schaeffer's work, as well as the competence of the observer himself, a museum curator, the Fannin record is now seen as eminently plausible and not so readily dismissed.

DB Marshall, author of Birds of Oregon, asked me, "How could such a huge, charismatic species have been missed?" The answer is, surprisingly, that the ornithology of the Cascade Mountains was poorly known in the mid-1900s; Gabrielson and Jewett (1970), the Northwest's most respected ornithologists wrote in 1940 of "the comparative isolation of ... Mount Jefferson, even up to the last few years." The eastern half Mt Jefferson is within the Warm Springs Indian Reservation and off-limits to outsiders. The upper Clackamas drainage was also a tribal berry-picking area for Wasco and Clackamas Indians not visited by outsiders (Taylor 1999; K Smith pers. comm.) until relatively recently. National forests of the Cascade Mountains were not penetrated by roads until the 1950s, and private logging of public timber did not gain momentum until the 1960s, accelerating into a furious crescendo of timber production in the 1970s and 1980s (Taylor 1999; Robbins 2004; personal observation). And condors were not "missed"; as noted above some at least were repeatedly observed, not by biologists, but by natives and working people (Smith and Krussow), knowledgeable and keen observers in my experience, whose survival and livelihood were dependent on natural resources. Observations of condors at various other locations in the Cascade Mountains, Mt Adams, Mt Hood, and Mt Jefferson, and in the Umpqua Mountains, were also made by native peoples and early forestry workers. Wildlife management as a profession was founded in the 1930s and 1940s, wildlife agencies were essentially game departments until the 1970s, and with exceptions, wildlife professionals

were concerned primarily with hunted species. After the first Endangered Species Act was passed (1966), state and federal wildlife agencies began to pay attention to endangered species, unwillingly at first (E Baysinger, Chief, US Fish and Wildlife Endangered Species Program, retired, pers. comm.), but nongame species were virtually ignored by state and federal bureaucracies until the 1970s and 1980s (personal observation). For these reasons, the improbability of agency biologists observing endangered species in roadless, rugged, unexplored wilderness in the mid-1900s should come as no surprise.

The Columbia River as Organizing Principle—The abundance of condor records on the Columbia River and its tributaries suggest that condor distribution in the Northwest may have been influenced by the Columbia River. This may be because of its windiness, because condors were dependent on the food supply produced by the river, or its proximity to nesting sites. The abundance of condor observations on the Columbia River may also be biased because rivers were/are an economic resource and travel corridor. The river's apparent attraction to condors is perhaps properly viewed as a function of its ecology, which included not only abundant salmon runs, but native settlements, with which condors seem to have associated, and on which they may have depended more than is realized (Sharp, ms in preparation).

The occurrence of condors in inland British Columbia could simply be a result of their following the Columbia River to its headwaters. Observations of condors along the upper Columbia River by Douglas, Merriam, and Cook (Appendix A; Figure 3) support the idea of the Columbia River corridor as travel route and food supply. Condor sightings in Alberta and Montana can then in this context be viewed as an extension of the interior British Columbia records via passes across the continental divide. The Columbia's headwaters are 90 km from Fannin's observation of the condors on the Bow River near Calgary, within the commuting capability of condors (Koford 1953). Condors east of the Rockies may represent a relic population of permanent residents which may have nested in the vicinity, as observations of condors east of the Rockies by Blackfeet and Fannin document them there

at different seasons of the year. However, permanent residence would require a year-round food supply, and whether one was available is unknown.

Whether condors arrived in Alberta and Montana from the Columbia River population, or were a relic of a more extensive population, is not known. The transmontane presence of condors in Montana and Alberta would also be explicable if condors used the Snake River as a southerly route to cross the continental divide into Wyoming; but this seems unlikely: Wyoming lacks condor records, and evidence of condors in Idaho is all from the lower Snake River. Condors may not have been likely to reach the upper Snake and the Wyoming line because Shoshone Falls in south-central Idaho are a barrier to salmon migration.

Though the Columbia River seems to exert a significant influence on the distribution of condors and records of condors, it should be noted that there are condor observations “away” from the river in the Cascade Mountains, at Mts Adams, Hood, and Jefferson and in the Umpqua foothills (Douglas, McLeod, Peale, Putnam, Peck, Brown, Smartlowit, Smith, and others) (Appendix A), though many of those locations are within foraging distance of the river. The Columbia River was not the only factor affecting condor distribution in Northwestern North America.

Significance of Year-round Occurrence—It is clear from records with dates ($n=63$) that condors were present year-round in the Northwest. A year-round condor presence could result from northward movements of condors from California irrespective of season of year. However, distances from California to the Northwest exceed the regular movements of condors between roosts and foraging areas in California (Koford 1953), and more than a “minor change in food location” was thought by Wilbur (1978 p 27) to be unlikely. Semi-permanent residence of adult or subadult condors in the Northwest is a possibility, with an eventual return to California to breed, but it implies that condors could not maintain themselves on the food supply available in the Northwest, or that nesting sites were lacking

in the region, neither of which seems to be the case.

Koford (1953 p 9) suggested that "condors moved northward in summer to feed on the salmon" of the Columbia River. However, condors were not "most numerous" in summer in the Pacific Northwest, and the year-round data are inconsistent with "occurrence and disappearance" and a "southward withdrawal." The salmon runs of the Columbia and other northwestern streams which contributed to the diet of condors in the Northwest (Sharp in preparation) also occurred year-round (B Bakke, Native Fish Society, pers. comm; Aguilar 2005; Taylor 1999). Peale (1848) seems to have been the first to suggest that California provided more of the mammalian food "preferred" by condors than did the Pacific Northwest, and Miller and others (1965) and Wilbur (1978) estimated that food availability in California was more than adequate. Wilbur (1973) also stated that "summer is the season of lowest [food] supply" in California; if condor movements into the Northwest were driven by food scarcity, they would thus be more likely to move north in summer. However, the data show no summer influx (Figures 1, 2).

There was, however, a higher than expected number of condor observations in the fall, particularly September in this study (Figure 2). A September influx of condors might be expected if salmon were more abundant in the fall, but a preliminary review of the historical strength of seasonal runs of returning live Columbia River salmon of 4 species indicates that is not the case (Johnson and others 1991; Anderson 1997; Washington Department Fish and Wildlife 2008; M Newsom, Bureau Reclamation, Portland OR, pers. comm.). However, also condors fed on dead spawned-out salmon (Appendix), which, even in spring and summer salmon runs, occurs in the fall, when carcasses (not live salmon) are most abundant (Aguilar op. cit.; M Newsom pers. comm.).

Wilbur (1973) inferred from the historical data that condors showed "a fairly definite movement to the Columbia in fall [to breed] and away in spring." The available data (Appendix A) do not support the notion of movement to the river in fall. The seasonal

number of records “at” and “away from” the river were in winter 8 and 5; in spring 7 and 2; in summer 3 and 10; in fall 9 and 15; and in total 27 and 32, respectively. Percentages of sightings at the river were highest in winter and spring (62% and 78%), and lowest in summer and fall (23% and 37%). Condors were thus found during the presumptive breeding season both near the river and in the mountains, they probably would have bred at both types of locations, and movement to the river cannot be equated with movement to a nesting area in any case.

It appears that a permanent resident population of condors is the most compelling explanation of the seasonal data. However, this does not exclude a possible northward dispersal in autumn of post-breeding adults, non-breeders, and/or younger birds from California, augmenting the permanently resident Northwest population. Northward movements in autumn are known for other species: Bald Eagles from Florida into southern Canada (mostly first and second-year birds) (Broley 1947), Common Murres *Uria aalge* (Sharp, unpublished banding data), Brown Pelicans *Pelicanus occidentalis* (personal observation), Heermann's Gulls *Larus heermanni* (personal observation), in summer Caspian Terns *Sterna caspia* to Prince William Sound, Alaska (personal observation) where they now breed, and in drought years movements of Northern Pintail *Anas acuta* as far north as Siberia to breed (Henny 1973). Considering how prevalent these northward movements are, Phillips' (1968 p 135) criticism of Koford's northerly movement hypothesis as a “disservice to the general understanding of *Gymnogyps*” is harsh. A northward movement by condors may have resulted in their locating foraging opportunities and satisfying other habitat needs, and would in fact be advantageous. Condor occurrence east of the Rockies and at high latitudes in British Columbia, and movements of reintroduced captive-bred birds in Arizona to Utah and between central and southern California, demonstrates that condors are and were capable of establishing patterns of resource use beyond their expected or “normal” ranges. The flight and communication capabilities which make condors efficient foragers probably pre-adapt the species for long-distance pioneering.

Probability of Condor Nesting in the Pacific Northwest—The evidence for condor nesting in the Northwest includes the following: 1) Condors occurred year-round in the Pacific Northwest (Wilbur 1973; this study). 2) According to Wasco oral history, young condors were kept in villages for protection against thunder and lightning (Nelson Wallulatum, chief Wasco Confederated Tribes, per M Schlick pers. comm.) (Appendix A). If true, it can be logically inferred that native villagers must have had local access to condor young, and therefore, that condors nested locally. 3) Oral history of Columbia River peoples refers to condors breeding at Saddle Mountain (overlooking the Columbia River estuary), in the Columbia River Gorge, near Celilo Falls, and at Mount Adams. A combination of sight records, centuries-old native stories, and art document a significant and long-term presence of the condor at these locations. For example, according to Clatsop creation myth, eggs from a condor nest at Saddle Mountain generated the Clatsop people (Gill 1928; Hines 1991; Boas 2002; Tom McAllister, naturalist and outdoor writer for The Oregonian, pers. comm.; Ken Smith pers. comm.). Actual events in the Northwest, including tsunamis, volcanic eruptions, and an account by Douglas (1829) of a trek to Larch Mountain also appear in native oral histories and tribal memory. 4) That condors were seen frequently by Lewis and Clark at the mouth of the Columbia from November to March, within sight of Saddle Mountain (Appendix A) is consistent with breeding at that site and with native oral history. 5) Condors were “reputed to breed in the Umpqua country” (Townsend 1848 p 267) at higher elevations, presumably relying on native information, is supported by sightings by Euro-Americans in that area for 110 years (this study). 6) Cohesive patterns of observations in other areas of the Northwest, e.g., the Columbia River and Cascade Mountains, are suggestive of a permanent presence. 7) Caves and cliffs along the Columbia River and in the Cascade Mountains provide abundant nest sites (pers. obs.). 8) The abundance of condors in the Indian midden at Five Mile Rapids (63 individuals) (Miller 1957) implies more than occasional visitor status, possibly residence and thus breeding.

Altogether, the evidence of condor nesting is impressive, but circumstantial; proof is lacking. The discovery of eggshells, whitewash or remains of nestling condors in caves would confirm nesting in this region (Snyder and Snyder 2000), as would photographs of nestling or juvenile condors in native villages. Few potential nesting caves in areas where concentrations of condor sightings occurred historically have been explored so far, and the effort to identify and locate nesting sites in Oregon is still in initial stages (David Moen pers. comm.). No photographs of tethered chicks in villages have surfaced; photo-archives are a line of inquiry that was not exhausted in this study.

Parallel Declines of the Condor in California and in the Northwest--Range reductions often accompany declining numbers of a species (personal observation). In California, condors disappeared from county after county, from Napa County by 1860 (Leach 1929), Monterey County between 1861 and 1871 (Cooper 1871), San Benito County by 1900 (Willet 1931), San Diego County by 1910 (Koford 1953) to name a few (see also Koford 1953 p 18; *ibid.* pp 139-146; Wilbur 1978 pp 57-69). The number of condor observations diminished along the lower Columbia River in the 19th century, but it seems from the data presented in this study that condors were still observed along the mid and upper Columbia, and more often in the Cascade Mountains, into the second half of the 20th century. Therefore, it appears that condors persisted in decreasing numbers in smaller and smaller parts of their range in both California and in the Northwest at about the same time. The observation of a large vulture in eastern Oregon in the mid-1980s, if valid, may have been a local remnant of the almost extinct Northwest population, and it was coincidence that the last wild condors in California were captured in 1985-1987, or it may have been a northward-moving visitor in fall from the ecologically almost extinct California population.

Causes of decline in the Northwest—The decline to extinction in the Northwest seems to have begun in the 1800s, and occurred over the better part of two centuries, as in

California. Coincident declines might imply that the northwestern and California condors were from the same population, and any decline in California would also cause a condor decline in the Northwest; or that the populations were separate and the factors that caused the declines were common to both regions. Elucidating the cause of the extinction of northwestern condors is beyond the scope of this paper and will require an examination of the foraging niche in the Northwest (Sharp in preparation). In general, it seems that the condor decline in the Northwest may have to do with ecological changes to the Columbia River, and the disappearance of both the fishery and the native population with which condors were associated (ibid.). The decline of wild condors in California was attributed by Snyder and Snyder (2000) to unsustainable mortality due to poisoning, confirmed now by radio-tracking captive-reared condors introduced to the wild in Arizona and California (Mee and Hall 2007). Briefly, in the Northwest there are 4 records of condors appropriating hunter-killed big game carcasses (Appendix A): E Saluskin's great-grandfather near Mt. Adams in the 1800s, Lewis and Clark at Deer Island in March and Idaho in June 1806, and Alexander Henry on the Pudding River in January 1814. These condors would, therefore, have been exposed to lead poisoning. Probable poisoning in the Northwest is also implicated in the observations by Putnam (1928) of a dead condor after her husband used "strycknine" to kill wolves *Canis lupus*, or it is an improbable coincidence; and the account of cattlemen who told Wilcox (1918) that condors were common in the Boise area of Idaho "before they began to poison carcasses to kill wolves." The two causes of poisoning mortality, lead and predator control, are consistent with the hypothesis that the coincident condor declines in northwestern North America and in California are due to the same cause.

Comparison with the Condor Record in the Southwestern Desert--Considering the absence of a native cultural connection with condors in Arizona (this study), the meager historical record of condors in Arizona is understandable. Six sightings in Arizona, all but one after 1881, probably represent a range expansion following the European introduction of

domestic cattle, a new food supply (Emslie 1987); the 1865 record indicates they could have vagrants that entered Arizona from southern California or from Baja California via the Colorado River. The only other evidence of condors in Arizona was purely palaeontological, from the end of the Pleistocene (Miller 1960b, de Saussure 1956). Carbon-dated condor bones found in Grand Canyon caves ranged from 9580 to 22180 years B.P., with a median of 12,500 years (Emslie 1987) (n=13), though the pre-historical period of condor occupancy might be somewhat longer than the data show (Snyder and Snyder 2000). Except for the tenuous condor-Hopi connection, there is a hiatus of at least 9600 years between the 19th century records and the Pleistocene records. It is significant that condors had to be *added* to the state list of native birds to provide a basis for reintroducing captive-reared condors into the state. The condor record in the Northwest, culturally and historically, is clearly more substantial than in Arizona, and the historical record of condors in other southwestern states is even more sparse than in Arizona.

Reintroduction--With little more than the Pleistocene data as a basis, therefore, the decision was made to introduce captive-bred condors to Arizona, and the fact that the ruggedness and inaccessibility of the Grand Canyon matched a conception of condor habitat (U.S. Fish and Wildlife Service 1996a; Nielsen 2006). The Arizona release site evaluation (U.S. Fish and Wildlife Service 1996a pp1-2) stated that condors were "extirpated" from Arizona and "the decline of the species in Arizona was probably due to ...human-induced mortality", when the absence of native American records, oral history, or art depicting condors strongly suggests that condors became extinct in Arizona in the Pleistocene of their own accord (Emslie 1987). The evaluation allotted only a meager 15 points of a total of 259 for "hunter-killed" carcasses (U.S. Fish and Wildlife Service 1996a pp 57-60), and greatly underestimated actual deaths from lead poisoning (a mortality of more than 40%) (www.arizonaes.fws.gov; Nielsen 2006). That said, the successful nesting of captive-bred condors in the Grand Canyon in a cave last occupied in the Pleistocene, after a hiatus of 9600-22000 thousand years, was a breathtakingly spectacular event (Osborn 2001; Kiff 2003).

Condors are also being reintroduced in California, their former center of abundance, and Baja California. In California, mortality and productivity problems are similar to those in Arizona, with a low number of pairings and nesting attempts until 2008 in southern California (J Grantham, D Clendenen, G McMillan, N Snyder, pers. comms.). Factors that caused mortalities in the wild condor population prior to 1985 were not eliminated before or during the reintroduction phase, nor successfully managed except by radio-tracking every released bird and treating those that were found immobile and poisoned (Meretsky and others 1999; Snyder and Snyder 2000). High mortality and low productivity in both Arizona and California means that condor deaths must be replaced by further releases of captive-reared birds (U.S. Fish and Wildlife Service 1996b). Legally banning the use of lead ammunition in California in July 2008 was a welcome development (Mee and Hall 2007), but it needs to be enforced. Given the history of reintroduction efforts in Arizona and California, and the rich fossil, cultural, and historical legacy of condors in the Northwest, it is odd that the feasibility of restoring condors in the Northwest region has so far been given so little consideration. The number of captive-reared birds available for release is limited, but the Northwest as a potential release site is, considering the strength of the cultural evidence and the record in the Northwest, more compelling than in Arizona and even Baja California. Preliminary investigation indicates no shortage of nesting habitat in Oregon (personal observation; D Moen, pers. comm.), but whether the Northwest can provide a functional, life-supporting foraging niche for condors is the critical question. If condors were reintroduced to the Northwest, an examination of condor foraging ecology is needed (Sharp, ms in preparation) to help assess whether their survival in this part of their historically occupied range would be any less problematic than it has been in Arizona and California thus far.

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LITERATURE CITED

AGUILAR GW Sr. 2005. When the River Ran Wild: Indian Traditions on the mid-Columbia and the Warm Springs Reservation. Oregon Historical Society Press, Portland, USA. 252 p.

ANDERSON JJ. 1997. Decadal climate cycles and declining Columbia River Salmon. University of Washington, School of Aquatic and Fishery Sciences.
www.cbr.washington.edu/papers/jim/victoria.html (accessed March 2008).

ANTHONY AW. 1895. Birds of San Fernando, Lower California. Auk 12:134-143.

AUDUBON JJ. 1839. Ornithological Biography, or an account of the habits of the birds of the United States, vol. 5. Adam and Charles Black, Edinburgh, UK.

BAIRD SF, CASSIN J, LAWRENCE GN. 1858. Reports of explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean. 1853-1856. Birds. Vol. IX. Washington D.C., USA.

BOAS F. 2002. Indian Myths and Legends from the North Pacific Coast of America. Bertz D, translator. Vancouver, Canada. 702 p.

BONAPARTE CL. 1827. Supplement to the genera of North American birds, and to the synopsis of the species found within the territory of the United States. Zoological Journal 3:49-53.

BRINGHURST R. (ed. and tr.) 2001. Being in Being: the Collected Works of Skady of the Qquuna Oiighawaay. University Nebraska Press, Lincoln, USA. 397 p.

BROOKS A, SWARTH HS. 1925. A distributional list of the birds of British Columbia. Pacific Coast Avifauna 17. 155 p.

BROWN H. 1899. The California vulture in Arizona. Auk 16: 272.

BROLEY CL. 1947. Migration and nesting of Florida Bald Eagles. Wilson Bulletin 59:3-20.

BURROUGHS RD. 1961. The Natural History of the Lewis and Clark Expedition. Michigan State University Press. East Lansing, MI. 340 p.

CAMPBELL RW, DAWE NK, COOPER JM, KAISER GW, MCNALL MCE. 1990. Birds of British Columbia. University British Columbia Press, Vancouver, Canada.

CARLSON KT. 2001. A Sto:lo Coast Salish Historical Atlas. University of Washington Press, Seattle, USA. 224 p.

CASSIN J. 1858. United states exploring expedition during the years 1838, 1839, 1840, 1841, 1842 under the command of Charles Wilkes, U.S.N. Vol. VIII. Mammalogy and Ornithology. J. B. Lippincott and Co., Philadelphia, USA. 466 p.

CHAMBERLAIN CP, WALDBAUER JR, FOX-DOBBS K, NEWSOME SD, KOCH PL, SMITH DR, CHURCH ME, CHAMBERLAIN SD, SORENSEN KJ, RISEBROUGH R. 2005. Pleistocene to

recent dietary shifts in California Condors. Publications of Natural Academy of Science 102:16707-16711.

COOPER JG. 1871. Monterey in the dry season. American Naturalist 4:756-758.

COOPER JG, SUCKLEY C. 1860. The natural history of Washington Territory and Oregon, being those parts of the final reports of the survey of the Northern Pacific Railroad route, relating to the natural history of the regions explored, with full catalogues and descriptions of the plants and animals collected from 1853 to 1860, with the cooperation of Messrs Baird, Girard, Stimpson, Geo. Gibbs, Kennicott, Torrey, Gray, Cassin, and Lawrence. Bailliere Brothers, London, UK. 399 p.

COUES E. (ed.). 1897. New light on the early history of the greater Northwest. The manuscript journals of Alexander Henry, Fur Trader of the Northwest Company, and of David Thompson, Official Geographer and Explorer of the same Company, 1799-1814. V. II. The Saskatchewan and Columbia Rivers. Ross and Haines, Inc., Minneapolis, USA. 1027 p.

COX R. 1957. The Columbia River. University Oklahoma Press, Norman, OK. 398 p.

DEMERS M, BLANCHET FN, BOLDUC JBZ, LANGLOIS A. 1956. Notices and Voyages of the Famed Quebec Mission to the Pacific Northwest. Landerholm C, translator. Oregon Historical Society, Portland, USA. 243 p.

DE SAUSSURE, R. 1956. Remains of the California Condor in Arizona caves. *Plateau* 29:44-45.

DE SMET J-P. 1978. Oregon Missions and Travels over the Rocky Mountains in 1845-46. Reprint of 1847 edition. Ye Galleon Press, Fairfield, WA. 426 p.

DOUGLAS D. 1829. Observations on the *Vultur Californianus* of Shaw. Zoological Journal 4:328-330.

DOUGLAS D. 1904. Sketch of a journey to the northwestern parts of the continent of North America during the years 1824-25-26-27. Oregon Historical Quarterly 5:230-271.

DOUGLAS D. 1959. Journal kept by David Douglas during his travels in North America, 1823-1827. Antiquarian Press, New York, USA.

EMSLIE SD. 1987. Age and diet of fossil California Condors in Grand Canyon, Arizona. Science 237:768-770.

FANNIN J. 1891. Check list of British Columbia birds. Queen's Printer, Victoria, Canada. 49p.

FANNIN J. 1897. The California vulture in Alberta. Auk 14:89.

FINLEY WL. 1908. Life History of the California Condor. Part II. Condor 10:5-10.

FLEMING JH. 1924. The California condor in Washington: another version of an old record. Condor 26:11-112.

GABRIELSON IN, JEWETT S. 1970. Birds of the Pacific Northwest. Dover Publications Inc., New York, USA. 650 p.

GASS P. 1904. Gass's Journal of the Lewis and Clark expedition. A.C. McClurg and Company, Chicago, USA.

GILL JK. 1909. Dictionary of the Chinook Jargon. J.K. Gill, Portland, OR. 84 p.

GILL J. 1928. Superstitions and ceremonies of Indians of Old Oregon. Oregon Historical Society Quarterly 29:311-322.

GILLIGAN J, SMITH M, ROGERS D, CONTRERAS A. 1994. Birds of Oregon: Status and Distribution. Cinclus Publications, McMinnville, OR. 330.

GREEN RE, NEWTON I, SCHULZ S, CUNNINGHAM AA, GILBERT M, PAIN DJ, PRAKESH V. 2004. Diclofenac poisoning as a cause of vulture population declines across the Indian subcontinent. *Journal Applied Ecology* 41:793-800.

GRINNELL J. 1928. A distributional summary of the ornithology of Lower California. *University of California Publications in Zoology* 32:1-300.

HALL FW. 1933. Studies in the history of ornithology in the state of Washington (1792-1932) with special reference to the discovery of new species. Part II. Lewis and Clarke. *Murrelet* 14:55-70.

HALL FW. 1934. Studies in the history of ornithology in the state of Washington (1792-1932). Part III. David Douglas. *Murrelet* 15:3-19.

HANSEL-KUEHN V. 2003. The Dalles Roadcut (5-Mile Rapids) Avifauna: evidence for a cultural origin. MS Thesis Washington State University, Pullman, USA. 178 p.

HARRIS H. 1941. The annals of *Gymnogyps* to 1900. *Condor* 43:3-55.

HENNY CJ. 1973. Drought displaced movement of North American Pintails into Siberia. *Journal of Wildlife Management* 37:23-29.

HILL HM, WIGGINS IL. 1948. Ornithological notes from Lower California. *Condor* 50:155-161.

HINES DM. 1991. The Forgotten tribes: Oral Tales of the Teninos and Adjacent Mid-Columbia river Indian Nations. Great Eagle Publishing, Issaquah, Washington, USA. 143 p.

JEWETT SC, TAYLOR WP, SHAW WT, ALDRICH JW. 1953. Birds of Washington State. University of Washington Press, Seattle, USA. 767 p.

JOHNSON OW, FLAGG TA, MAYNARD DJ, MILNER GB, WAKNITZ FW. 1991. Status Review

for Lower Columbia River Coho Salmon. National Marine Fisheries Service , Seattle, WA.
www.nwfsc.noaa.gov/publications/techmemos/tm202/index.htm (accessed March 2008).

KEYSER JD. 1992. Indian Rock Art of the Columbian Plateau. University of Washington Press, Seattle, USA. 139 p.

KIFF L. 2003. A new epoch for the California Condor. Peregrine Fund Newsletter 34:2-3.

KIRK DA, MOSSMAN MJ. 1998. Turkey Vulture (*Cathartes aura*). In: Poole A, Gill F, editors. Birds of North America Number 339. The Birds of North America Inc., Philadelphia, PA. 32 p.

KOFORD CB. 1953. The California Condor. Dover Publications, New York, USA. 154 p.

LEACH FA. 1929. A turkey buzzard roost. Condor 31:21-23.

LEWIS M, CLARK J. 1990. The Definitive Journals of the Lewis and Clark Expedition, vols. 2-8. Moulton GE, editor. University of Nebraska Press, Lincoln, USA.

LORD JK. 1866. The Naturalist in Vancouver Island and British Columbia. Vol. 2. Richard Bentley, London, UK. 375 p.

MACOUN J, MACOUN JM. 1909. Catalogue of Canadian Birds. General Printing Office. Ottawa, Canada. 761 p.

MARSHALL DB, HUNTER MG, CONTRERAS AL. 2003. Birds of Oregon, a general reference. Oregon State University Press, Corvallis, OR. 247 p.

MEANY ES. 1923. Origin of Washington Geographic Names. University of Washington Press, Seattle, WA. 357 p.

MEE A, HALL LS. 2007. California Condors in the 21st Century. Nuttall Ornithological Club and American Ornithologists' Union. Buteo Books,. 279 p.

- MERETSKY VJ, SNYDER NFR, BEISSINGER SR, CLENDENEN DA, WILEY JW. 2000. Demography of the California Condor: implications for reestablishment. *Conservation Biology* 14:957-967.
- MILLER AH. 1942. A California Condor Bone from the Coast of Southern Oregon. *Murrelet* 23:77.
- MILLER LH. 1957. Bird remains from an Oregon Indian midden. *Condor* 59:59-63.
- MILLER LH. 1960a. Some indian midden birds from the Puget Sound area. *Wilson Bulletin* 72:392-397.
- MILLER LH. 1960b. Condor remains from Rampart Cave, Arizona. *Condor* 62:70, 298.
- MILLER AH, MCMILLAN I, MCMILLAN E. 1965. The current status and welfare of the California condor. *National Audubon Society Research Report* 6:1-61.
- MOEN DB. Unpublished. Condors in the Oregon Country: Examining the Past to Prepare for the Future. Master's Thesis, Portland State University, Portland, OR. 175 pp.
- MUNROE JA, MCTAGGART-COWAN I. 1947. A Review of the bird fauna of British Columbia. *British Columbia Provincial Museum Special Publication Number 2*. Victoria, Canada.
- NIELSEN J. 2006. Condor, to the brink and back: the life and times of one giant bird. HarperCollins, N.Y., USA. 257 p.
- NIELSEN JC. 1940. Donald McKenzie in the Snake River fur trade 1816-1821. *Pacific Northwest Quarterly* 31:161-179.
- NISBET J. 2003. Visible Bones: Journeys Across Time in the Columbia River Country. Sasquatch Books, Seattle, USA. 246 p.
- OGDEN PS. 1933. Traits of American Indian Life and Character, by a Fur Trader. Grabhorn

Press, San Francisco, USA. 107 p.

ORDWAY J. 1916. The Journals of Captain Meriwether Lewis and Sergeant John Ordway, kept on the Expedition of Western Exploration, 1803-1806. Quaife MM, editor. State Historical Society, Madison, USA. 414 p.

OSBORN S. 2001. Major milestone achieved for California Condor restoration. Peregrine Fund Newsletter 32:4-5.

PEALE TR. 1848. U. S. Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842 under the Command of Charles Wilkes, U. S. N. Vol. 8: Mammalia and Ornithology. C. Sherman, Philadelphia, USA.

PEALE TR. 1957. The Diary of Titian Ramsay Peale, Oregon to California Overland Journey, September and October, 1841. Dawson Books, Los Angeles, USA. 85 p.

PECK GD. 1904. The California Condor in Douglas County, Oregon. Oologist 21:55.

PHILLIPS AR 1968. The instability of the distribution of land birds in the Southwest. Collected Papers in Honor of Lyndon Lane Hargrave. Papers of the Archaeological Society of New Mexico 1:129-162.

PUTNAM R. 1928. The letters of Roselle Putnam. Oregon Historical Society Quarterly 29:242-264.

REA AM. 1981. California Condor captive breeding: A recovery proposal. Environment Southwest 484:8-12.

RHOADS SN. 1893. The birds observed in British Columbia and Washington during spring and summer 1892. Proceedings of the Academy of Natural Sciences, Philadelphia 45:21-65.

ROBBINS WG. 2004. Landscapes in Conflict: The Oregon Story, 1940-2000. University of

Washington Press, Seattle, USA. 414 p.

ROSS A. 1956. The Fur Hunters of the Far West: A Narrative of Adventure in the Oregon and Rocky Mountains. Smith, Elder, & Co. London, UK. 317 p.

SCHAEFFER CE. 1951. Was the California condor known to the Blackfoot Indians? Journal Washington Academy Science 41:181-191.

SCHLICK MD. 1994. Columbia River Basketry. University Washington Press, Seattle, USA. 232 p.

SCOTT CD. 1936. Are condors extinct in Lower California. Condor 38:41-42.

SCOULER J. 1905. Dr. John Scouler's journal of a voyage to Northwest America. Oregon Historical Society Quarterly 6:276-287.

SELLERS CC. 1980. Mr. Peale's Museum: Charles Willson Peale and the First Popular Museum of Natural Science and Art. WW Norton and Company, New York. 370 p.

SHAW GC. 1909. The Chinook Jargon, and how to use it. Rainier Printing Company, Seattle, Wa. 65 p.

SMITH MW. 1940. The Puyallup-Nisqually. Columbia University Press, New York. 336 p.

SNYDER N, SNYDER H. 2000. The California Condor: A Saga of Natural History and Conservation. Academic Press, London, UK. 410 p.

SNYDER NFR, REA AM. 1998. California Condor, *Gymnogyps californianus*. In: Glinski RL, editor. The Raptors of Arizona, University of Arizona Press, Tucson, USA, p. 32-36.

SNYDER NFR, SCHMITT NJ. 2002. California Condor (*Gymnogyps californianus*). In: Poole A, Gill F, editors. Birds of North America Number 610. The Birds of North America Inc.,

Philadelphia, PA. 35 p.

SPILYAY. 2001. Untitled. Journal of Warm Springs Confederated Tribes. December 2001.

STEEL RGD, TORRIE JH. 1960. Principles and Procedures of Statistics. McGraw-Hill, New York, USA. 481 p.

SWANTON JR. 1898. A Preliminary Catalogue of the Collections of Natural History and Ethnology in the Provincial Museum, Victoria, British Columbia. Ms 4117-A, Queen's Printer, Victoria BC, Canada. 55 p. Available from: Smithsonian National Museum, Washington D.C.

SWARTH H. S. 1914. Distributional list of the birds of Arizona. Pacific Coast Avifauna 10. 133 p.

TAYLOR B. 1999. Salmon and steelhead runs and related events of the Clackamas River Basin-a historical perspective. Portland General Electric Company, Portland, OR. 64 p.

TOLMIE WF. 1963. William Frasier Tolmie, Physician and Fur Trader. Mitchell Press Ltd., B.C., Canada. 413 p.

TOWNSEND JK. 1848. Popular monograph on the accipitrine birds of N.A. - No. II. Literary Record and Journal of the Linnaean Association of Pennsylvania College 4:265-272.

TURNER H. 1976. Ethnozoology of the Snoqualmie. 2nd ed. Revised. Self-published, Washington. 105 p.

U.S. FISH AND WILDLIFE SERVICE. 1996a. Final Environmental Assessment: Experimental release of California condors at the Vermilion Cliffs (Coconino County, Arizona). The Peregrine Fund, Boise, USA. 81 p.

U.S. FISH AND WILDLIFE SERVICE. 1996b. California Condor Recovery Plan. Prepared by Kiff, L., Mesta RI, Wallace MP. Portland, OR. 62 p.

WATERMAN TT. 1922. The geographic names used by the indians of the Pacific coast.

Geographical Review 12:175-194.

WASHINGTON DEPARTMENT FISH AND WILDLIFE. 2008. Chum Salmon. Columbia River Chum Salmon. <http://wdfw.wa.gov/fish/chum/chum-7.htm> (accessed March 2008).

WILBUR SR. 1973. The California Condor in the Pacific Northwest. *Auk* 90:196-197.

WILBUR SR. 1978. The California Condor, 1966-76: a look at its past and future. *North American Fauna* 72. 136 p.

WILBUR SR. Unpublished. <http://home.netcom.com/~symbios/northwestcondors3.html> (accessed June 2008).

WILBUR SR, KIFF LF. 1980. The California Condor in Baja California, Mexico. *American Birds* 34:856-859.

WILCOX TE. 1918. Occurrence of the California Vulture in Idaho. *Journal Washington Academy of Science* 8:25.

WILLET G. 1931. The condor in San Benito County, California. *Condor* 33:31.

www.arizonaes.fws.gov/Documents/Documentsbyspecies/CaliforniaCondor/10jReviewReport_Final2.pdf. (accessed 2004, 2006).

www.memory.loc.gov/award/iencurt/ct07/ct07010v.jpg (accessed 9 Jan 2008).

www.sil.si.edu/digitalcollections/usexex/navigation/ScientificText/usexex19_10b.cfm?start=73 (accessed 27 Jan 2008).

Appendix A. Source data for Figures 1-3, arranged by date when known, with observer, date, geographical location, reference, and comments on identification criteria.

OR=Oregon, WA=Washington, BC=British Columbia, ALB=Alberta, MT=Montana, ID=Idaho.

1. Records with locations and dates (day-month or season of the year)

1a. Fossils and prehistoric material:

- Indian midden at Five Mile Rapids, near The Dalles OR: minimum of 63 individual condors (Miller 1957); radiocarbon dates from 8470 +/-190 and 8770 +/-230 years B.P. (Hansel-Kuhn 2003); some bones with cut marks made by native implements on the distal end of wingbones, indicating ceremonial use of the feathers (ibid.).

- Indian midden, southern Oregon Coast 6 miles north of Brookings: one condor radius (Miller 1942).

- Pender Island, BC, native village site, tarsometatarsus, radiocarbon date 2900 BP (R. Wigen, University of Victoria, pers. comm. Feb 2006).

1b. Sightings and specimens:

Lewis and Clark and Company:

- 30 Oct 1805, confluence Columbia and Wind Rivers, WA: "Scattered about in the river, this day we Saw Some few (sic) of the large Buzzard. Capt. Lewis shot at one, those Buzzards are much larger than any other of ther spece (sic) or the largest Eagle white under part of their wings" (Lewis and Clark 1990 vol. 5 p 356); "some turkey buzzards which had white under their wings" (Ordway 1916 p 306). Note: seen at gunshot range.

•18 Nov 1805, mouth of Chinook River, Baker Bay WA: "Reuben Fields killed a Vulture"; "Rubin Fields Killed a Buzzard of the large kind near the whale we Saw...measured from the tips of the wings across 9½ feet... wing feather 2-½ feet", weight 25 lbs (Lewis and Clark 1990 vol. 6 p 66). Annotation inserted in 1810: "head in Peale's Museum" (not extant, see text). Gass journal entry 20 Nov notes Clark had killed a "remarkably large buzzard, of a species different from any I had seen. It was 9 feet across the wings, and 3 feet 10 inches from the bill to the tail." (Gass 1904 p 153). "One of the party killed a verry (sic) large turkey buzzard which had white under its wings, and was nine feet from the points of its wings, and 3 feet 10 inches in length." (Ordway 1916 p 311-312).

•29-30 Nov 1805, Columbia River estuary (editor's annotation "Youngs Bay"): "I observe...The large Buzzard with white under their wings Grey & Bald eagle..." (Lewis and Clark 1990 vol. 6 p 94).

•3 Jan 1806 mouth Columbia River: "the beautifull Buzzard of the columbia still continue with us" (sic) (Lewis and Clark 1990 vol. 6 p 164).

•16 Feb 1806, near mouth Columbia River: "Shannon an[d] Labiesh brought in to us today a Buzzard or Vulture of the Columbia which they had wounded and taken alive. I believe this to be the largest Bird of North America...." The rest is a lengthy account describing the bird in detail and a drawing of the head; the wingspread measured "9 feet 2 Inches", weight 25 lbs but "not in good order", maybe 10 lbs heavier when healthy (Lewis and Clark 1990 vol. 6 p 319-23); "killed...a new kind of Turkey buzzard" (journal entry for 17 Feb) (Ordway op. cit. p 325).

•16 Mar 1806, near Fort Clatsop: "Yesterday [15 Mar] while I was absent, getting our meat home, one of the hunters killed two vultures, the largest fowls I had ever seen. I never saw any such as these except on the Columbia River and the seacoast." (Gass op. cit. p 169); "nothing else extraordinary"! (Ordway op. cit. p 328).

•28 Mar 1806, Deer Is OR: "The men who had been Sent after the deer returned with four only, the other 4 having been eaten entirely by the Vulture (sic) except the Skin." (Lewis and Clark 1990 vol. 7 p 25); "the grey Eagles are plenty on this Island. They eat up three deer in a short time which our hunters had killed some of the hunters killed Several of them." Editor's footnote: "J. Fields even reported to Lewis 'that the Vultures had draged (sic) a large buck which he had killed about 30 yards, had skined it (sic) and broken the back bone.'" (Ordway op. cit. p 333). Note voracity and strength, unmatched by *Cathartes*. Gass noted that "fowls" had eaten 4 of 7 deer the same day as they were killed, "entirely, except the bones" (Gass 1904 p 171). Note: no Turkey Vultures seen until 9 April (see journal entry below).

•5 Apr, near Sandy River: "we saw...crows, eagles, Vultures and hawks" (Lewis and Clark 1990). Note vultures, eagles, and raptors differentiated, and no Turkey Vultures seen. Burroughs (1961 p 204-208) lists all Lewis and Clark's encounters with eagles, which demonstrate their familiarity with those species.

•6 Apr 1806, Columbia River, OR, near Beacon Rock: "Jos: Field killed a vulture of that Species already discribed" (sic). (Lewis and Clark 1990 vol. 7 p 88), 9 miles above the mouth of the Washougal River on the Oregon side.

•9 April 1806, near Multnomah Falls, Columbia River: "we saw some turkey buzzards this morning of the species common to the United states which are the first we have seen on this side the rocky mountains." (Lewis and Clark 1990; Burroughs op. cit. p 204). Therefore, all "buzzards" and "vultures" seen by the Lewis and Clark party in the Northwest were condors.

•13 Jun 1806, near Weippe, Idaho: "About noon 7 of our hunters returned with 8 deer; they had wounded several others and a bear but they did not get them. In the evening Labuish and Cruzatte returned and reported that the buzzards had eaten up a deer which they had killed butchered and hung up this morning." (Lewis and Clark 1990 vol.

8 p 22-23). "All the meat except Labuches was brought in & that the ravens and buzzards eat while he was hunting a little more." (Ordway 1916 p 366). Turkey Vulture is absent from this part of Idaho (Kirk and Mossman 1998), there is only 1 record of the species west of the Rockies in the journals of the Lewis and Clark party (cited above), and there are no records of *Cathartes* appropriating game killed by hunters (Kirk and Mossman op. cit.), whereas there are several such records for condors (Lewis and Clark 1990 vol. 7 p 25; Harris 1941). The evidence suggests that this is a probable encounter with condors; Burroughs' annotation (1961 p 203-4) that it refers to Turkey Vulture is unfounded.

A Henry, fur-trader:

- 19 Jan 1814, Strawberry (now Hamilton) Island, Columbia River: "Some extraordinarily large vultures were hovering over camp" (Coues 1897 vol. 2 p 808). Note size, sighting at close range, time of year when *Cathartes* is absent, and association with humans typical of condors (this study).

- 25 Jan 1814, Pudding River, tributary to Willamette River, OR: "I sent for the eight deer killed yesterday. The man brought in seven of them, one having been devoured by the vultures. These birds are uncommonly large and very troublesome to my hunters, by destroying the meat, which, though well covered with pine branches, they contrive to uncover and devour." (Coues 1897 vol 2 p 817). Note description, size, foraging profile that of condors (appropriating game, troublesome voracity), number of birds, and Turkey Vultures absent in winter (this study).

A Ross, fur-trader, writer:

- On or about 19 September 1817, northwest of Canoe River, British Columbia: "Not far from Eagle Hill, we shot two grizzly bears and a bird of the vulture tribe." (Ross 1956 p 105). The location is inexact; landmarks passed before the shooting included Canoe

River on Sept 10, 7 days travel to the southeast. Note location, interior BC at latitude north of Turkey Vulture records; late-September date, late for Turkey Vulture even on the coast; note also fall and winter records of condors across the continental divide in Alberta within commuting distance (see text); Ross not a naturalist, and mentioned only impressive animals and birds (bears, wolves, eagles and large vultures, etc.) in his writings; "Turkey Vultures do not occur regularly at the Canoe River, although there may be one or two sightings [since 1990s, since global warming] from there" (Weber, British Columbia birder, pers. comm. Feb 2008). No specimen.

Donald McKenzie, fur-trader:

- October 1818, Snake River, Idaho, location imprecise: On McKenzie's "outward journey ... eagle and vulture of uncommon size fly about the rivers" (Ross 1956 p 137). For details of McKenzie's itinerary, see Nielsen (1940). Note differentiated from eagles, large size, "uncommon" is also an indication of the remarkable quality of the observation, intimacy of the relationship with habitat ("fly about the" rivers), "rivers" plural suggests more than 1 encounter with large vultures.

- Winter 1819, location vague, Snake River, Idaho: "On our way back nothing to be seen but dreary and forbidding winter, the leafless forests and snow-clad hills with scarcely an animal to attract attention, except a wolf or fox which now and then crossed our paths, or an eagle or vulture watching their prey about rapids when open water was still to be seen." (Ross 1956 p 137). McKenzie left Boise River in Jan 1819, and after 600 miles on snowshoes arrived back at Ft. Nez Perces, Walla Walla River, in Apr 1819. (Ross 1956; Nielsen 1940). Note season/winter, *Cathartes* absent, cannot survive cold such as mentioned (Marshall and others 2003 p 76; H Nehls, Oregon ornithologist, pers. comm.); uncommon size of the vultures mentioned again.

John Scouler, botanist:

- 22 Sep 1825, near Ft George (Astoria), downstream from Mt Coffin: "obtained specimens of *Pelecanus onocrotalus*, *Falco*.--and a species of *Vultur*, which I think is nondescript. My birds were principally obtained from the Indians, who would go through any fatigue for a bit of tobacco" (Scouler 1905). Location of specimen unknown (Wilbur 1978); thought perhaps to be the specimen seen by Bonaparte in London in 1827 (Harris 1941).

David Douglas, botanist, explorer:

- Between 2 Jan and March 1826, near Fort Vancouver: "A species of Buzzard or Vulture (*Sarcoramphos Californianus* of Vigors) is the largest bird seen here except the Wild Swan. I killed only one of these interesting birds, but the buckshot which went through its head spoiled the specimen" (Douglas 1904). "On the Columbia there is a species of Buzzard, the largest of all birds here, the Swan excepted. I killed only one of this very interesting bird, with buckshot, one of which passed through the head, which rendered it unfit for preserving; I regret it exceedingly, for I am confident it is not yet described....When they find a dead carcase or any putrid animal matter, so gluttonous are they that they will eat until they can hardly walk and have been killed with a stick. They are the same color as the common small buzzard found in Canada [east of the Rockies]. The feathers of the wing are highly prized by the Canadian voyageurs for making tobacco pipe-stems. (Douglas 1959 pp 152,154). Note mention of "common small buzzard." Eagles and other hawks also described.

- Date probably 6-7 Sep 1825, inland and south of Columbia River, 3-4 km southeast of Larch Mountain 30 km east of Portland, OR): "Specimens, male and female, of this truly interesting bird [*Vultur californianus*, described], which I shot in lat. 45.30.15., long. 122. 3. 12. [Larch Mountain] were lately presented by the Council of the Horticultural Society to the Zoological Society, in whose Museum they are now carefully deposited." (Douglas 1829). No date was given, but in his journal Douglas (1959) had climbed

Lookout Mountain north of the Columbia River on 3-5 Sept 1825 (where he saw "hawks, eagles, and vultures"--vultures in early September could be Turkey Vultures at this location) before he ascended a mountain south of the river (Larch Mountain is directly across the Columbia from Lookout Mountain); his journal reports being in that vicinity on no other occasion. K Smith told me an astonishing story, passed down orally through his family for over 180 years (pers. comm Feb 12, 2006), of 4-6 Wasco Indians having guided Douglas up the Oneonta trail to the back side of Larch Mountain for 2 days, but condors were not mentioned. Douglas' familiarity with condors was already established by 1829 (Douglas 1829; journals, see below).

- 3 Oct 1826, Willamette Valley OR: "The Large Buzzard, so common on the shores of the Columbia, is also plentiful here; saw nine in one flock." (Douglas 1959 p 216). Wilbur (1978 p 109) has "Condors 'plentiful' on Umpqua River, Oregon, 3 Oct 1823—nine seen in one flock", but date is in error: Douglas did not arrive in the Northwest until 1825; and on 3 Oct, but in 1826 (not 1823), Douglas saw 9 condors when in the Willamette Valley (not Umpqua).

- Douglas: 10-15 Oct 1826, Umpqua Mountains: "Several species of *Clethra* were gathered—one in particular, *C. grandis* [sic], was very fine--and many birds of *Sarcoramphos californica* and *Ortyx californica*, and two other species of great beauty were collected." (Douglas 1959 p 67). Douglas wrote two accounts of his journey, one an abbreviated sketch summarized by weekly or monthly periods, and a daily journal. The above quotation is the sketch account; grammatically ambiguous, it is the source of Koford's (1953 p 8) and Harris' (1941 p 20) inferences that Douglas collected one condor in the Umpqua. The more detailed daily journal makes no mention of condors in the period 10-15 Oct, but does refer to the *Clethra* and a spoiled specimen of the quail, which was also new to him, probably because Douglas' encounters with condors had already been described adequately in his view. In his summary paper on condors, Douglas (1829) does not mention a specimen from the Umpqua; however, he lost much

of his collection in the Santiam River returning to Fort Vancouver in Nov 1826.

- 23 Oct-4 Nov 1826, Umpqua River: Douglas' journal for February 1827, summarizing what he knew about the occurrence of condors, stated "great numbers seen by myself on the Umpqua river" (Douglas 1959 p 241), though his daily journal for that period did not mention condors. Details included, "Feeds on all putrid animal matter and are so ravenous they will eat until they are unable to fly....Their flight is swift but steady, to appearance seldom moving the wings; keep floating along with the points of the wings curved upwards. Of a blackish-brown with a little white under the wing; head of deep orange color; beak of a sulphur-yellow; neck, a yellowish-brown varying in tinge...." (ibid.).

- 23 Oct-4 Nov 1826, Umpqua: "great numbers" of condors seen in the Umpqua area by fur-trader McLeod, summarized in February 1827 (Douglas 1959 p 241), not in daily journal. McLeod had separated from Douglas and traveled from the mouth of the Umpqua as far south as the mouth of Coquille and Elk Rivers (ibid. pp 228-233), while Douglas focused on finding sugar pine *Pinus lambertiana* in the Umpqua River area. No details, Douglas presumably satisfied by McLeod's account after reuniting with him two weeks later; McLeod had been with Douglas when condors were seen on 3 Oct and 10-15 Oct 1826, and was thus presumably familiar with them himself.

- Feb 1827, Fort Vancouver WA: "Killed a very large vulture, sex unknown." (Douglas 1959 p 241); Barnston, the company clerk, stated "spring"; wingspan of the specimen measured 9'; the winter of 1827 was hard and many condors were seen (Fleming 1924).

- No date: "I have met with them as far to the north as 49 degrees N. Lat. in the summer and autumn months" (Douglas 1829 p 329), in a summary of his encounters with condors and their distribution--specific Columbia River locations not mentioned in daily journal. The location was probably east of the Cascades on the Columbia River

upstream to Canadian boundary in 1827; it could not have been west of the Cascades in 1833, a journey which occurred after the publication of this observation in 1829.

- No date, from the Columbia River to the Snake River: "During the summer are seen in great numbers... from the ocean to the mountains [of Snake River] four hundred miles in the interior. In winter they are less abundant" (Douglas 1959 p 241). General summary, no specifics mentioned; not mapped; Douglas traveled extensively in eastern Oregon and probably to the Snake River, as did Hudson's Bay trappers and traders.

PS Ogden, fur-trader:

- Nov 1830, downstream near Fort Vancouver: PS Ogden, sick with malaria in mid-October, after convalescing, visited two villages downriver, probably Multnomah and Clannahquah (Boyd 1999 p 232), probably in November, perhaps late October, and documented the "utter destruction of every human inhabitant...why linger those foul birds around the spot, gorged, and scarcely noticing my presence?...Let these unburied carcasses resolve the question." (Ogden 1933 p 69). That Ogden was apparently no naturalist can be inferred from the rest of his writings, and he did not identify the species he was seeing. It is highly probable that the "foul birds" were not Turkey Vultures, the last of which have migrated south by October (this study); Ogden's observation was also of several birds, not a vagrant Turkey Vulture. Moreover, the "foul birds" were identified as condors in Wasco oral history: "During the worst years, some people could no longer bury or take care of their dead. The victims of these diseases fattened the huge Thunderbirds" (Aguilar 2005 p 12). "Intermittent fever" (malaria) was "the single most important epidemiological event in the recorded history of ...Oregon" (Boyd 1999 p 84); it arrived on the Columbia River in summer 1830 and lasted through November. McLoughlin (1948, letter number 134) wrote that by mid-October it had "carried off three fourths of the Indian population in our vicinity" of Fort Vancouver. The epidemic recurred every

year until at least 1834 (McLoughlin op cit; Boyd op. cit.). Tolmie (1963 pp 182, 185) observed "large vultures" (which he contrasted with "small vultures") near Fort Vancouver twice in the space of a few days in May 1833, 3 years later, when the malaria was still virulent (see next).

WF Tolmie, physician, furtrader, scholar:

- 21 May 1833, 2 miles up Jolifie ("Pretty-girl") River, presumably Kalama R. (Meany 1923 p 126), site of the deserted village Callamaks, formerly with 200 inhabitants (Boyd 1999 p 240): "scared some large vultures and crows from their feast" (Tolmie 1963 p 185). Tolmie, 2 days earlier (19 May), on Columbia River downstream from Sauvie Island: "Coasted along right bank, on which several small vultures seen, tearing their prey" (ibid. p 182). Tolmie's observation of condors helps to identify PS Ogden's autumn 1830 observation of "foul birds" (see previous paragraph). The malaria outbreak of 1830 and several years thereafter, including 1833, depopulated all Columbia River villages, including the Cowlitz (Boyd 1999).

- 22 May 1833, Cowlitz River, about 18 river miles from mouth, near the "forks of the Cowlitz" (junction with Toutle River): "Arrived about 11 at a deserted Indian village and startled some large vultures, who hovering above at length perched on the neighboring trees, awaiting our departure...fired twice at vultures" (Tolmie 1963 p 186). Seen at close (gunshot) range, large and small species of vulture differentiated.

- 24 Nov 1834, Fort McLoughlin, near present-day Bella Bella, British Columbia:
"Monday, November 24: After breakfast went to the lake, coasted it in the canoe through (sic)....saw on the rocky islet 4 swans - tried to land near them but they flew away. What I supposed a large species of vulture at the north end, along with some white headed eagles attracted probably by dead salmon." (Tolmie 1963, p. 293). In his writings, Tolmie reveals a meticulous observer with an active enquiring interest in flora and fauna, medicine, science, agriculture, native culture and languages; he was familiar

with Bald Eagle; however, he could not name many birds, all of which were new to him, spoke of need to refer to Wilson's Ornithology, but distinguished large and small crows, large and small pigeons, as well as large and small vultures (ibid., pp 196ff, 292).

Tolmie mentioned the Bella Bella native belief in Thunderbird as cause of thunder and lightning (ibid. p 292).

JK Townsend, ornithologist:

- specimen shot, April 1835 Willamette River Falls, near Oregon City, OR: "In a journey of exploration which I made to the Willamet (sic), in the month of April, when the river was crowded with Salmon, making their way up against the stream, urged by an abortive (sic) instinct to pass the barriers of the thirty feet fall, I observed dozens of Turkey Vultures constantly sailing over the boiling surges, with their bare heads curved downwards as if in search of prey. As I gazed upon them, interested in their graceful and easy motions, I heard a loud rustling sound over my head, which induced me to look upward; and there, to my inexpressible joy, soared the great Californian, seemingly intent upon watching the motions of his puny relatives below. Suddenly, while I watched, I saw him wheel, and down like an arrow he plunged, alighting upon an unfortunate Salmon which had just been cast, exhausted with his attempts to leap the falls, on the shore within a short distance. At that moment I fired, and the poor Vulture fell wounded...." (Townsend 1848).

- No date, Fort Vancouver, WA: "I once saw 2 near Ft. Vancouver feeding on the carcass of a pig that was dead", in letter from Townsend to Audubon (Audubon 1839).

- spring and summer, 1835, Columbia River: seen "in abundance" (Townsend 1848); location general, not mapped.

- No date or location: Townsend writing to JJ Audubon of his experience with condors, of their "strutting over the ground with great dignity; but this dignity is occasionally lost

sight of, especially when two are striving to reach a dead fish, which has just been cast on the shore." (Audubon 1839). This vivid description is suggestive of a first-hand observation, not hearsay.

- No date or location: "On the upper waters of the Columbia the fish intended for winter store are usually deposited in huts made of branches of trees interlaced. I have frequently seen Ravens attempt to effect a lodgement in these deposits, but have never known the Vulture to be engaged in this way, although these birds were numerous in the immediate vicinity." (Audubon 1839). This and the previous account seem to represent discrete occurrences; they contain no usable dates or geographical information, but they give an impression of the frequency of Townsend's first-hand encounters with condors in the Northwest. Townsend's competence and familiarity with condors, other raptors, etc., was elsewhere established.

Titian Peale, ornithologist with the Wilkes Exploring Expedition:

- September 1841, Willamette R. OR: "Cannot be considered a common bird in Oregon; we first saw them on the plains of the Willamette River...much more numerous in California, from the fact that the carcasses of large mammals are more abundant, which they certainly prefer to the dead fish on which they are obliged to feed in Oregon and all the countries north of the Spanish settlements..." (Peale 1848; <http://www.sil.si.edu/digitalcollections/usexex/>). "Plains of the Willamette" refers to the grasslands as far south as Eugene, which the Indians burned to set back or retard, succession to forest (D Marshall, biologist and author *Birds of Oregon*, pers. comm. Nov 2005). Peale was an experienced ornithologist.

- 24 Sep 1841, north of Rogue River, OR: "We saw today golden wing woodpeckers (red var.), Ravens, Crows, Stellar (sic) and Florida Jays, California Vultures, and a few larks. The country was mostly burned by the Indians..." (Peale 1957). Regarding location, the next day (Sep 25) Peale reached the Rogue River.

PJ De Smet, Catholic priest:

•week of 4 Sep 1845, Canoe River, source of the Columbia River, interior British Columbia: "On arriving at the two lakes, I saw them covered with swarms of aquatic birds—coots, ducks, water-fowl, cormorants, bustards, cranes, and swans; whilst beneath the tranquil water lay shoals of salmon in a state of exhaustion....I saw them pass in great numbers, cut and mutilated, after their long watery pilgrimage among the rapids...In the absence of man, the grey and black bear, the wolf, the eagle, and vulture assemble in crowds, at this season of the year. They fish their prey on the banks of the river, and at the entrance of the lakes; --claws, teeth, and bills serving them instead of hooks and darts" (De Smet 1978 p 130-31). De Smet, probably no naturalist, provided no details about these "vultures." I was more doubtful about this sighting than any in this study, but, in the 1800s before global warming, the probability of Turkey Vultures occurring in the Canoe River area or at that latitude at any time of year was almost nil (see Methods, text this study).

Roselle Putnam, pioneer settler:

•Winter 1851-2, Upper Umpqua R, OR, near Yoncalla: "the largest wild bird in the country is the vulture which is only an overgrown buzzard ... I saw one measured which I think was between ten and eleven feet from the point of one wing to the point of the other." (Putnam 1928, letter of 9 Feb, 1852). In a previous letter, she had commented on the poisoning of "wolves": "there has been a great many of them killed this winter [1852], in this neighborhood with strycknine, Charles (her husband) put out upwards of 30 doses of it. and I suppose every one killed a wolf...have seen two that died near the house." Wilbur classified this specimen as "shot" (1978 p 72), but retracted that conclusion in 2008 (Wilbur pers. comm.; unpublished). It is highly likely this condor was poisoned.

JG Cooper, ornithologist:

- 1854, Lower Columbia River: "In January 1854, I saw, during a very cold period, a a bird which I took for this [a condor], from its great size, peculiar flight, and long, bare neck, which it stretched out as it sat on a high dead tree, so as to be scarcely mistakable for any other bird." (Cooper and Suckley 1860 p 141). Note characteristics eliminate *Cathartes*, and time of year (*Cathartes* absent).

TE Wilcox, Brigadier General, Surgeon, US Army:

- Fall 1879, Boise City ID: "In the fall of 1879 I came upon two which were feeding on the carcass of a sheep. They hissed at me and ran along the ground for some distance before they were able to rise in flight. They were much larger than turkey buzzards, which which I was quite familiar, and I was very close to them so that I could not be mistaken in their identity. The cattle-men said that the California vulture or buzzard was not uncommon there before they began to poison carcasses to kill wolves" (Wilcox 1918).

CH Merriam, M.D., Head of Bird Section, US Department of Agriculture:

- Sep 30 1897, Coulee City, eastern WA: "In the early morning of September 30, 1897, Dr. Merriam saw a condor on the ground in open country a few miles east of Coulee City." (Jewett and others 1953 p 160). No details provided; letter to Jewett 4 Jan 1921. Jewett. Merriam's authority, profession, and competence are assumed.

G and H Peck:

- 1903, near Drain, OR: George Peck saw 2 condors on 1 Jun 1903 - "They were at great height and I could not have identified them if I had no often seen them in Los Angeles County, Cal." (Peck 1904). This is 1 of only 2 sightings at a distance, but observers experienced and competent.

- 1903, near Drain, OR: "several" condors seen during the month of June (ibid.).

- 1903, near Drain, OR: 2 condors on 4 July 1903 flying high, related by Henry Peck, son of G Peck, to Finley (1908); this seems to be a duplicate of the 1 Jun record, and is not graphed or mapped. The 1 Jun 1903 record is one of only 2 observations of condors at a considerable distance in this paper.

- March 1904, near Drain, OR: H Peck, "I saw 4 condors which were very close to me, almost within gun shot. I recognized them first by their size, and second by the white feathers under their wings" (ibid.). Note plumage details provided, condors seen in one instance at very close range, and were seen repeatedly. Finley, who was familiar with nesting condors in California, wrote that the Pecks were "both reliable ornithologists, and both well-acquainted with the bird in southern California." (ibid.). Drain is 7 miles from Yoncalla where condors were seen in 1852 (see entry for Putnam above), also observations by Douglas in 1826, Peale in 1841, and B Brown in 1930s (see text) in this vicinity.

- late 1800s or early 1900s, coast of southern Oregon: H Peck also reported to Finley that a condor was "killed on the coast of southern Oregon a number of years ago" (Finley 1908). No details, reliability of Peck established, but information likely second-hand.

J Fannin, curator, Royal British Columbia Museum:

- Sep 1880, Burrard Inlet, Vancouver BC: "In September, 1880 I saw two of these birds at Burrard Inlet [mouth of Fraser River]. It is more than probable that they are accidental visitants here." (Fannin 1891). Note professional position, competence as published naturalist.

- Sep 1896, west of Calgary Alberta: "two fine condors" seen in Bow River valley between Calgary and the Rocky Mountains; "I was not aware that this bird was found east of the Rocky Mountains, or so far north" (Fannin 1897). Fannin a professional

ornithologist, birds seen well; note his own surprise at what he saw. Note supporting context: multiple Blackfeet records of *omaxsapitau* in Alberta and Montana (Schaeffer 1951); can no longer be considered "startling" (Harris 1941) or deserving of being automatically dismissed for lack of specimen (Macoun and Macoun 1909); Wilbur's (unpublished) rejection of the record on the basis of a letter 30 years later, in my opinion, is not sufficient to negate Fannin's record.

British Columbia, Fraser River delta:

- "Mouth of Fraser River" no date: Lord (1866). "During his wanderings in British Columbia, Lord (1866) recorded this species at the 'Mouth of Fraser River'" (Campbell and others 1990). No details; Lord a published naturalist.
- "Seen on Lulu Island, no date, as late as 'three or four years ago' [late 1880's] by Mr. W. London. 'None seen since, used to be common.'" (Rhoads 1893). Details lacking; no information on London, relying on Rhoads, an ornithologist. Note other records at mouth of Fraser River, weight of evidence, context.

DM Hines, author, ethnographer:

- Vicinity of Celilo Falls, Columbia River east of The Dalles, 1910: photo of Wyam shaman with condor feather, junction of Deschutes and Columbia Rivers, or Celilo. Curtis photo North American Indians, vol 7, folio plate 20, in Hines (1991 plate 5); photo available online at www.memory.loc.gov/award/iencurt/ct07/ct07010v.jpg. Corroborates Wasco oral history of condors at Celilo Falls (K Smith, pers. comm. 2004; Spilyay 2001; Aguilar 2005; D Moen pers. comm.). Condor feathers were a symbol of power and not an article of trade, but were earned or could be gifted within the kinship group (K Smith, pers. comm.).

John Krussow (surveyor, retired, Mt Hood National Forest, Hood River, Oregon):

- December 1964 to March 1965, Mount Hood, upper Clackamas River area: 3 condors seen almost daily for four months, as many as 70-80 sightings, roosting in the morning on a rock outcrop overlooking the Collowash River; necks long, bare; heads red-orange-yellow, neck paler; did not note any birds with brown heads; huge size, "magnificent", larger than the Turkey Vultures he saw on a visit to the site with D Moen and myself in Sep 2006; stated that wings were held out-stretched, drooping, little white noted; said they seemed to be testing the air for lift; left roost by 9-9:30 a.m.; when the wind "seemed right", jumped off and dropped 75 feet before "catching" the air; flew off to southeast toward Mt Jefferson. Note: 3 condors were seen attending a carcass at Mt Jefferson; and 3-4 condors seen nearby on the Clackamas River (see following entries for Ken Smith); per Krussow, presence of the birds was known to area loggers, who called them "the California Condors" (J Krussow pers. comms. 6 May, 9 Sep 2006). Note absence of *Cathartes* in mid-winter.

Ken Smith, Wasco tribal member, Corbett, Oregon:

- 1947 Gresham OR: a single condor roosted in a tall live Douglas-fir *Pseudotsuga menziesii* for 2 summers on the farm he grew up on; said neighbor shot at it with shotgun but without effect; saw it roosting and flying; noted large size, white underwings, mentioned wings horizontal in flight, not dihedral like Turkey Vulture; visiting Indians from Warm Springs Reservation also saw the bird, said it was a "thunderbird", a good omen (pers. comm. 2004).
- Early summer, probably June, 1950s or 1960s, east slope of Mt Jefferson OR: On the Warm Springs Reservation, saw 3 condors at close range, "each perched on a different limb" of a large snag 150 feet away, after which he came upon a winter-killed elk in snowbank on a north-facing slope, on which a flock of Ravens *Corvus corax*, 3 Bald and 2 Golden Eagles were feeding, Turkey Vultures also present; of the condors, saw large size, bald head, some of the bare neck; emphatically said different from Turkey

Vultures; observer very knowledgeable about birds, including raptors and small songbirds, familiar with area geography (pers. comm. 2004); reinforces previous entry (Krusow) of 3 condors leaving roost on the Collowash River in southeast direction toward Mt Jefferson, December 1964 to April 1965.

- Summer, mid-1960s, between Napavine and Centralia WA: 1 condor seen on the ground in a pasture, 3 on a wooden fence across the pasture 300 feet away; stopped car and the bird on the ground flew up on the fence, white underwing seen, noticed others on the fence, a total of 9 birds; did not see what on the ground had attracted them (pers. comm. 2004); familiar with Turkey Vultures, eagles, etc, these larger; mentioned his excellent eyesight.

- 1950-1965, Clackamas River: fished regularly in that area every summer for many years as a young man, new roads gradually opening up the back-country, regularly saw up to 4 condors sitting on boulders in the river, half a mile east of its junction with Collowash; at close range, noted white in wings, large size, and that "sometimes they'd flush, and had difficulty getting up, flew against the wind coming upriver"; mentioned seeing Mountain Goats *Oreamnos americanus* that used to be in the area (pers. comm. Feb 2008). Smith was very familiar with the back-country wilderness of Mount Hood at that time; also knows the Wasco oral cultural history of the area.

- 1950s, Mt Hood: 2-3 seen on several occasions in higher elevation meadows, "used to go up there just to see them", sometimes at very close range, feeding on "wild cranberries" (late summer), near enough to hear the sounds of their wings ("swoosh, swoosh, swoosh"), called them "the big birds", familiar with Turkey Vultures, eagles, etc. (pers. comm. 2007). Location not specified, not mapped.

Russ Charley:

- 1980s, in autumn, Warm Springs Reservation, central Oregon, south of Kahneeta: "15-

20 years ago" Charley saw a large bird on the ground about 400 yards away, eating something (thought a dead animal), no markings noted, only that it was "larger than Turkey Vulture", not Golden or Bald Eagle, "never saw anything like it before", described the bird as "enormous", with size relative to the surrounding sagebrush, familiar with the flora and fauna of the area (R Charley, Wasco tribal member, pers. comm. 18/09/2006). Record plausible, probable, though less than conclusive, no non-arbitrary reason to dismiss.

Bill Brown:

- 1930-1935, Umpqua Mountains, OR: As a young man, Brown worked summers (1 Jul-15 Oct) as state fire lookout in the Umpquas (White Rock, Dutchman Butte, Silver Butte, N. Sis lookouts), saw single condors "multiple times" flying below the level of lookout tower; observed ruffs, white wing markings; lookouts at neighboring towers radio-phoned each other to "pass off the sightings from one tower to the next"; he met and talked to J Nisbet, author of Visible Bones, at meeting of Spokane Audubon Society, 4 May 2005, skeptical and not easily-persuaded, who found his account "convincing" (J Nisbet, pers. comms. Feb 2006, Feb 2008), sightings corroborated by several observations in the same area over 110 years (see text). "N. Sis" (North Sister) is in a different part of the state; there is little corroboration for that location except that according to Wasco oral history condors were known from the Three Sisters (K Smith pers. comm.). Only the 3 lookout locations in the Umpqua are mapped in Figure 3.

James Fraser, Sto:lo First Nation:

- Fraser River, British Columbia: James Fraser of Seabird Island, Sto:lo First Nation, BC, saw "a large bird", "bigger than an eagle", north of Spuzzum, on the Fraser River, about 1935 (Sonny McHalsie, Biologist, Sto:lo Nation, pers. comm. Apr 2006). No further details available. Identified in Figure 3 as lacking details, unconfirmed.

E Saluskin, native american:

- Early 1800s, probably autumn, Sahalie-Tyee Lake, Indian Heaven Wilderness, Gifford Pinchot National Forest: "Ellen Saluskin's great grandfather saw a 'huge black bird' that landed and began to devour a half-dressed deer. 'It had eyes like fire. It appeared enormous. Its beak was long and yellow and it was constantly opening and shutting its beak.'" He carried a condor tail-feather as talisman the rest of his life. (Transcript of interview taken by Cheryl Mack, US Forest Service archaeologist, Mt Adams Ranger District, Trout Lake, WA pers. comm. 22/05/06; Mary Schlick email 17/03/06). Note description, appropriation of hunter-killed big game, suggestive of condor.

Jaqueline Cook, native american:

- mid-1930s, Columbia River, Colville Reservation: Cook's father, a rancher, saw a condor on Columbia River, Colville Reservation, between present-day Coulee and Chief Joseph Dams, near the latter, 1930s (Coulee Dam under construction) (J Cook pers. comm. May 2006). No details available; context of other Indian observations in 1930s; no reason to reject, Indians usually reliable, referred to me by M Schlick, authority on native basketry of Columbia River Indians and author, friend of informant; unconfirmed), mapped as lacking details in Fig. 3.

J Smartlowit, native american:

- 1920 and 1940s, Mt Adams, WA: Josephine Andrews Smartlowit (born 1914) saw pachanahoo or canahóo (condor) as a child at Howard Lake, northeast of Mt. Adams (therefore in 1920s); "last time I saw it when G. Mo. living; camping at Howard Lake, Jim Kwiyal and Otis Shiloh saw it; when she was about 28-30 years old (thus 1942-1944 or 1947-1949); "bald headed, like turkey but smoother; like k'shpali (Turkey Vulture)...much bigger than k'shpali but almost same; black & brown; no white on wing; sitting on horse, he could look you in eye standing." From interview 11 May 1977

with Eugene Hunn, Department Anthropology, University of Washington, Seattle (pers. comm. Jan 2006). Note comparison with Turkey Vulture; seen by several observers.

Nez Perce:

- Idaho, Nez Perce oral history: "Qu'unes [condor] said to be in the area of Seven Devils Mountains [wilderness] and Hells Canyon" (Josiah Pinkham, Nez Perce cultural office, pers. comm. 2006). Named, no details, mapped as such in Figure 3.

Lila Walawitsa, native american, Toppenish, WA:

- 1890s, Mt Adams: Lila Walawitsa, of Toppenish, WA, on 14 February 1977 recalled that her father spoke of how pach'anhúy (condor) occurred at Potato Hill, north of Mt Adams, probably 1890s (Gene Hunn pers. comm. Jan 2006).

Blackfoot and Cree records of *omaxsapi'tau* ("big eagle"), Montana and Alberta (Schaeffer 1951):

- George Bull Child: Blackfoot reservation about 1908, 2-3 seen, "dark in color and about 4 feet high."

- "Older Piegan, in 1945 or thereabouts, identified the species by its native name and recalled that it had visited the region at an earlier period", a corroboration of the preceding (ibid. p 183).

- "Lewis Bear Child (a Piegan)...stated that about the period 1907-08 some Gros Ventre Indians of the Fort Belknap Reservation wrote Piegan friends that a great bird had been sighted in their part of north-central Montana"; considered a bad omen--next year an earthquake occurred (ibid. p 183).

- Raven/Big Crow: winter 1897, Little Badger Creek, Blackfoot Indian Reservation, near Browning, MT: "immense dark-colored bird with a feathered ruff and bald head",

thought at first from a distance it was a cow; numerous accounts, this one from Richard Sanderville, age 82 circa 1945; the year 1897 "became known as 'that in which Big Crow saw the omaxsapi'tau'"; "Big Crow was not familiar with the species or with its native name" at the time (ibid. p 183).

- Chewing Black Bones, according to his father Tail Feathers Coming Over a Hill, on a raid against the Crow, west of Crow reservation, southeastern Montana, 1860s, reported seeing "a very large bird flying directly before them. Its wingspread and length of tail exceeded those of the eagle...Heavy Runner ...warned his companions, saying 'I have never seen a bird of this kind....We had better turn back'...Most of the party...returned home. Of the six that continued on, five were killed...Chewing Black Bones believed that the bird's appearance...was prophetic of misfortune"; "since Heavy Runner was killed in the Baker Massacre of 1870, the date of this raid may be set in the 1860s." (ibid. p 184).

- Dog Takes a Gun, then age 85 (1945) born on Blood Reserve in Alberta, "recalls his parents' account of an omaxsapi'tau near Calgary shortly before the time of his birth (1860s)...great size...emphasized. In feeding it was said to lean forward so far that its breast nearly touched the ground. A tailfeather described as about 2 feet in length, was dropped by this particular bird in flight and picked up..." (ibid. p 184).

- Dog Takes a Gun: "wing of another 'big eagle' killed in this region equaled, when fully extended, the distance from a man's shoulder across his chest to the fingertips of his opposite outstretched arm (about 4 feet)...in the possession of a Calgary curiosity dealer in Calgary some 10 years ago (about 1935) (ibid. p 184).

- Blackfoot record, Montana, Alberta: Rides at the Door (age 87), Piegan warrior, "one of the few surviving Piegan with a record in intertribal warfare, is said to have seen 'a big eagle' while raiding for horses (mid-1800s) somewhere to the south" (ibid. p 184). Location vague.

- According to Harry Under Mouse, his grandfather White Bear, a Cree who lived with the Blood tribe of the Blackfeet in Alberta, died 1905 about age 83 (born about 1820), a conjuror and eagle trapper who used to trap and kill eagles for feathers for ceremonial purposes "in the region south of Edmonton", about 1850, could have caught an immense bird which circled his pit trap, landed, and warily approached the bait (a stuffed coyote skin), but he was afraid of it, so he took a stick and frightened it away; "Later he described it as the largest bird he had ever seen. It was dark in color with brown-striped tailfeathers (sic). Its head and hooked beak were large and its legs coarsely scaled." (ibid. p 184-85).

- Big Eagle, Alberta Blood tribe of Blackfoot, fasted Devil's Head Mtn, nw of Calgary, Alberta, had vision and *omaxsapitau* power, occasions were related when he used it against enemies, carried tail feather throughout life, died in 1925, feather came into possession of Small Eyes, "a prominent ritualist" (as told by Harry Under Mouse) (ibid. p 187). Hard to distinguish between magic and reality in this record. It is perhaps significant that Devil's Head in the Alberta Rockies is near the headwaters of the Columbia. Probable on basis of location and the tail-feather.

- Harry Under Mouse saw stuffed body, wings and tail of a condor used as regalia in Grass Dance, kept by group of Cree, from the Hobbema Reserve south of Edmonton, Alberta "as late as a decade ago" [about 1935], presumably killed by them in the past, (ibid. p 187).

Source unknown:

- Specimen, prior to 1856, Probably "Nord-Ouest Cote d'Amerique": Specimen labeled "Aquis par exchange du Musee St. Petersbourg en 1856"; "*possibly* was taken by Pallas. I infer this by the fact that there are several other birds here which were received in exchange the same year from the same source. They are all by Pallas from 'Nord-Ouest Cote d'Amerique'" (Pacific Northwest coast) (Harris 1941 p 19). "It is of course entirely

possible that...the St. Petersburg specimen referred to above, even though a juvenile, may have been taken on the coast even farther north." (ibid. p 21). Location vague, possibly British Columbia, but also possibly from coastal California; record not included in this study.

- Specimen, early 1800s: "Cathartes Californianus. A specimen from the Oregan (sic), the second known in any collection." (Bonaparte 1827 p 49; Harris 1941 p 19). ("The Oregan" is the Columbia River.) Location probably valid, but very imprecise and not mapped.

N Wallulatum, Chief of Wasco tribe:

- No date or location: "I did find my original notes from the meeting with the Wasco elders. Nelson Wallulatum's exact comment was: 'We kept big [condor] babies in camps to keep thunder and lightning spirit from striking.' 11/11/89. Warm Springs. That is taken directly from my handwritten notes, however in my transcription typed when I came home, I write: '...Said they kept a chick tied in camp to keep away thunder and lightning spirits.' I suspect that I would not have written that it was tied if he had not said that." (Mary Schlick pers. comm., email 17 Mar 2006). Observation qualitative, not mapped or tabulated, implies nesting in Pacific Northwest.

Demers:

- Cowlitz and/or lower to mid-Columbia River, 1840s: "the Vulture, said to be from California, a bulky black bird, very voracious, noted for the keenness of its sense of smell. Alluding to this quality, the natives call it *iakessitlnos*, who has a sharp nose. The odor of a carrion attracts it from a great distance. It gorges itself so well...that it is then impossible to start flying; and then a club suffices for killing it. The feathers...are much sought after by the aborigines." (Demers and others 1956). T Johnson, Grand Ronde tribal biologist uses the term *iakessitlnos* for condor (pers. comm.); K Smith

(pers. comm.) said *iakessit/nos* might be Chinook jargon for Turkey Vulture, though it appeared to Smith, Johnson, and myself independently that most of the characteristics given in the account describe condors better than *Cathartes*--'bulky', "voracious", "feathers much sought after", "unable to fly after gorging", "said to be from California", all of which were generally understood of condors in the 1800s. "Unable to fly" when gorged is characteristic of condors (Douglas 1829) already near the mass limit for flapping flight, more so than Turkey Vultures (Snyder and Schmitt 2002 p 5). The Chinook word *iakessitl'h* means "sharp" in the sense of "cutting", rather than pertaining to smell or taste (Gibbs 1863; Thomas 1935; T Johnson pers. comm.; K Smith pers. comm.), and *nos* is nose, beak, or prow of a boat (Shaw 1909; T Johnson pers.comm.), rather than nose for smelling (*e'-meets* in Chinook [Long 1909]). It could be that Demers and others, hampered by a language barrier and relying on information from natives, merged characteristics of two vulture species into one. Whether condors have a sense of smell or not is a basic unresolved question of condor biology, with management implications.

FIGURE CAPTION.

Figure 1. Records of condor sightings by month.

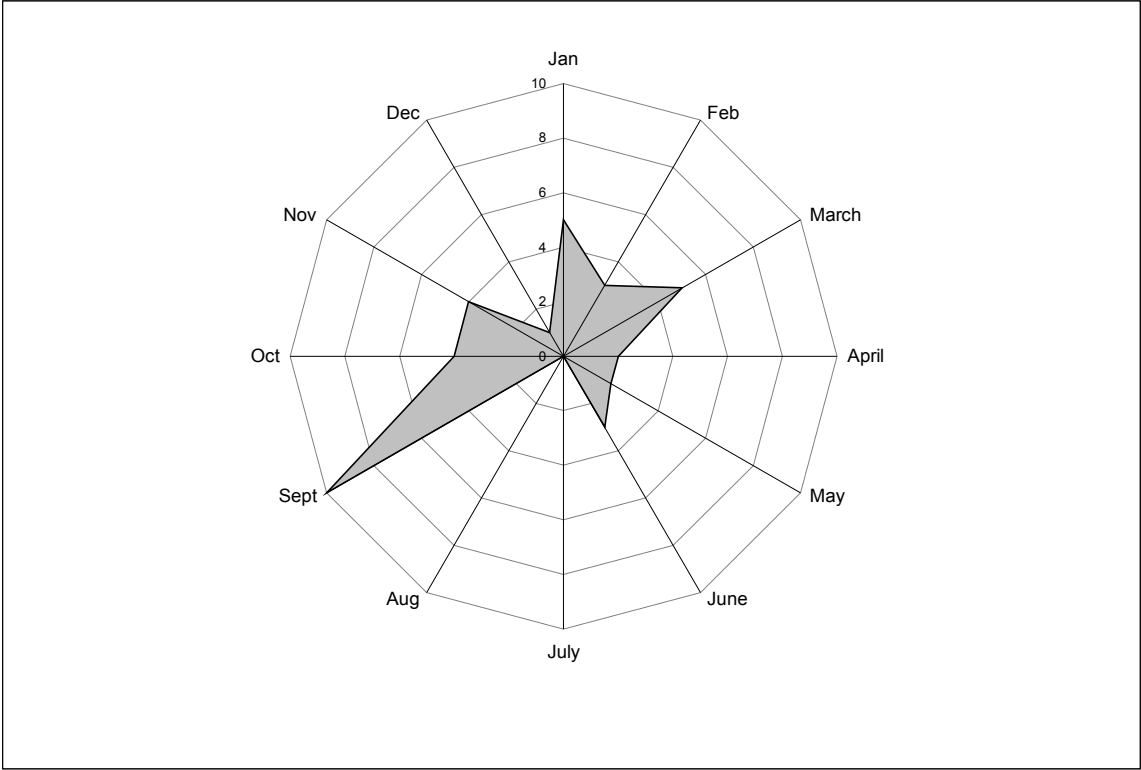


FIGURE CAPTION.

Figure 2. Records of condor sightings by season.

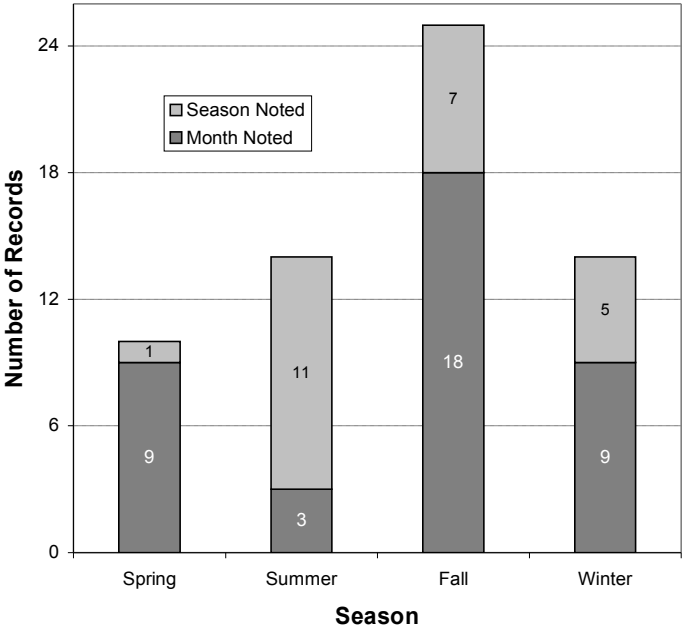


FIGURE CAPTION.

Figure 3. Locations of California condors observed in northwestern North America.

