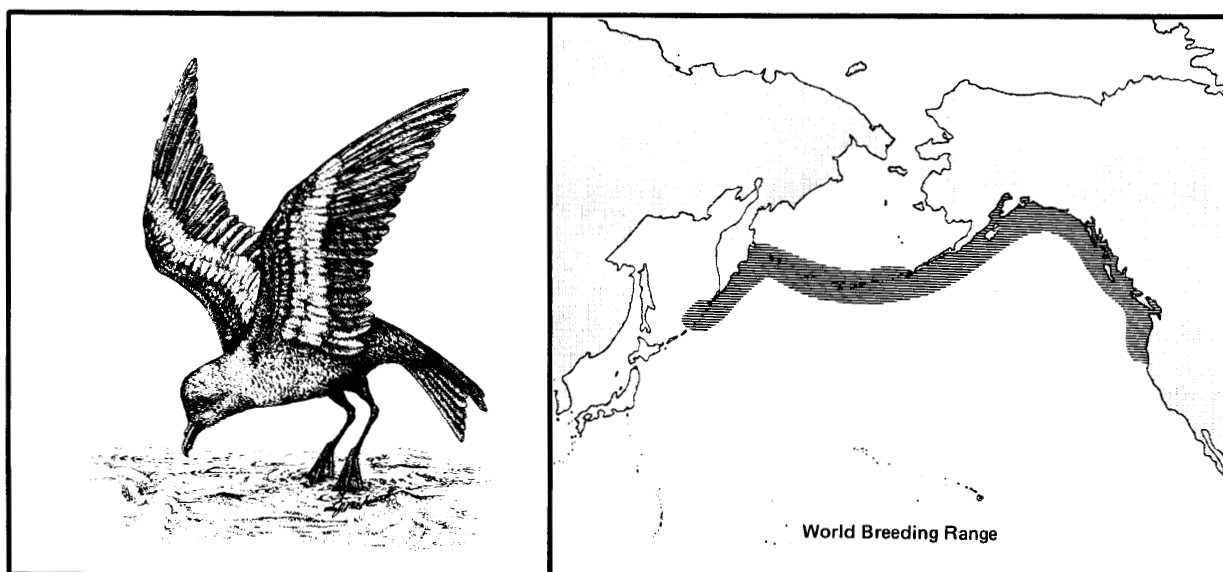


SPECIES ACCOUNTS



Willoughby Rock (174017) 19 June 1979 S.M. Speich.

Fork-tailed Storm-Petrel (*Oceanodroma furcata*)



Fork-tailed Storm-Petrels are among the smallest seabirds, yet they range far from land over the mid-ocean waters. They usually feed on surface plankton, but they follow fishing vessels and forage on oil and offal when the opportunity arises. They are abundant over large areas of the cooler waters of the North Pacific and are frequently seen over the outer continental shelf waters of Washington and pelagic waters farther offshore.

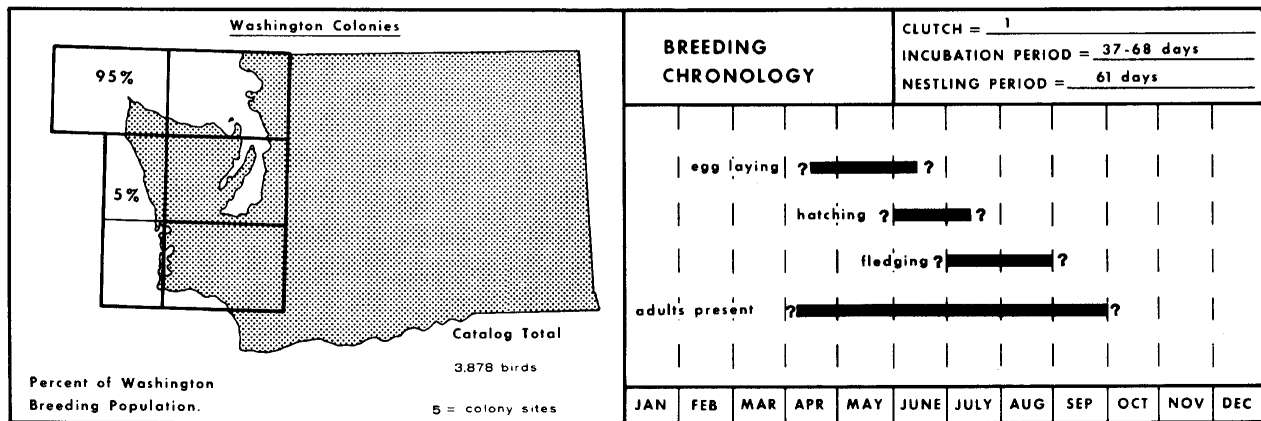
Fork-tailed Storm-Petrels breed on offshore islands where they are secure from land-based predators. Throughout their range they nest in both rocky crevices and, to a lesser extent, in burrows in soil.

To avoid diurnal predators, colony activity occurs during the darkest hours of the night. Adults mate, exchange incubation and brooding duties, and feed

chicks only during the night, remaining in the burrow or returning offshore by day. For this reason, storm-petrels are seldom seen near breeding colonies during the day. Their nocturnal habits make detection of colonies difficult and estimation of populations imprecise.

WASHINGTON COLONIES

Fork-tailed Storm-Petrels have been found breeding at five sites in Washington, all of them along the outer coast. It is possible the species is breeding at other sites, but confirmation of this is lacking because of the difficulty of surveying nesting sites on Washington's outer coast and the difficulty of finding all nests of burrowing species in general. The largest known colony is on Carroll Island where about 1,600 birds are estimated to be nesting in burrows



under grassy slopes. An estimated 1,900 breed on two of the Bodelteh Island group, and about 200 breed on both Alexander and Tatoosh Islands. On the Bodeltehs the birds nest extensively under deciduous shrub cover on north-facing slopes.

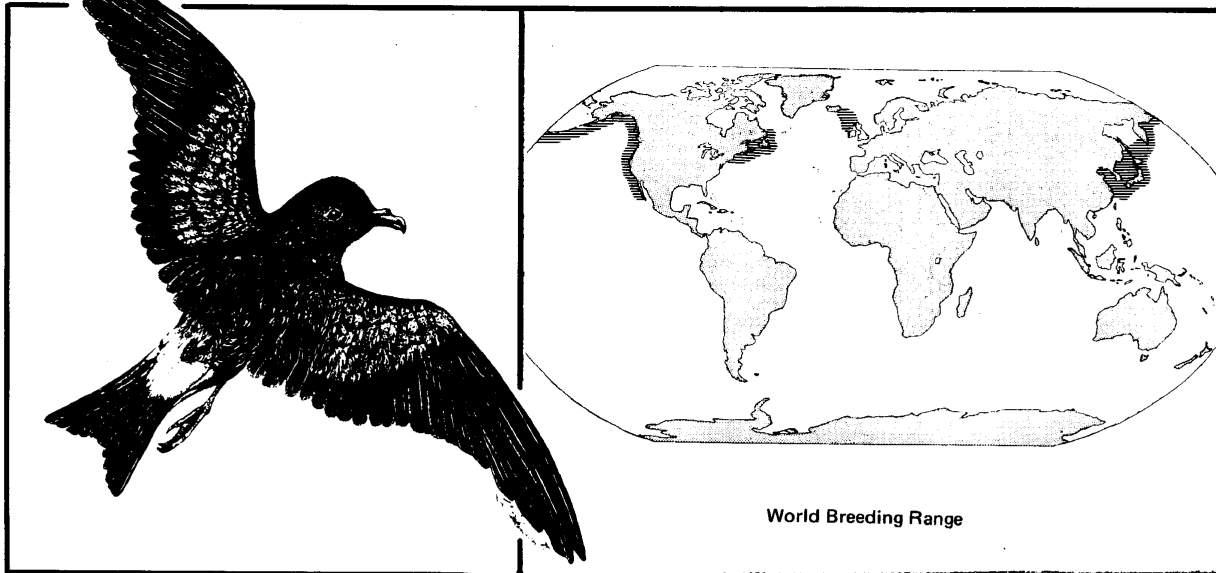
HISTORICAL STATUS AND VULNERABILITY

Virtually nothing is known of historical trends in populations of Fork-tailed Storm-Petrels nesting in Washington. Many of the seabird colonies, especially those along the outer coast in particular, have been entered only a few times during the known history of the State (some rocks with nesting colonies apparently have never been landed upon by seabird biologists), and fragmentary reports and casual estimates make meaningful comparisons impossible. However, based on recent field work surveying available habitat, we feel it is unlikely that there could be more than 3,000 additional Fork-tailed Storm-Petrels nesting in Washington.

Fork-tailed Storm-Petrels readily desert their nests if disturbed by humans during incubation or while parents are brooding recently hatched chicks. Evidence from studies of an Alaskan population shows that extremely unfavorable weather conditions or insufficient food supplies will cause parents to temporarily abandon eggs and chicks (Boersma et al. 1980). Such temporary abandonment of nests reduces viability of eggs, causes death among chicks, and lengthens the breeding season (Boersma and Wheelright 1979; Boersma et al. 1980).

These storm-petrels are most vulnerable to oil pollution during the summer months when the birds are distributed close to continents due to breeding activities (Lensink et al. 1978; Weins et al. 1978). They could be severely impacted by pollution of marine food webs at this time when they are "tied" to colony sites, though loss of prey species could have severe effects at other times. They are also vulnerable to predation at colonies by animals like river otters (*Lutra canadensis*) when colonies are close to the mainland (Speich and Pitman 1984).

Leach's Storm-Petrel (*Oceanodroma leucorhoa*)



Leach's Storm-Petrels are an abundant species with an extensive breeding range around the perimeter of the North Pacific Ocean. They range widely at sea during the nonbreeding season, with birds ranging south to tropical waters in both the Pacific and Atlantic Oceans (Palmer 1962). Although they are a numerous nesting bird on Washington's outer coastal off-shore islands, this species is infrequently seen away from the colonies during daylight hours.

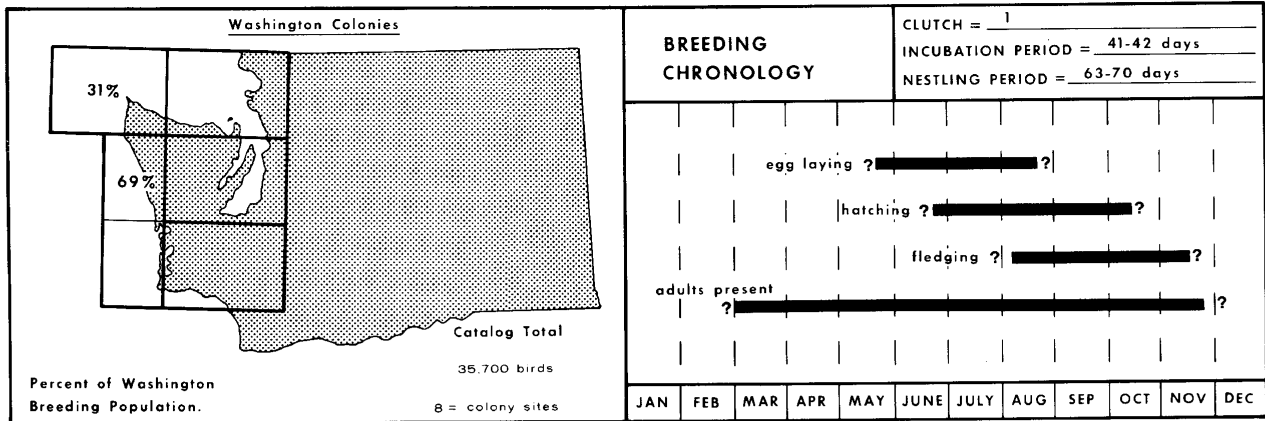
Like all storm-petrels, Leach's Storm-Petrels are nocturnal on the breeding colonies, an adaptation which reduces their susceptibility to diurnal predators such as gulls. Nests are usually located in burrows or, less frequently, in rock crevices (Palmer 1962). Like other species of the Procellariiformes, this one has a well-developed olfactory system (Bang 1966; Stager 1967), and

Grubb (1973, 1974) has suggested that these birds, which sometimes nest in forests, may locate their burrows by odor.

Like most seabirds, Leach's Storm-Petrels exhibit relatively long lifespans and low mortality rates for their size. Individuals that survive the hazardous first year of life can live up to 24 years and possibly longer (Graham 1980). Additional references on this well-studied species include Gross (1935), Ainslie and Atkinson (1937), Huntington (1963), Wilbur (1969), Harris (1974), Threlfall (1974), Ainley et al. (1974, 1976) and Morse and Buchheister (1979).

WASHINGTON COLONIES

While Leach's Storm-Petrels are known to nest in 11 colonies in Washington, there may be as many as 20 or 25 locations where nesting takes place. They burrow



under tussocks on grassy slopes, and this habitat exists where surveys have not yet been adequate or even attempted off Washington. The largest known colonies are 20,000 birds on Jagged Island and 10,000 on Carroll Island. Dhuoyautzachtahl (Petrel Rock) is estimated to have 2,600 birds nesting, Alexander Island 2,000, and while Kohchaa(uh) is listed as having "hundreds," olfactory impressions to observers approaching but unable to land on this island suggested that possibly thousands may nest there. Likewise, Cake and Rounded Islands may have thousands of nests. It is possible there may be 50,000 or more Leach's Storm-Petrels nesting in Washington.

HISTORICAL STATUS AND VULNERABILITY

As in the case of the Fork-tailed Storm-Petrel and other burrowing species, infrequent and incomplete surveys and inconsistent censusing methods make assessment of historical trends of this species difficult if not impossible. Furthermore, while they are obviously more abundant

as nesting birds, Leach's Storm-Petrels are seen much less frequently than Fork-tailed Storm-Petrels on boat trips off the coast during the nesting season, presumably because their preferred foraging habitat is far offshore and possibly because the species is more nocturnal in habits. This virtual lack of nearshore at-sea data offers no help in locating colonies or in making historical comparisons.

Leach's Storm-Petrels appear to forage farther offshore and over warmer waters than Fork-tailed Storm-Petrels (Wahl 1975). Their later nesting season in Washington is apparently a response to seasonal oceanographic conditions: the warm waters of the West Wind Drift come closest to the continent during July and August when young birds are hatching and being fed by adults.

Predators such as river otters can impact storm-petrel colonies along the Washington coast (Speich and Pitman 1984). Like other seabirds, Leach's Storm-Petrels are vulnerable to contamination by oil. While they may forage far

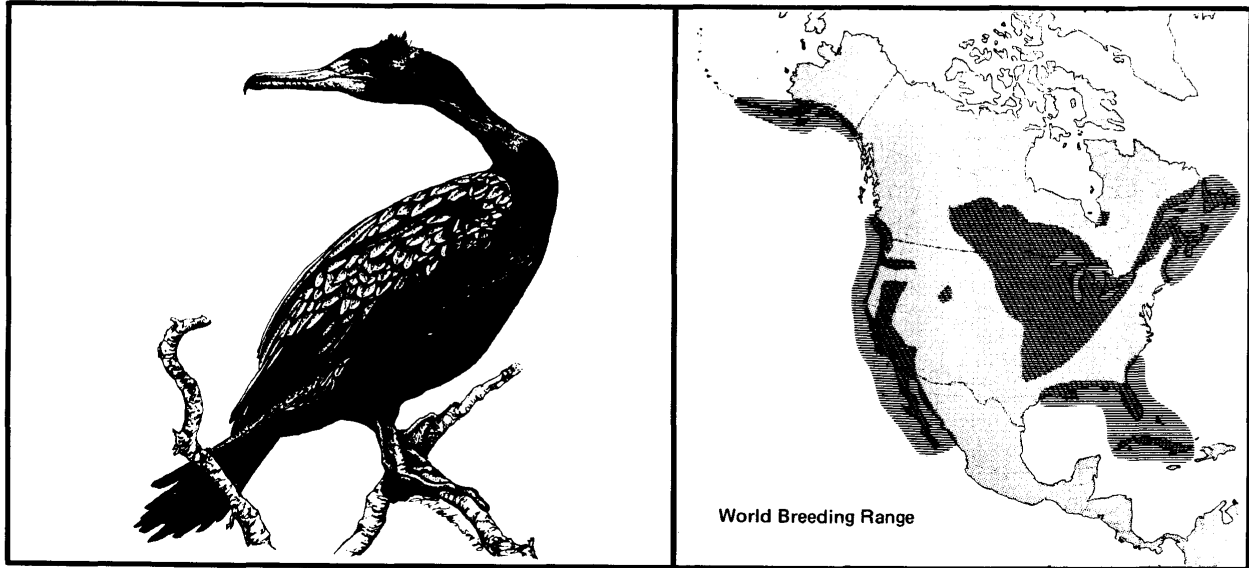
offshore during the nesting season, their use of the coastal waters is only partially known (waters near nesting colonies have not been adequately sampled), and nocturnal foraging habits would

make present sampling methods inadequate in any case. They appear to be absent from Washington waters in winter, the season of greatest storms and hazards to shipping.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Double-crested Cormorant (*Phalacrocorax auritus*)

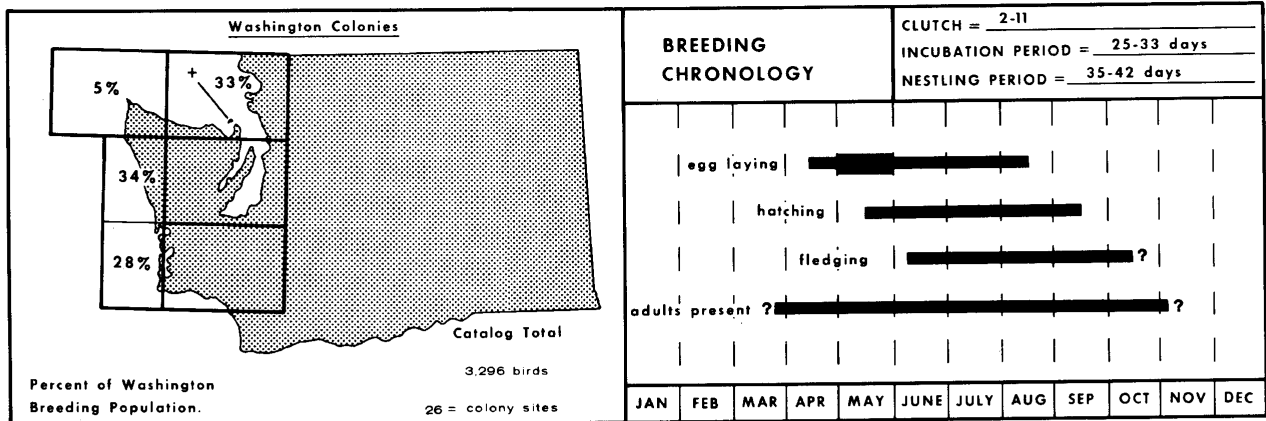


Double-crested Cormorants are the most widespread of North American cormorants. They are the only species in the United States and Canada regularly found in freshwater habitats. In Washington, Double-crested Cormorants are found breeding in limited numbers inland (Jewett et al. 1953), but by far the largest numbers breed in marine habitats near and around the San Juan Islands, along the outer coast, and in Grays Harbor.

Double-crested Cormorants nest in a variety of habitats. Along the coast they nest on the exposed tops of offshore rocks, in Grays Harbor on low sand islands around the periphery of dune grass areas, and in some areas, though not in coastal Washington, occasionally in dead trees. Those nesting inland nest in trees or snags or on islands in

lakes. This species constructs nests of sticks, with inland-nesting birds also using matted vegetation gathered near the colony.

Double-crested Cormorants are sleek and strong swimmers that prey on shallow-water fish (Robertson 1974). After their fishing sessions, they are frequently seen perched on logs or rocks, extending their wings to dry. Cormorant feathers become completely saturated during underwater swimming and require periodic drying (Rijke 1968). Many Double-crested Cormorants which nest on coastal rocks and islands feed in nearby bays and rivers on the mainland. There are impressive flights of cormorants between colonies and roosts in the San Juans and the estuaries of the Skagit and other rivers in Washington (Wahl et al. 1981).



WASHINGTON COLONIES

Double-crested Cormorants nest at about 30 locations in Washington. The marine population of about 3,300 breeding birds is concentrated in three regions. About 900 nest in Grays Harbor on Goose Island. Approximately 1,100 nest along the northern outer coast at 14 locations. Another 1,100 nest in the northern inland waters at nine locations, though three colonies at the southern end of Rosario Strait--Colville Island and its adjacent "annex," Bird Rocks, and Williamson Rocks--account for almost all the nesting population. The estimate of total nesting population size is probably reasonably accurate, though shifts in colony locations can make errors possible.

HISTORICAL STATUS AND VULNERABILITY

Cormorants are well known for moving nesting colonies from one location to another, and this is also true in Washington's marine waters. There are some locations where Double-crested and Pelagic cormorants are present each year,

but others may have large numbers for a few years and none for another period of time. Cormorants also may shift colony sites in the middle of a nesting season. The reasons for this are unknown but could relate to human disturbance in some cases.

Numbers of nesting Double-crested Cormorants in Washington appear to be increasing. However, lack of consistent censusing over time and the shifts of cormorant colonies mean that caution is required in interpreting census numbers, even in the case of large, conspicuous birds like cormorants. Changes in availability of prey due to variations in oceanographic conditions from year to year have been suggested as explanations for very large variations in nesting numbers (Ainley 1976) in California and similar cycles undoubtedly occur in Washington.

While eggshell thinning due to pesticide contamination decreased reproductive success of cormorants in California (Gress et al. 1973), this threat has not been documented in Washington. Until recent decades, cormorants were

officially persecuted as suspected predators on commercial fishes and, while policies have long been changed to protection, a bomb set off in 1980 on Bird Rocks which killed a number of Double-crested Cormorants suggests that old attitudes die hard. Since the few colonies in inland marine waters are concentrated within a very few square kilometers and are easily accessible by small boat, this type of persecution, along with disturbance due to boating, fishing, and diving, poses a potentially real danger to the birds nesting there. Human disturbance of Double-crested Cormorant colonies can be very

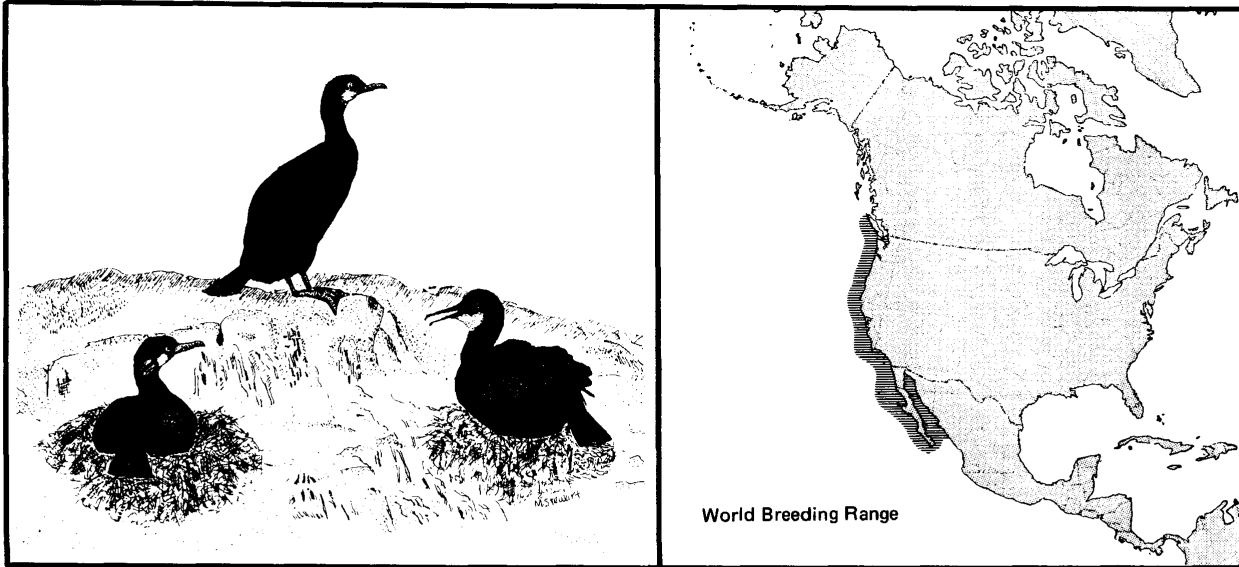
destructive (Ayers 1975). Cormorant eggs and chicks are vulnerable to gull predation when adults are frightened off their nests by human intrusion (Kury and Gochfeld 1975).

Little is known of the vulnerability of cormorants to oil, but few oiled birds have been found after spills in California (Smail et al. 1972). Cormorants are mobile, and it is likely they can avoid oil spills to some degree. Unlike many other seabirds, cormorants spend large amounts of time out of the water and would thus be less exposed to oil.

FIELD NOTES

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Brandt's Cormorant (*Phalacrocorax penicillatus*)

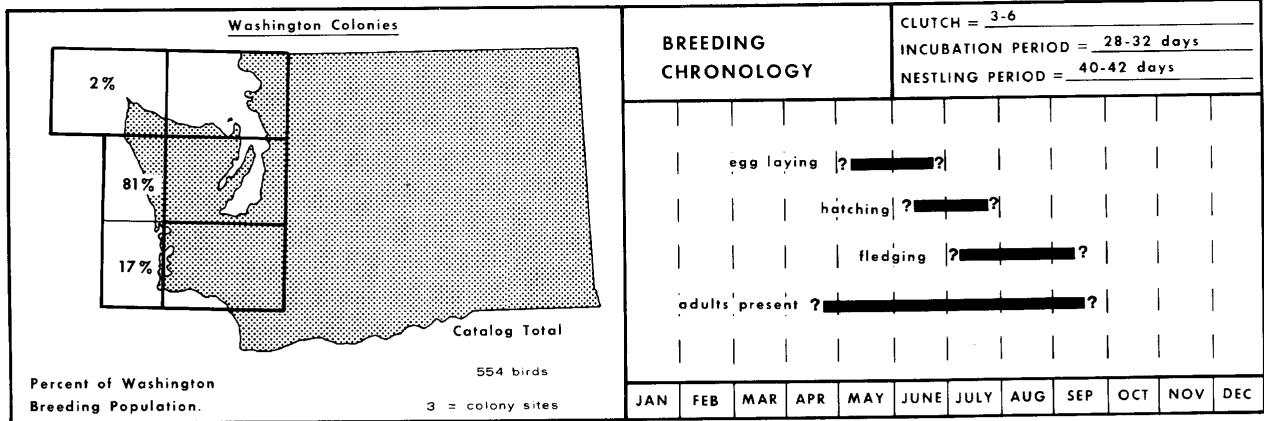


Brandt's Cormorants are among the most conspicuous seabirds in Washington waters during most of the year, but this species is one of the least numerous breeding birds in the State. Large numbers breed along the Pacific coast of Baja California, California, and Oregon. The northernmost sizeable colonies in the species' range are found on the western side of Vancouver Island, British Columbia (Hatler et al. 1978). There has been a small colony at Prince William Sound, Alaska, since 1972 (Kessell and Gibson 1978). Birds from these colonies apparently winter in the coastal waters and the deeper channels and passages of the protected waters of Washington. A few nonbreeders are found locally during the summer in the State, roosting and foraging in traditional cormorant habitats (Wahl et al. 1981).

Brandt's Cormorants usually nest on offshore islands or, less

frequently, on inaccessible mainland bluffs and wide cliff ledges near the water above the splash zone. During the breeding season, these cormorants present a striking appearance with their bright blue throat pouches and white feather plumes on the sides of their heads. At colonies, Brandt's Cormorants are opportunistic gatherers of nesting material (Hunt et al. 1979). They collect nearby herbaceous plants and pluck seaweeds from close tidal rocks. Once nests are constructed, continual additions are made, often with material stolen from neighboring nests (Palmer 1962).

Young Brandt's Cormorants are born without feathers but soon are covered with coal-black down. Nestlings feed by inserting their heads down the throats of their parents and removing partly digested fish remains.



Strong swimmers and divers, Brandt's Cormorants prey on various species of fish (Hubbs et al. 1970; Scott 1973; Baltz and Morejohn 1977). Clay (1911) reported Brandt's Cormorants caught in fishing nets at depths as great as 70 meters. These cormorants often feed in large flocks in deep waters with strong tidal currents and frequently feed with loons, gulls, murre, and other alcids (Wahl et al. 1981).

WASHINGTON COLONIES

While Brandt's Cormorants often form large colonies elsewhere, they nest in small numbers in Washington. There are only four sites recently used for nesting by this species in Washington, all on the outer coast. These include the cliffs at Cape Disappointment, Paahwoke-it, Willoughby Island, and Split Rock. The estimated total number of Brandt's Cormorants nesting in Washington is probably reasonably accurate.

HISTORICAL STATUS AND VULNERABILITY

This species apparently has never been numerous or widespread

as a breeding bird in Washington. Historically, there are reports of birds nesting at Paawoke-it and Grenville Arch and Sea Lion Rock in 1906/1907 (Dawson 1908) in small numbers.

Brandt's Cormorants are believed to have suffered reproductive failure from thin eggshells caused by accumulation of pesticide residues (Hunt et al. 1979), though whether the same situation may have occurred in Washington is unknown. Cormorants in North America have generally been affected by human disturbance, especially during the nesting season. Adults flush from their nests readily when approached by boats, low flying aircraft, or humans on foot. Once parents are away from the nests, gulls are able to prey upon eggs and chicks. Repeated disturbance can cause permanent colony desertion.

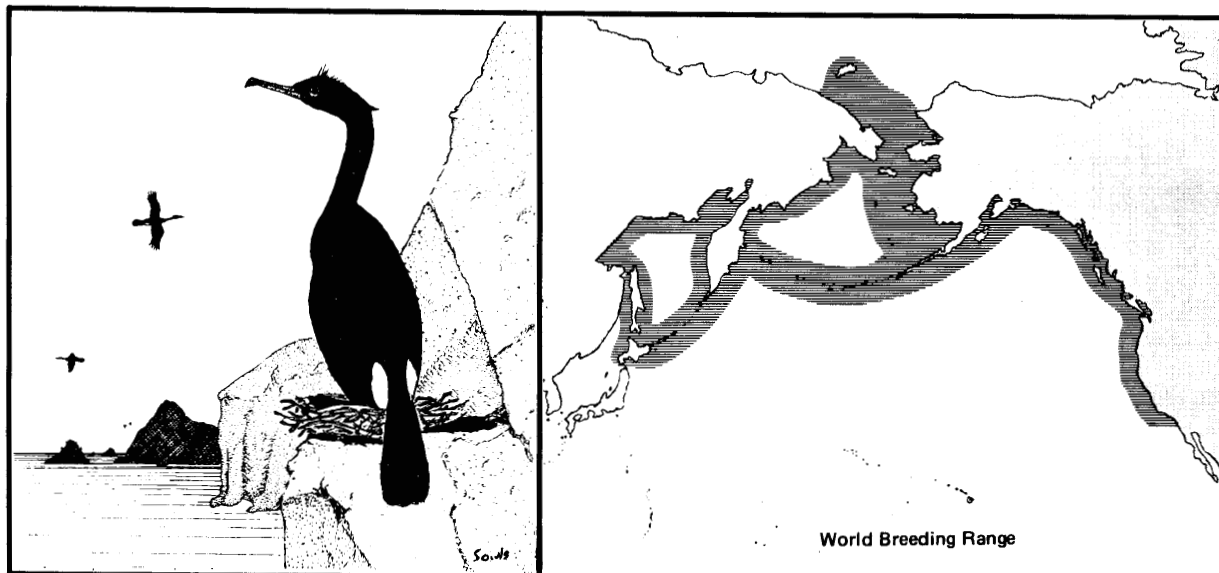
Observed cormorant deaths from oil spills are not frequent (Wahl et al. 1981), and it may be that cormorants, which spend proportionately more time out of the water than other diving birds, avoid oil spills more easily. However, the relatively low numbers of oiled cormorants found

on beaches could be due to a greater tendency of cormorants to sink because they lack the waterproof plumage of other seabirds.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Pelagic Cormorant (*Phalacrocorax pelagicus*)

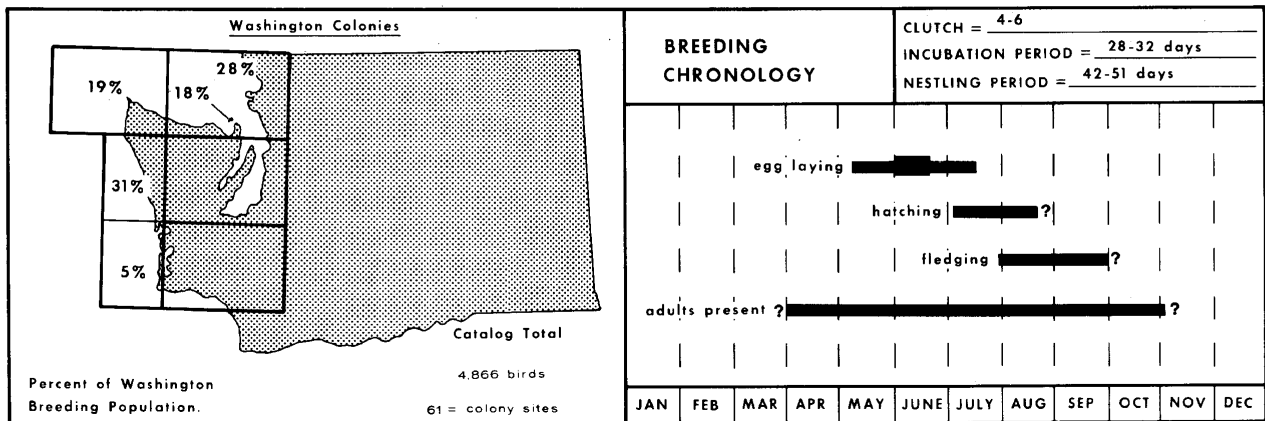


Pelagic Cormorants are the most widespread nesting cormorants in Washington and, while they are seldom seen in large flocks like Brandt's Cormorants or Double-crested Cormorants, they are commonly seen foraging in many areas along the outer coast and inland marine waters of Washington. These small cormorants can be seen at any season along rocky shorelines around kelp beds and tidal channels where they propel themselves underwater with their strong webbed feet in pursuit of fish and shrimp (Robertson 1974; Hatler et al. 1978). Clay (1911) reported that Pelagic Cormorants are capable of diving to depths of up to 140 meters.

Pelagic Cormorants nest in solitary pairs, scattered groups, and colonies of up to hundreds. While some sites appear to be traditional and are occupied each year, the locations of others may

shift from one year to the next (Benz and Garrett 1978; Nysewander and Barbour 1979). With nests anywhere from hundreds of feet above the ocean to just within the spray zone, Pelagic Cormorants raise their young in platform nests of seaweed built on small outcrops and ledges. These cliffside colonies stand out because of the summer whitewash they receive and can be seen for great distances. In Washington, Pelagic Cormorants also nest inside sea caves on narrow ledges, on vertical cliff faces, on top of dolphins (at Port Angeles), on abandoned piers, and on an off-shore navigation marker tower.

Pelagic Cormorants are often found nesting near other cormorants. In these locations, direct competition is apparently reduced by staggered nesting chronologies, by differences in nest site selection, behavior, and



in selection of food types, sizes, and feeding locations (Robertson 1974; Benz and Garrett 1978).

WASHINGTON COLONIES

Pelagic Cormorants nest in suitable locations along the entire coast of Washington, from the northern San Juan Islands and the Strait of Juan de Fuca south along the outer coast to Cape Disappointment at the mouth of the Columbia River. They nest at 63 locations, most of them on offshore rocks, islands and human-made structures; relatively few nest on mainland cliffs. While there are many small colonies, a few larger ones at Cape Disappointment, Paahwoke-it, Tatoosh, Protection, Smith, Colville, and Castle Islands make up almost one-half of the total nesting population. The total estimated nesting population is likely reasonably close to actual numbers.

HISTORICAL STATUS AND VULNERABILITY

Pelagic Cormorants were noted by the earliest of the naturalists

who visited Washington. The colony at Cape Disappointment, for example, appears to have been active for over 100 years. However, the tendency of this and other cormorant species to shift breeding locations makes interpretation of historical records, which lack simultaneous, state-wide coverage, difficult if not impossible.

This species and the Double-crested Cormorant both suffered depressed populations in the past when cormorants were not protected because they were considered a menace to commercial fishing.

Shoreline use and development pose threats to cormorants. They can be easily disturbed by any human activity near colonies. Approach to nesting birds by aircraft, boats, and humans on foot may force adults off their nests, leaving eggs and young chicks unprotected. Chicks and eggs may be knocked from nests by frightened adults, with gulls, crows, and ravens then preying on eggs or young. Eagles also visit colonies in Washington frequently and, while they are mobbed by

gulls on such occasions, they may prey on young cormorants.

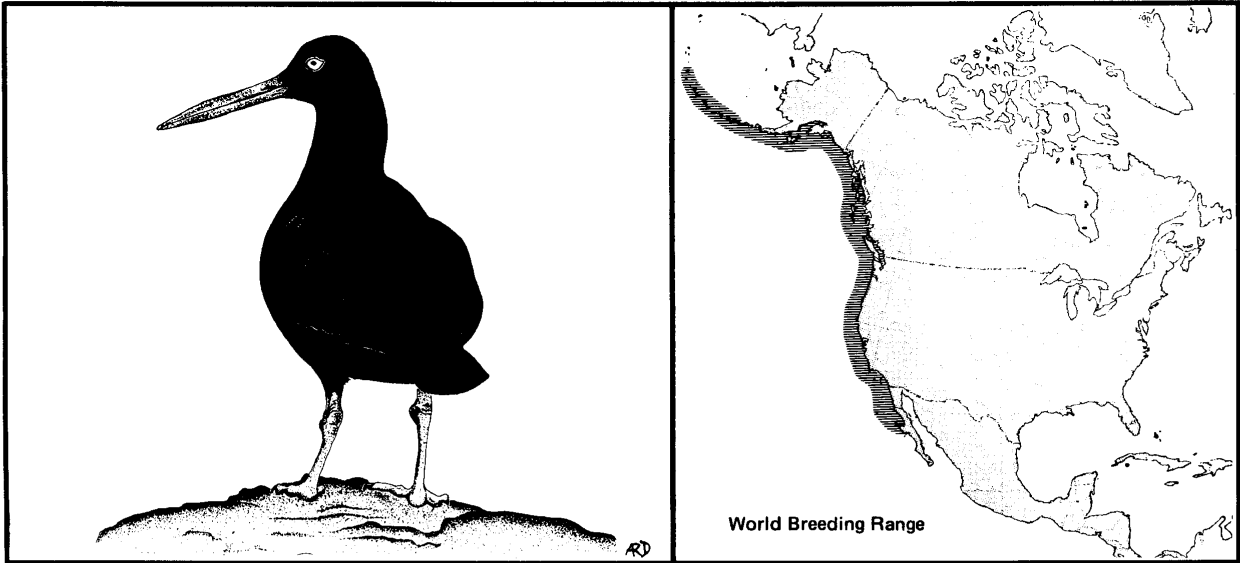
Pelagic Cormorants, like other members of the order Pelecaniformes, may be vulnerable to pesticide pollution. The eggshell thinning, egg breakage, and subsequent nesting failure and population declines experienced by other species in California (Gress et al. 1973) have not been documented for this species (Hunt et al. 1979).

Oil spills have resulted in few known cormorant deaths to date in Washington (Richardson 1956). Because of their widespread distribution and ability to shift colony sites, Pelagic Cormorant populations may be relatively resistant to localized oil slicks. Their habit of spending nights and much of the day roosting out of the water may reduce vulnerability to oil pollution (Smail et al. 1972).

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Black Oystercatcher (*Haematopus bachmani*)



Black Oystercatchers are distinctive shorebirds inhabiting the rocky shorelines of the coast from Baja California to the western Aleutian Islands. Adults establish breeding territories on offshore rocks and islands and occasionally on mainland rocky beaches. An oystercatcher nest, composed of a scrape lined with pebbles and shell fragments, is difficult to find. One to three cryptically-colored eggs are placed directly on the pebbles.

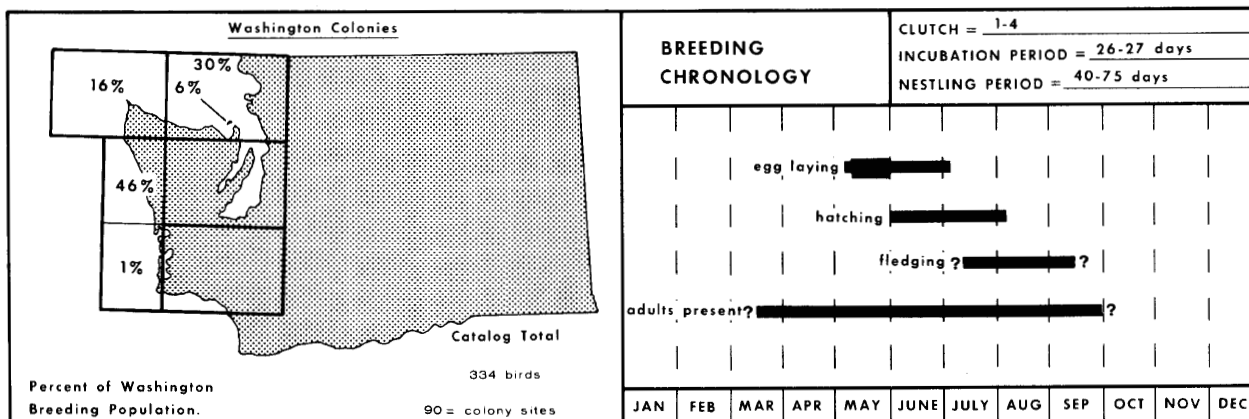
The young oystercatchers are precocial and may leave the nest within hours of hatching. Although they remain near the nest the first few days, chicks later follow adults to intertidal foraging areas. The food consists of mussels (Hunt et al. 1979), limpets, and chitons; chicks may be fed crabs (Hartwick 1976; Helbing 1977).

Mortality among eggs and chicks is apparently high. Hartwick (1974) lists gull predation as an important cause of mortality. In addition, chicks and eggs are frequently "washed overboard" from nests by storm waves.

During the winter, oystercatchers are gregarious (Wahl et al. 1981), and flocks may be found roosting in some localities. In the San Juan Islands, the entire population may gather into three or four such flocks (Wahl et al. 1981). With their strange, vermillion-colored bills, pale pink feet, and loud, distinctive calls, the crow-sized black oystercatchers are a characteristic species of exposed rocky shorelines in Washington.

WASHINGTON COLONIES

Black Oystercatchers are a non-colonial nesting species nesting



at about 100 different locations in Washington. They are usually found on the same offshore islands and rocks as colonial nesting species. They establish large nesting and feeding territories and thus distribute themselves along the available coastal habitat. While censusing nesting oystercatchers can be difficult because approach must be close enough to initiate a reaction from territorial adults, the catalog total for the inland marine waters is probably quite accurate because calm waters and limited size of the study area made coverage thorough. Numbers for the exposed outer coast are probably less accurate due to more rigorous conditions and lower sampling effort there. We feel the total breeding population for the State is unlikely to be more than 400 birds.

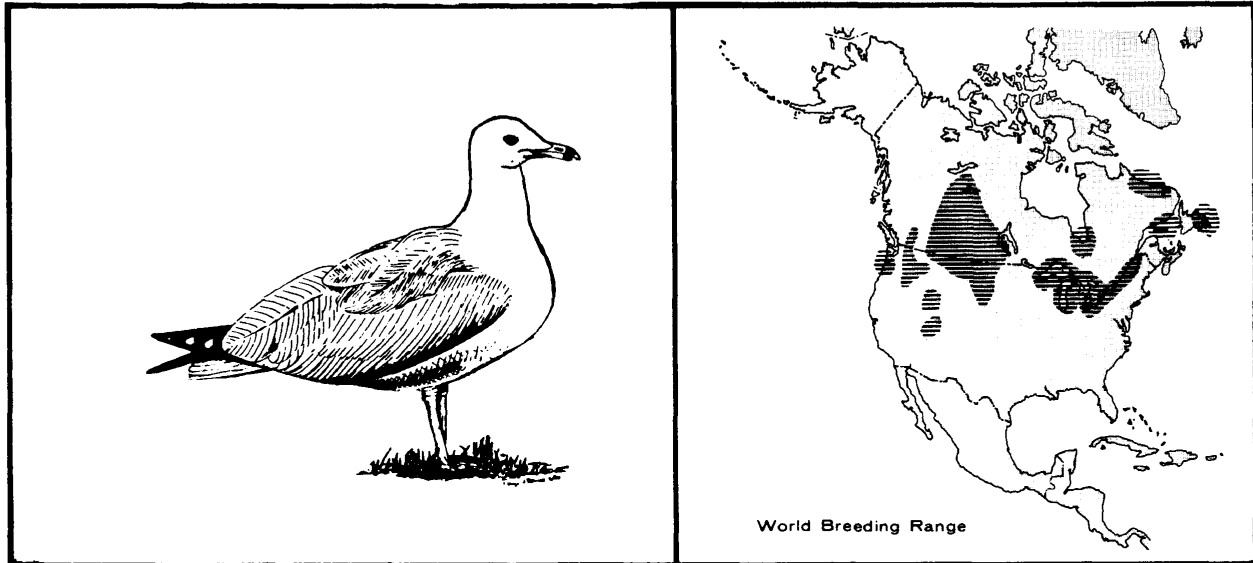
HISTORICAL STATUS AND VULNERABILITY

The Black Oystercatcher was among the first birds reported in Washington when Menzies (1792) found and ate birds on Smith Islands on 6 June 1792. Black

Oystercatcher populations in Washington have probably been relatively stable over historical time, though numbers may be somewhat higher on the outer coast due to abandonment of lighthouse stations and other human uses of islands now under refuge protection. Numbers in inside waters may have declined due to increased human activities, but reports of nesting attempts at sites where the species had previously been unreported may mean the species is reoccupying its original range or expanding into new areas.

These birds require clean and undisturbed rocky coastlines for nesting and feeding. To the extent that these areas are disturbed by humans, reproductive success will be reduced. Oil spills, which foul rocky coastlines where oystercatchers feed within the narrow band of intertidal exposure, could seriously affect their food supplies, but losses from direct oiling would probably be low. Long-term degradation of intertidal habitat would almost certainly cause population decline.

Ring-billed Gull (*Larus delawarensis*)

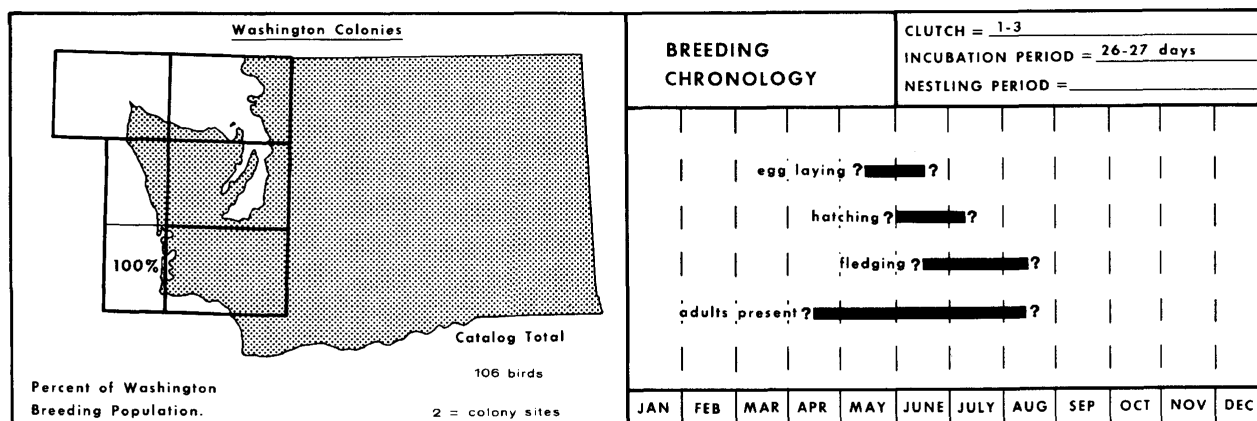


Ring-billed Gulls nest throughout much of inland North America, but they are a relatively recent addition to the list of seabirds nesting in marine habitats in Washington. They nested in the Columbia Basin areas in central Washington as early as 1930 (see Jewett et al. 1953) but have been recorded nesting in Willapa Bay only since 1976 (Penland and Jeffries 1977). This light-mantled, black wingtipped gull with yellow legs is a relatively common migrant in inland marine waters in Washington. Ring-billed Gulls nest colonially offshore on low-lying sandy islands that are relatively secure from land-based predators and disturbance. They have shown less adaptability in nest site selection than Glaucous-winged and Western Gulls and are much more restricted in breeding range in Washington.

Like other gulls, Ring-billed Gulls feed on almost anything, including fish and other aquatic organisms, and insects and grubs foraged in plowed fields, sewage, and garbage. They may land in trees to eat fruit. This species is more often seen in fields during the winter in western Washington than in marine habitats.

WASHINGTON COLONIES

Ring-billed Gulls on Gunpowder Island nest in a densely packed group in the middle of the Glaucous-winged Gull colony near Caspian Terns. Penland and Jeffries (1977) noted birds nesting in the tern colony itself on Ellen Sands. The existing colony is somewhat precarious as are all those on the exposed, low-lying sandy islands in Willapa Bay



and Grays Harbor, which may be altered or destroyed by winter storms. The estimate of numbers of breeding birds in western Washington is likely quite accurate at the time of the most recent survey. The species may also nest at Sand Island, though their recent status there is unknown.

HISTORICAL STATUS AND VULNERABILITY

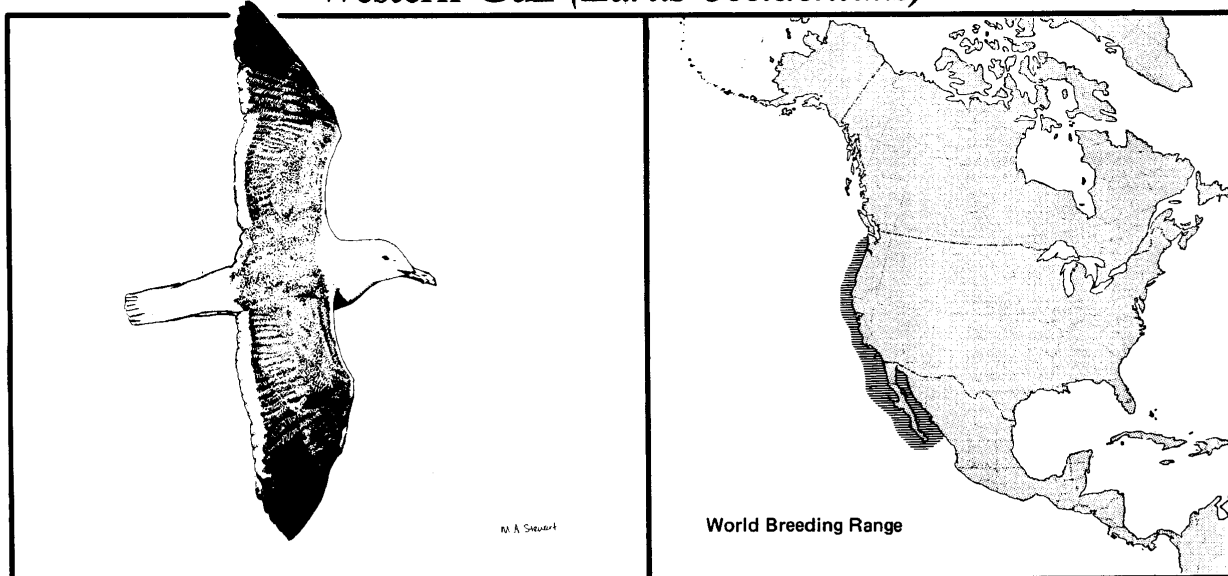
Like other species of "large" gulls, Ring-billed Gulls are gregarious, adaptable, and opportunistic. They have increased in numbers as garbage and sewage from human populations have increased, and have exploited new food supplies resulting from agricultural operations and the

prey populations of insects and other animals provided by massive irrigation projects in what were deserts prior to the 1930's.

Ring-billed Gulls are sensitive to disturbance on nesting sites, though these sites at present are generally secure in western Washington because of relative inaccessibility to humans. Like other species using the accreted sand and gravel spits, they can be severely impacted during nesting by storm waves flooding nests or even obliterating nesting islands.

While studies to date have not determined the extent of competition for nest sites with larger Glaucous-winged and Western Gulls, this may limit the population growth of this species in western Washington.

Western Gull (*Larus occidentalis*)



Western Gulls reach the northern edge of their breeding range on the outer coast of Washington at about Destruction Island. However, Glaucous-winged Gulls are sympatric with Western Gulls, and hybrids of the two are found well to the north and into the inland marine waters of the State (see Hoffman et al. 1978).

Western Gulls nest in a variety of habitats, but in Washington the most frequently used nest sites are on offshore rocks and islands, and on several accreted, low, sandy islands in Grays Harbor and Willapa Bay. Birds nesting on the mainland select areas, such as steep slopes and cliff faces, inaccessible to predators. The nests are substantial and usually made from vegetation collected nearby. The normal clutch is three eggs.

Like most of the large gulls, Western Gulls feed on a variety of

prey, including fish, euphausiids and other plankton, and fishing discards and offal. They are opportunistic feeders, of course, and forage readily at garbage dumps and fish-processing plants.

WASHINGTON COLONIES

Western Gulls are concentrated at colonies along the southern Washington coast. However, we have not separated Western Gulls from Glaucous-winged Gulls in population estimates, and thus numbers given for the latter species include a large proportion of Western Gulls, at least in the colonies from Destruction Island south to the Columbia River. This is due to the fact that, though Dawson (1908b) recognized that different forms were present, few observers since then have differentiated between the two, perhaps because the extent of hybridization (see Hoffman et al.

1978) makes identification of many individuals difficult. Observer variability and differences in what are considered "pure" forms and "hybrid" forms further add to the confusion of field determinations. This subject is discussed at length by Hoffman et al. (1978), and K. Richter (pers. comm.) gives additional ideas of proportions of the two species or forms at the colony at East Sand Island. The population of large gulls nesting from Destruction Island south, about 12,000 birds, might include about 6,000 to 8,000 Western Gulls.

HISTORICAL STATUS AND VULNERABILITY

Western Gulls and Glaucous-winged Gulls are probably the least likely of Washington seabirds to suffer population declines as a result of human activities. Their populations have grown substantially over recorded history (Thoreson and Galusha 1971); and while changes in human garbage and sewage disposal methods may limit these food sources, gull populations remain at a high level and may still be increasing. Increases in numbers of large gulls may cause safety problems around airports, and gull predation and competition may reduce populations of other seabirds.

Increases in the size of several populations of large gulls have been attributed to the availability of human food wastes and sewage (Vermeer 1963; Kadlec and Drury 1968; Drury 1979). Both Herring Gulls (Larus argentatus) and Great Black-backed Gulls (Larus marinus) in eastern North America have increased in number

and caused substantial damage to tern and Atlantic Puffin (Fratercula arctica) colonies by usurping optimal nesting habitat, stealing food, and eating eggs and chicks (Nettleship 1972; Nisbet 1973).

Populations of Western Gulls in Washington appear to have increased during the past 100 years, but there are no data to support this from the early explorations on.

The effects of gull populations on other seabirds are difficult to assess. Western Gulls are the most important predators on storm-petrels and Cassin's Auklets on the Farallon Islands in California (Manuwal 1974b; Ainley et al. 1974), and the situation in Washington is likely similar. Large gulls kleptoparasitize cormorants, Rhinoceros Auklets, and probably Tufted Puffins. Rates of incidence are unknown, but are probably higher and effects on other seabird populations more severe at present than in the past when gulls were less abundant.

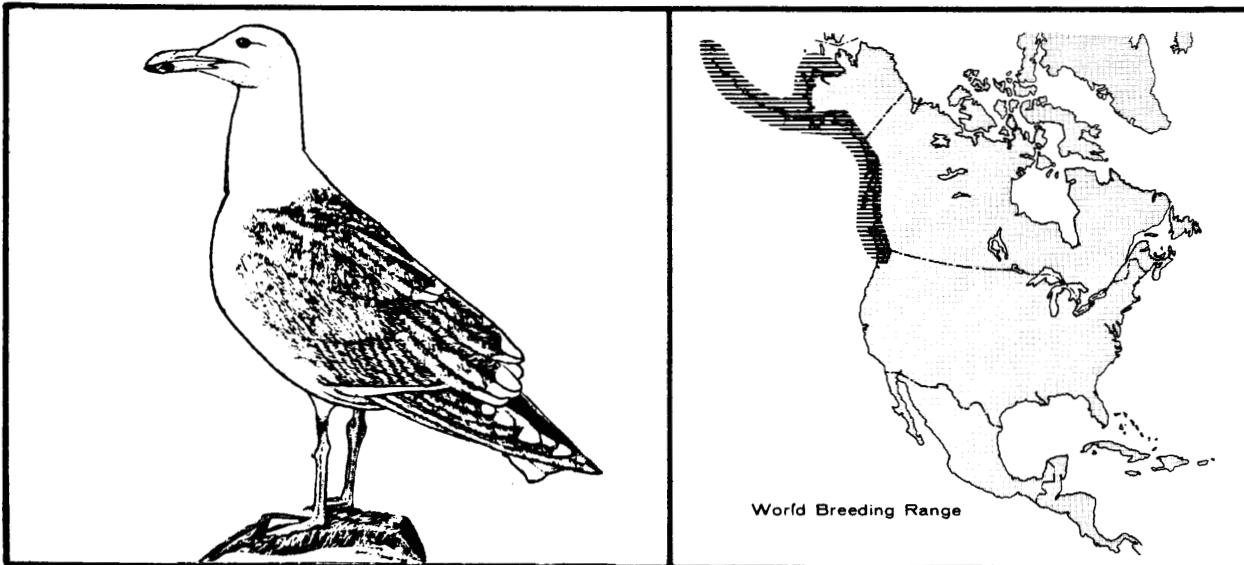
Large gulls are probably less vulnerable to oil spills than other seabird species nesting in Washington. They are highly mobile and frequently return to land to rest and roost. They are susceptible, like other surface-nesting birds, to disturbances while nesting. Disturbance in a particularly dense colony may result in intraspecific pirating of eggs and cannibalism. Chicks frightened from their territories may be killed by neighboring gulls or become lost and starve. However, with many nesting sites either in refuge status or inaccessible, populations of the large gulls nesting in Washington will probably continue at high

levels. Because of their ability to feed on a wide variety
relatively high reproductive of prey, the large gulls would
potential, an excess of likely make a rapid recovery from
nonbreeding adults, and their any decline.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Glaucous-winged Gull (*Larus glaucescens*)

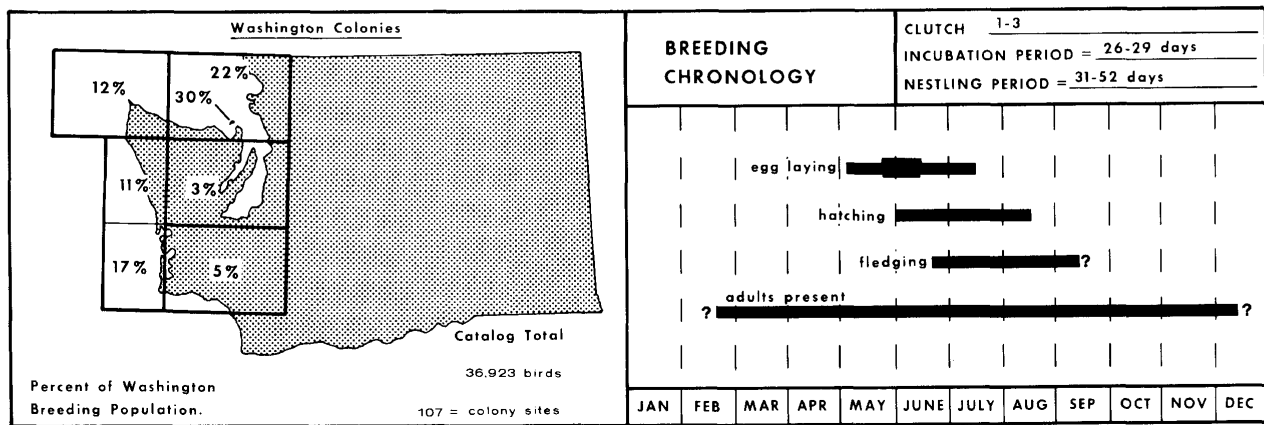


The Glaucous-winged Gulls nest around the perimeter of the North Pacific Ocean, from the area of Destruction Island off Washington to northern Japan. They are the most abundant and widespread gull nesting in Washington and the one most familiar to most people. Glaucous-winged Gulls and Western Gulls hybridize, and the varied plumage characteristic of many large gulls hatched in Washington display this to the confusion of many observers.

Like Western Gulls, Glaucous-winged Gulls nest in many different habitats and situations, from rocky islands off the coast to accreted gravel spits, roofs of downtown buildings in Seattle, abandoned piers, inaccessible dolphins at ferry docks, and log piles at sorting yards. Some of the largest seabird colonies in Washington are those of the Glaucous-winged Gull. The

combined colonies of this species and the Western Gull total up to more sites than any species except the Pigeon Guillemot.

Glaucous-winged Gulls are omnivorous in their feeding habits and range from open-ocean diets of fish and other natural foods to fishing vessel discards, anchovies, and intertidal organisms like starfish, crabs, and clams. They have become accustomed to foraging at garbage dumps, sewage ponds, and outfalls and to following plows for grubs and other organisms. Glaucous-winged Gulls commonly feed on earthworms that come to the surface in farm fields and athletic fields saturated by winter precipitation. They have become closely associated with humans in many situations and boldly approach picnic tables, fishing piers, and bird feeders in many places in western Washington.



WASHINGTON COLONIES

Glaucous-winged Gulls breed at virtually any suitable location along the shoreline of the State. They are essentially absent as nesting birds along the exposed sand beaches from North Head, near the Columbia River, to Point Grenville where the coastline becomes suitable. They do not nest along the Strait of Juan de Fuca between Seal and Sail Rocks and Dungeness. And, while there are colonies on piers and other waterfront situations in Seattle, Tacoma, Olympia, and Shelton, there are very few nesting in Puget Sound in "natural" situations south of Colvos Rock at the entrance to Hood Canal. The largest colonies in the State, a number of which include Western Gulls and intergrades between the two species, are at Protection, Gunpowder, Tatoosh, East Sand, Colville, Smith and Minor, Carroll, and Destruction Islands.

HISTORICAL STATUS AND VULNERABILITY

Glaucous-winged Gulls steal food from other seabirds, particularly

birds nesting nearby. They also prey on young birds of many species, including alcids and Black Oystercatchers. Consequently, they have probably suppressed populations of other species as Western Gulls have in California (Sowls et al. 1980) and large gulls have in eastern North America (Nettleship 1972; Nisbet 1973).

Like the closely related Western Gull, this species has increased in numbers in recorded time, taking advantage of increased food availability in the form of garbage, waste and discards from fisheries activity and sewage, and also through protection from shooting, feather collecting, eggging, automation of lighthouses, and establishment of refuges for maintenance of nesting areas. While population data are limited, increases in nesting populations at several inland Washington colonies are documented (Thoreson and Galusha 1971), and qualitative observations by many observers indicate the trend has been area-wide.

Glaucous-winged Gulls appear to be less vulnerable to effects of

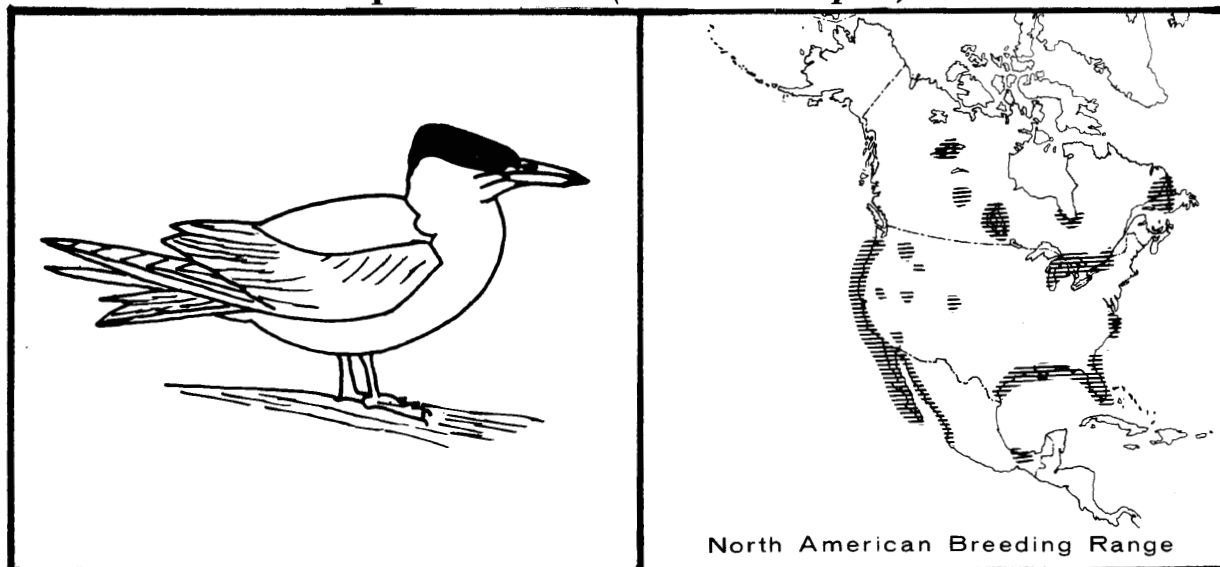
oil spills than other, more specialized marine birds, which spend more of their lives in the water, which dive for prey, and are less adaptable to changing conditions. However, the species, like all surface-nesting birds, is vulnerable to disturbance while nesting; and high mortality may result from entry of humans and dogs into colonies during times when there are chicks in the nests. Disturbance at this time

can easily result in chilling of eggs or chicks, chicks leaving home territories and being killed by neighboring gulls, and eggs being stolen by crows. For the most part, however, since large gulls are adaptable, opportunistic, and aggressive, populations of large gulls in Washington appear likely to be maintained at current levels, at least for the foreseeable future.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Caspian Tern (*Sterna caspia*)



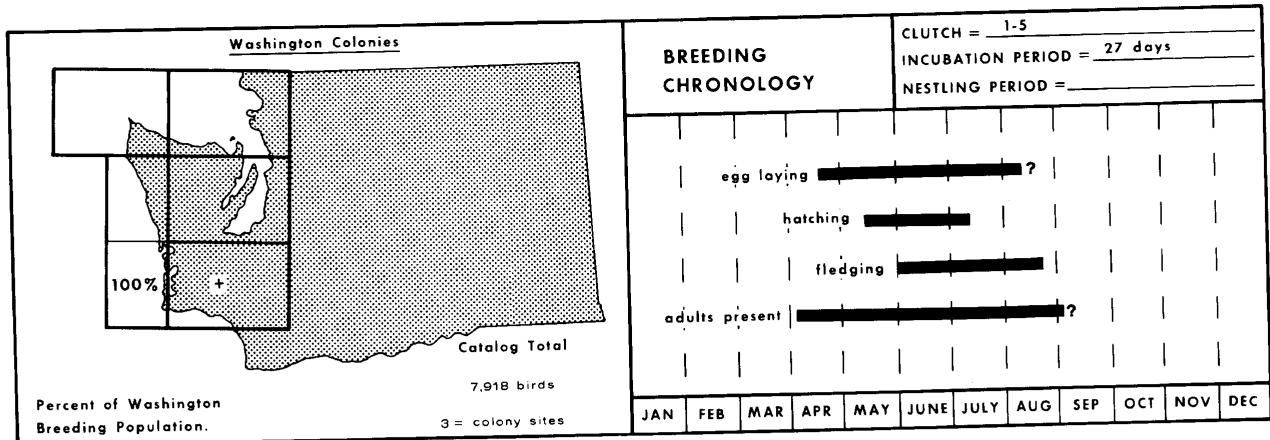
Caspian Terns are one of the largest and most widespread species of terns in the world. They are found in both the temperate Northern and Southern hemispheres. On the west coast of North America they nest as far north as Grays Harbor in Washington and inland as far north as Great Slave Lake in Canada. The nesting population in Washington is now by far the largest on the west coast north of Mexico, with only a few hundred birds recorded breeding in California (Sowls et al. 1980).

The species was recorded nesting in central Washington near Moses Lake in 1930 (see Jewett et al. 1953). About 1957 it was found nesting in Grays Harbor (Alcorn 1958) and has become established as one of the most abundant nesting marine birds in Willapa Bay and Grays Harbor since then. The spread of this species has been remarkable, both as a nesting

bird and as nonbreeders and post-breeding dispersants. Godfrey (1966), for example, felt it unusual in British Columbia; in recent years, however, adult-plumaged birds are numerous in spring and early summer in many locations in western Washington and British Columbia.

Caspian Terns nest on low sand or gravel islands accreted by wave action and usually with a minimum of vegetative cover. Two to four eggs are laid in a small depression in the sand lined with bits of vegetation. Like other terns and gulls, this species is a colonial nester, and it nests near gulls in many situations.

This large tern apparently feeds almost exclusively on fish, which it catches by plunging from several meters above the surface, frequently submerging in order to secure the prey. Smith and Mudd (1978) found Caspian Terns had



delivered small perch, chum salmon, staghorn sculpin, and other fishes to nestlings in Grays Harbor in May and June. The birds probably also feed on species like anchovies which are extremely abundant at other seasons in the area.

WASHINGTON COLONIES

Since the discovery of nesting Caspian Terns in Washington, the species has shifted colony sites, likely due to changes in available nest site habitat. Goose Island, site of the first known colony, Sand and Whitcomb Islands in Grays Harbor, and Gunpowder Island in Willapa Bay have all been occupied, but the terns recently (1982) nested only on Sand and Gunpowder Islands. It is possible the species nested earlier in western Washington as it has been recorded for many years (Jewett et al. 1953) during the summer in marine habitats.

HISTORICAL STATUS AND VULNERABILITY

The Caspian Tern is present in relatively large numbers in

western Washington during the nesting season. Its harsh cries and the begging call of chicks following adults are now among the most conspicuous seabird sounds in Grays Harbor and Willapa Bay during the summer and into September. However, while Caspian Terns have increased at rates probably greater than Glaucous-winged or Western Gulls in recent years, they are much more precarious in their existence as nesting birds in Washington. This is due to their being much more vulnerable to disturbance on the nesting colonies, to habitat loss, and to disruption of food webs. Most colony sites are protected, but entry by boaters, fishermen, sightseers, and researchers unfamiliar with biology and behavior of terns are potential threats. The islands used for nesting are vulnerable to ravages of winter storm waves which have created, moved, and eliminated the sites over time. Caspian Tern colonies, even during their relatively brief history in Washington, have relocated several times, sometimes inexplicably. The first known colony on Goose Island peaked in numbers in 1970, and no birds were found there after 1976. Whitcomb Island

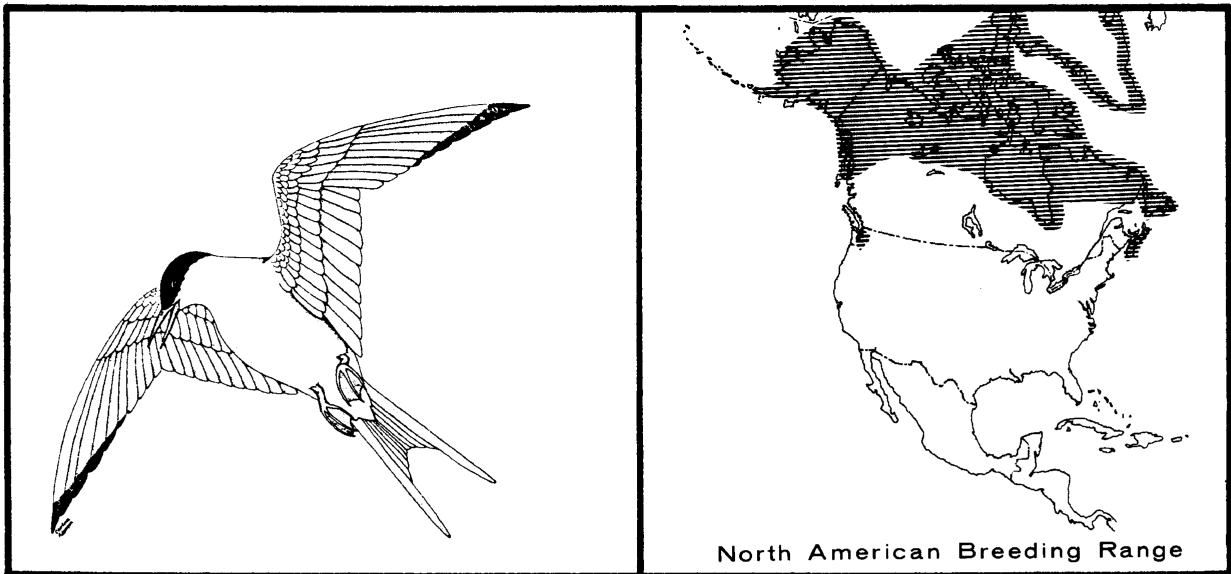
presumably received the Goose Island population starting in 1974, with numbers building to 2,000 by 1976, but by 1981 the terns were gone from there. Sand Island was chosen in 1976, with large numbers present in 1982, when 3,000 birds were also

found on Gunpowder Island in Willapa Bay. While food resources appear to be adequate and stable for this species, disruption or contamination of these could have profound effects on the status and abundance of nesting populations using Washington's marine waters.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Arctic Tern (*Sterna paradisaea*)



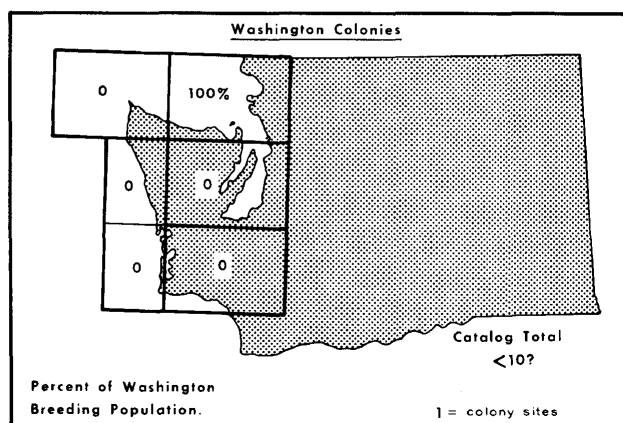
Arctic Terns generally nest in western North America in Alaska and northern Canada and migrate at sea to winter in the Southern Hemisphere. They appear on the list of birds nesting in Washington's marine habitats due to an extremely unusual nesting occurrence in 1977 and 1978 (Manuwal et al. 1979a). It appears that the species does not nest in the State at the present time.

Arctic Terns are small terns, generally gregarious in nesting habits and in foraging behavior and migration. They nest in open areas on tundra, sand and gravel shorelines, or islands, laying two eggs in a scrape. They are aggressive in nest defense and attempt to drive off suspected predators with harsh calls and diving attacks, sometimes striking vigorously.

Like other similar small terns, this species seeks its prey of small fish and planktonic organisms by searching above the sea surface, hovering and plunging to strike below the surface, and emerging quickly to take flight again. Unlike gulls, terns (even pelagic species like this one) seldom are seen resting on the water. During their migration at sea, Arctic Terns may be seen resting on floating logs and debris.

WASHINGTON COLONIES

A small group of Arctic Terns nesting at the gull colony on Jetty Island, a dredge-spoil island off Everett harbor, in 1977-1978 represented the southern-most known colony of this species in western North America (Manuwal et al. 1979a).



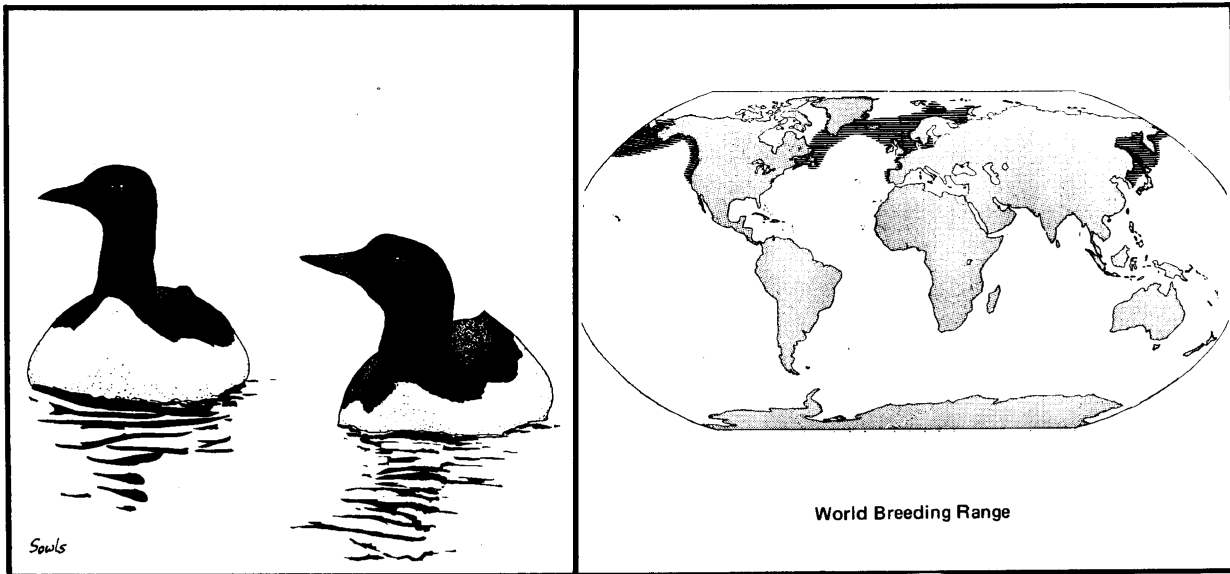
HISTORICAL STATUS AND VULNERABILITY

Checks of the Jetty Island colony site subsequent to 1978 (Richter, pers. comm.) have failed to find Arctic Terns there, and it is doubtful the species is

nesting in Washington presently. Whether or not Arctic Terns reoccupy this site may depend on its preservation in suitable form.

Terns are extremely vulnerable to disturbance on nest sites, and wholesale flights and colony abandonment are recorded, resulting from what might be minimal disturbance to other species like gulls. It is unknown whether disturbance from recreation caused abandonment of the one Washington colony or whether this small outlier colony, far outside the species' normal range, was simply abandoned. Because terns feed principally on small fish and other marine organisms and apparently do not shift to other foods, they are much more vulnerable to perturbations in food supply or to contamination of food webs.

Common Murre (*Uria aalge*)



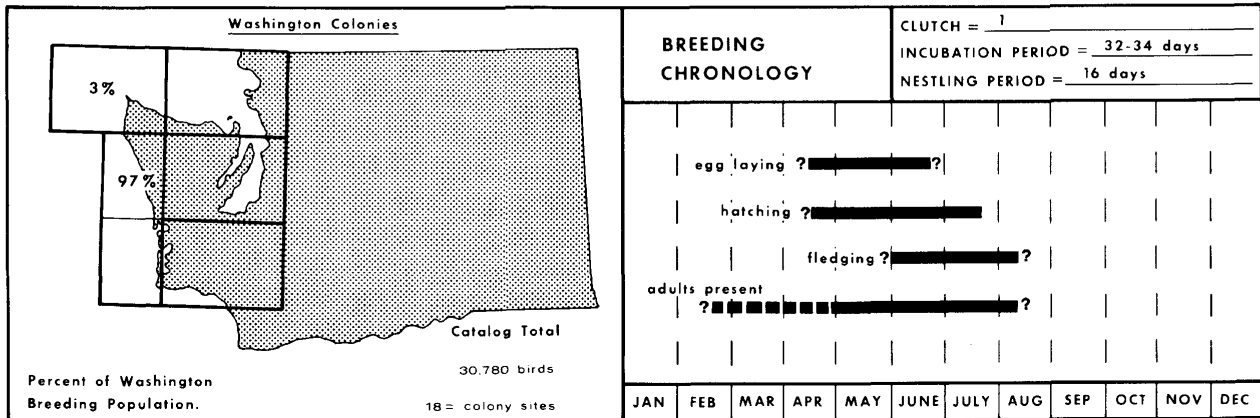
Common Murres are among the most highly colonial of seabirds. Their colonies, usually on rocky offshore islands, are often densely packed with noisy birds, nesting just out of the pecking range of neighbors. Common Murres occur in both the North Pacific and North Atlantic Oceans and are among the most numerous seabirds in the northern hemisphere.

Common Murres prefer to nest on wide, flat cliff ledges and the tops of islands, but they also nest on narrow ledges of vertical cliffs. A large, single egg is laid on bare rock or soil. It is narrowly pointed on one end and broad and rounded on the other. Murre eggs vary greatly in color, ranging from white to buff, brown, reddish, blue, or green. They are almost always marked with dark dots, blotches, or intricate scribbling (Harrison 1978). The unique pattern of each egg

probably aids individual recognition by adults (Johnson 1941).

Murre chicks are fed by both parents and jump from the colonies to the waters below when only partly grown (Tschanz 1968). They are accompanied at sea by only one parent, usually the male (Varoujean in Sowls et al. 1980), swimming from the nesting area to wintering grounds. Observations suggest this may be from colonies along the Oregon coast to Puget Sound in Washington.

Common Murres are strong fliers and are capable of foraging long distances from their colonies. They dive to considerable depths and include fish, crustaceans, and cephalopods in their diet (Ogi and Tsujita 1973, 1977). Common Murres may be seen along the outer coast of Washington during all months of the year. Larger numbers are present from fall



through winter when numbers also are present in the deeper habitats of the inland marine waters.

WASHINGTON COLONIES

Common Murres nest at 18 locations along Washington's outer coast from Erin's Bride north to Tatoosh Island at the entrance to the Strait of Juan de Fuca. The largest numbers are found at Willoughby Rock (5,300), Split Rock (10,400), Grenville Arch (5,000), and Rounded Island (2,200). While these larger colonies are probably used each year, murres also appear to shift nesting colony sites; assessments of populations require monitoring of all possible locations.

Colonies of murres are easy to find but are difficult to census. Variables such as time of year, time of day, and the unknown breeding status of many individuals complicate the task. The estimates of murre numbers presented in this catalog represent the number actually counted and make no allowance for members of breeding pairs that may

be away from the colony. Ainley (1976) estimated that two-thirds of the total number of birds actually nesting may be away during some censuses. Thus our estimated totals may be somewhat low. We feel, however, that all sizeable nesting sites have been found. The Common Murre is much less numerous, perhaps as a function of availability of suitable nesting habitat, as a breeding bird in Washington than it is in California, Oregon, British Columbia, or Alaska.

HISTORICAL STATUS AND VULNERABILITY

Due to very infrequent surveys until recent years, trends in populations of nesting Common Murres in Washington are not known. Differences in census methods and incomplete coverage of the coastline by many observers make comparisons impossible. While in the case of Tatoosh Island there is less human presence due to automation of the light station, the murre population there is relatively small in comparison with the larger colonies elsewhere. The

amount of eggging carried out on murre colonies in the past is unknown, but this could have depressed populations in the State as it did elsewhere.

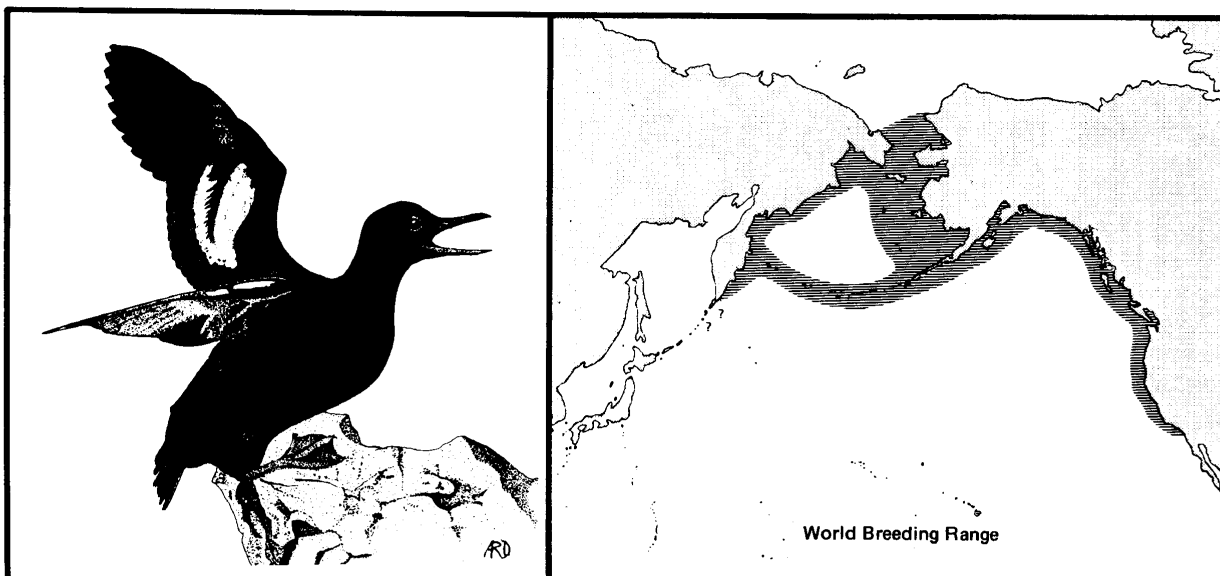
Nesting Common Murres are very sensitive to disturbance by boats, low-flying aircraft, and humans on foot. When disturbed, adults flush from the colonies and may knock eggs and chicks from nest sites. The remaining chicks and eggs are subject to increased predation from gulls, ravens, and crows. Common Murres are highly vulnerable to oil contamination and were some of the most frequently oiled birds in the 1971

San Francisco oil spill (Smail et al. 1972). They are common in outer coastal waters off Washington throughout the year and in inside waters in winter. Since they spend virtually all their nonbreeding lives in the water, forage by diving, and congregate both around colonies on the water and in flocks during the rest of the year, they are among the most vulnerable of marine birds to oil spills. Murres also have suffered heavy mortality in gill nets (see DeGange and Newby 1980). Net mortality to murres has been observed in Washington, but the magnitude and impact on local nesting populations is unknown.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Pigeon Guillemot (*Cepphus columba*)

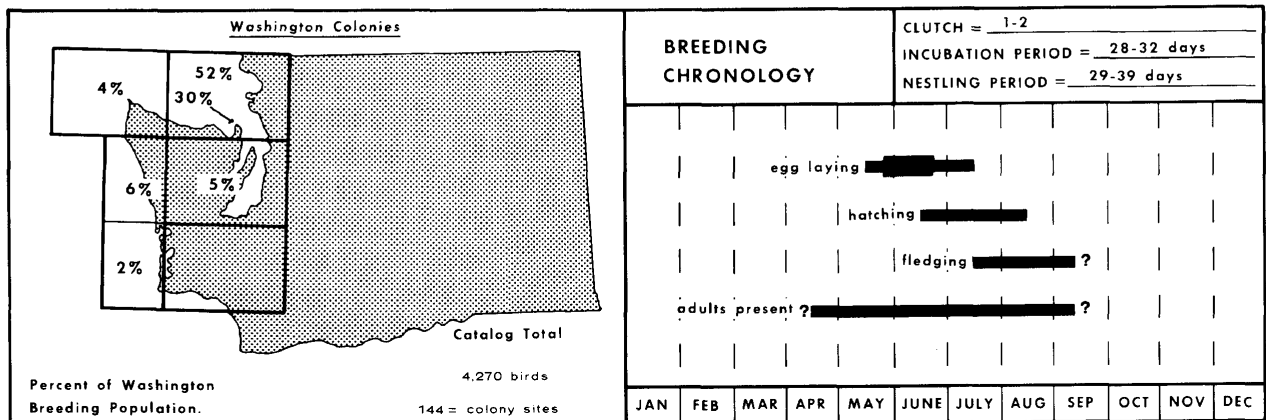


Pigeon Guillemots inhabit the relatively shallow nearshore zone and are usually found along stretches of rocky shoreline. They are most easily observed in the early morning, before the egg laying season, when both members of each pair frequent waters adjacent to their colonies.

This species usually nests in natural rock crevices, talus, and boulder beaches (Thoreson and Booth 1958; Drent 1965). In the inland marine waters of Washington, birds also frequently nest under drift logs on beaches that are relatively undisturbed and free from land predators. They also use burrows dug into loose conglomerate bluffs and artificial structures such as wharf timbers and drain pipes. On one island formerly used for practice bombing, they have nested in spent bomb casings.

The Pigeon Guillemot is one of the few alcids which regularly lays two eggs (Bent 1946; Thoreson and Booth 1958; Drent 1965). Eggs are laid on bare rock, soil, or sometimes on a bed of pebbles and shell fragments. Guillemots usually feed close to shore, and the proximity of the feeding grounds to the colonies may explain their ability to sometimes raise two chicks. Pigeon Guillemots, like all members of the family Alcidae, dive for food by using their wings for propulsion. Fish are the principal food of guillemots.

Following breeding, Pigeon Guillemots apparently move away from some areas where they are common during the summer. Winter distribution is presently uncertainly known, and determination of the seasonal range of this important breeding species is highly desirable.



WASHINGTON COLONIES

In Washington, Pigeon Guillemots are perhaps the most widespread nesting seabird. While they are absent from shallow estuaries and sandy beaches, they are opportunistic and take advantage of suitable nesting possibilities like crevices in the jetties at the Grays Harbor entrance. While there are sizeable breeding "colonies" or aggregations at well-known sites like Protection Island and Sucia Island, many guillemots nest in scattered locations and often in small numbers. Delimiting concentrations for much of Washington's coastline is difficult; while we have described this species' sub-surface nesting locations as precisely as possible, we have also given breeding-season population size and location by subregions (bays or stretches of coastline) without reference to precise nesting locations in order to show relative abundance and estimate total breeding populations (see Appendix C for estimates derived from two surveys conducted in inland waters).

The catalog total for this species in Washington is 4,270.

While given censuses or subregion totals may be high or low, we feel the overall total is conservative because of birds missed during censusing. Censusing Pigeon Guillemots is an inexact science at best and is complicated by many factors (see Methods). We have used the best recent estimates here, though we feel there may be about 33% more nesting in the inland waters, particularly in the San Juan's and adjacent areas, and perhaps 50%-75% more nesting along the outer coast than are listed here. There may be about 6,000 Pigeon Guillemots breeding in Washington.

HISTORICAL STATUS AND VULNERABILITY

While there are many records for many sites over many years describing Pigeon Guillemot breeding populations--the first nesting observations date to May 1792 (Menzies 1792)--it is difficult to determine actual population trends because of problems involved in field censusing, timing, geographic coverage, and access.

Compared to other seabirds such as murre and cormorants, Pigeon

Guillemot populations are not highly prone to disturbance, primarily because of their comparatively low nesting densities and inaccessible nest sites. However, individual pairs will readily desert their nests if disturbed during nesting or brooding.

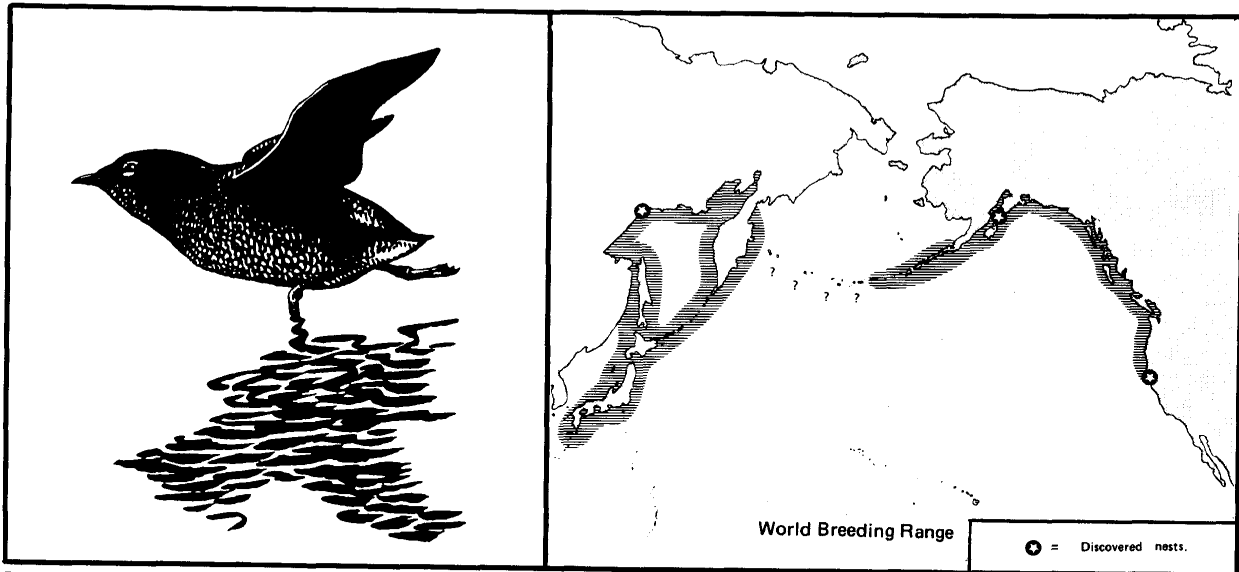
Like murre and other alcids, Pigeon Guillemots are very

vulnerable to oil pollution. Guillemots spend large amounts of time on the water, usually close to shorelines and in shallow waters where oil development, transfer, and processing take place. While local populations could be severely impacted, the wide distribution of the species would likely mean impacts would be less than in the case of some other species.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Marbled Murrelet (*Brachyramphus marmoratus*)



Drawing by Allan Brooks, compliments of *The Murrelet*, A Journal of Northwest Ornithology and Mammalogy.

NOTE

On January 15, 1988, the U.S. Fish and Wildlife Service received a petition from the National Audubon Society to add the Marbled Murrelet in California, Oregon, and Washington to the List of Endangered and Threatened Wildlife and Plants. A preliminary finding that the petitioned action may be warranted was published in the *Federal Register* on October 17, 1988. Further review is pending.

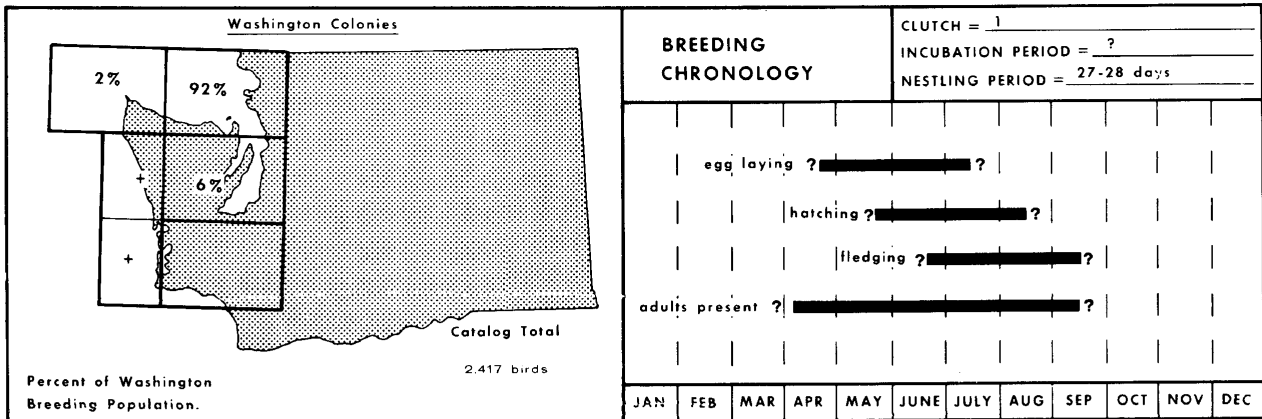
For additional information on this species, consult the following:

Marshall, D.B. 1988. Status of the Marbled Murrelet in North America: with special emphasis on populations in California, Oregon, and Washington. U.S. Fish and Wildlife Service Biological Report 88(30). 19 pp.

Copies of the publication may be obtained from the Publications Unit, U.S. Fish and Wildlife Service, Washington, DC 20240, or may be purchased from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.

Marbled Murrelets are the least known, as to their breeding habits, of all the birds nesting in Washington. One of the earliest clues of their nesting habitat resulted from an egg found in Whatcom County, Washington (see Kiff 1981), but they remain for

all intents and purposes "mystery birds" in the State. Only four nests have been found throughout the species' wide range around the perimeter of the North Pacific. One was found in Siberia (Kuzyakin 1963), one in California (Binford et al. 1975; Singer and Verardo



1975), and two in the Barren Islands in Alaska (Simon 1980; Hirsch et al. 1981). Kiff (1981) recently reviewed the known eggs and nests of this species.

Of the four nests, both the Siberian and California nests were found in trees, but the Alaskan nests were found on the tundra of a treeless island. The Siberian nest was found in the upper branch of a larch (*Larix dehurica*) 6.8 meters above the ground (Kuzyakin 1963). The California nest was found 45 meters above the ground on a moss-covered limb of a douglas-fir (*Pseudotsuga menziesii*) in northern California (Binford et al. 1975). This nest contained a Marbled Murrelet chick sitting in a small depression encircled by droppings.

Binford et al.(1975) theorized that the pale green egg, the cinnamon brown breeding plumage of the adult, and the light brown nestling are cryptic adaptations for nesting in trees. The entire breeding population of this species in California is suspected to nest in trees; and while this is likely also for Washington, the

use of talus slopes or other ground sites cannot be ruled out.

Marbled Murrelets seen offshore are almost always in pairs and within about one kilometer of the shoreline. This is true all year, though they aggregate in foraging areas during the summer and in winter have been seen in large flocks, including one of over 5,000 birds passing Point Roberts, Washington (Wahl et al. 1981). Breeding birds return to their nests in the evening and depart at dawn (Sowls et al. 1980), and flights of calling birds over inland coastal forests in California are similar to reports in Washington (e.g., Dawson and Bowles 1909).

Marbled Murrelets, like all other alcids, spend a large percentage of the time on the water. They feed on fish and less frequently on crustaceans (Sealy 1975).

WASHINGTON POPULATION

Marbled Murrelets are present during the breeding season along almost all of Washington's marine

shoreline, but they are concentrated in certain areas. These concentrations likely are related to foraging opportunities, but the locations are also frequently near forested areas relatively undisturbed by humans. These include the Olympia Peninsula, particularly near Tongue Point and Voice of America, the south shore of Lopez Island, the southwestern shoreline of Lummi Island, and Obstruction/Peavine Passes between Orcas and Blakely Islands in the San Juan's. Marbled Murrelets also gather in loose but sizeable aggregations where fish runs appear to be heavy, as in Hale Pass, Whatcom County, during the season when Pacific herring (Clupea harengus) are spawning near Cherry Point.

Estimating numbers of Marbled Murrelets in Washington present at any season, including the breeding season, is difficult, considerably more so than in the case of the Pigeon Guillemot. We have treated it here similarly to that species and have estimated numbers by geographic subregion (see Appendix C). Numbers are likely underestimated as censusing was often done from fast-moving small boats or aircraft, and Marbled Murrelets in breeding plumage are inconspicuous under many conditions of observation. Data are almost completely lacking for areas along the outer coast of Washington, small concentrations along the northern section of the coast (Speich, pers. obs.), and numbers often are observed along the shoreline near Ocean Shores and in the Grays Harbor channel during the breeding season (Wahl, pers. obs.). The estimates presented here are intended to aid further

investigations into the biology of this species. These estimates are based on our systematic censuses only, and many reports from other sources are useful in specific investigations of this little-known species. While the catalog total estimate is 2,417 breeding birds, insufficient coverage and difficulties of censusing lead us to believe as many as 5,000 Marbled Murrelets may nest in Washington.

HISTORICAL STATUS AND VULNERABILITY

There is virtually no information on the historical status of Marbled Murrelet breeding populations in Washington, though birds in breeding condition were collected in Puget Sound in the 1850's.

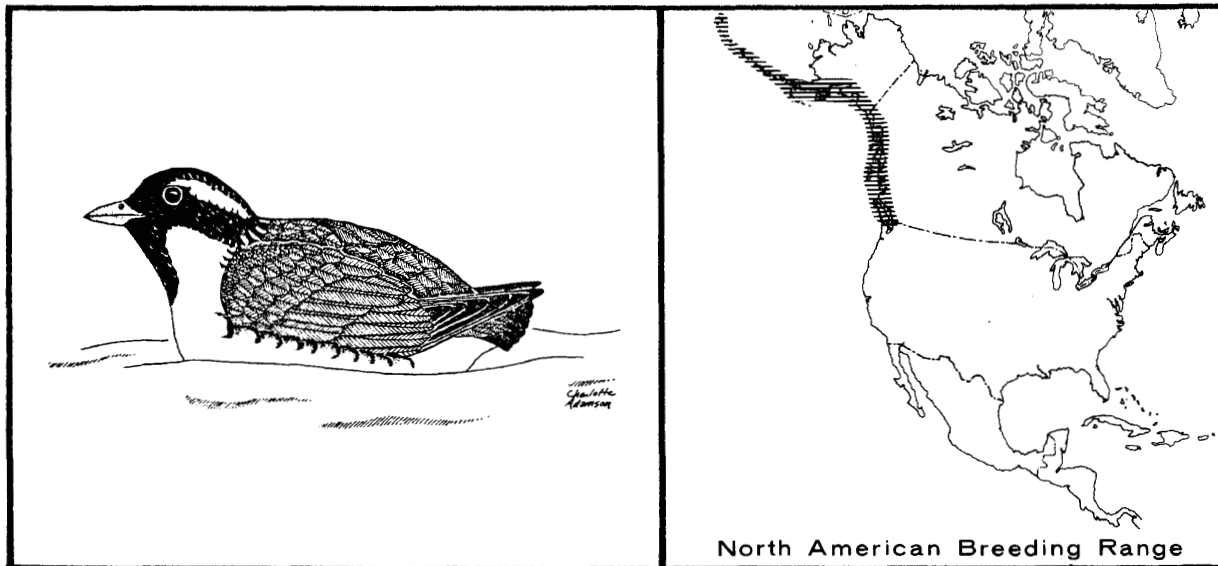
Disturbance to nesting birds probably has been and will continue to be primarily through the destruction of nesting habitat, particularly if, as strongly suspected, they nest in trees. Populations may have been reduced by the reduction of old-growth coastal forests. We suspect Marbled Murrelets may have formerly been more abundant than they are today.

Marbled Murrelets are vulnerable to oil contamination since they are often found very close inshore, feeding in tidal fronts and other places where their prey concentrates. This impact can be considered in perspective by referring to subregion estimates which indicate areas of concentration.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Ancient Murrelet (*Synthliboramphus antiquus*)



The Ancient Murrelets are an abundant and widespread species breeding north from the Queen Charlotte Islands, British Columbia around the northern North Pacific Ocean. They are numerous in offshore habitats in Washington during the winter, but they may be the rarest breeding seabird in the State, if indeed they nest here at all.

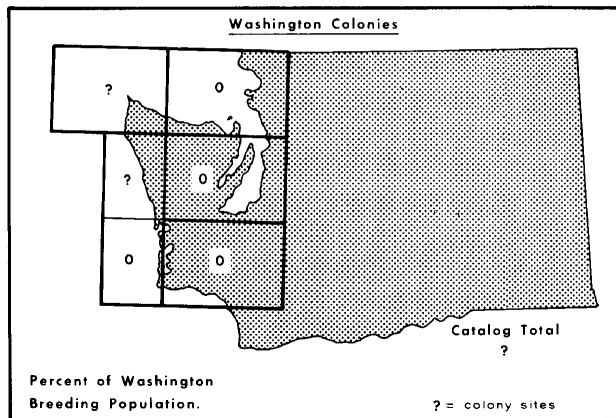
This cleanly marked species nests in colonies on coastal islands, in burrows or crevices, beneath stones, roots, or fallen logs on grassy or wooded slopes. Clutch size is usually two eggs, often elongate in shape and large for the size of the bird, variable in color from bluish-white through cream or buff, marked with different shades of brown and bluish-grays. Young birds leave the nest when very small, unlike many other alcids, perhaps when only one to two days old and

follow the calls from adults leading them to water at night.

Ancient Murrelets are more pelagic than Marbled Murrelets, being found farther at sea, and are more gregarious, with flocks of up to 30 birds not uncommon in winter in Washington. Birds often plunge directly from flight to pursue prey underwater in areas of tidal fronts and strong currents. Like other alcids, Ancient Murrelets feed on small fish and marine invertebrates.

WASHINGTON COLONIES

The breeding distribution of this species in Washington has apparently always been limited. It was breeding 9 May 1924 on Carroll Island (Hoffman 1924), and this represents the only certain record. In 1978, 12 adults were observed near LaPush,



that small numbers of Ancient Murrelets may nest in Washington.

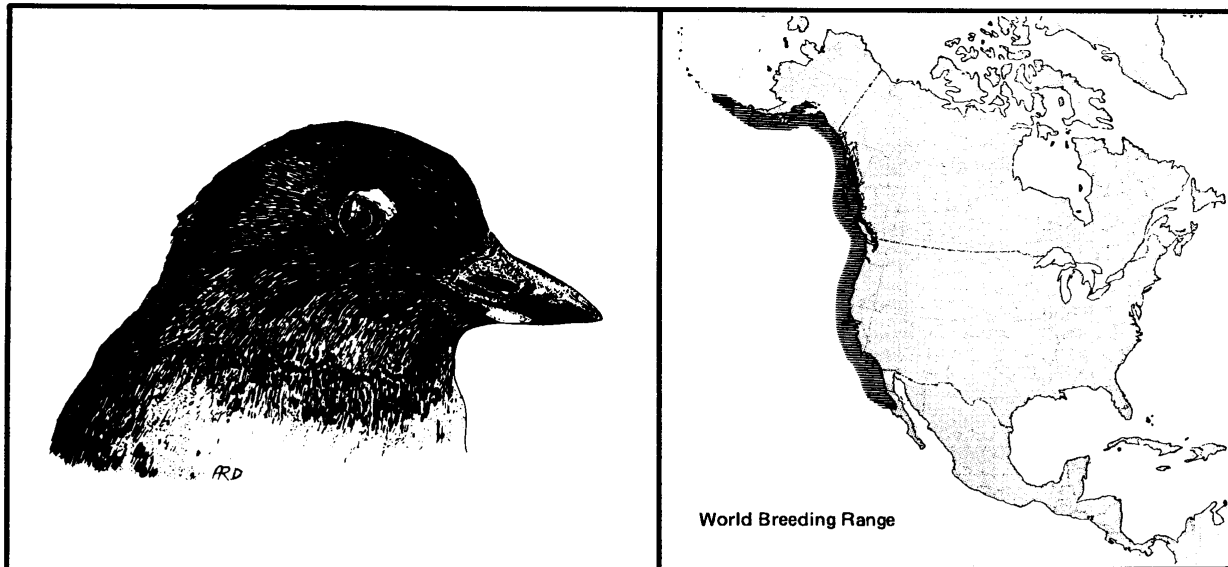
HISTORICAL STATUS AND VULNERABILITY

There is no certain breeding record for Ancient Murrelets in Washington since 1924. Sightings of birds during the breeding season are few enough that the breeding population would have to be very localized, small, and difficult to locate.

and a fledgling was seen near Alexander Island (Speich and Pitman, pers. obs.). There are sightings of birds off the Washington coast during the summer from at least the area of Grays Canyon (Wahl, pers. obs.) north, though these could be stragglers from colonies much farther north. However, the evidence suggests

Like many marine birds, Ancient Murrelets are vulnerable to loss of breeding habitat, contamination by oiling, and disruption of food webs. Oiling would seem to be a greater hazard during winter when the environmental stress is greater, but the population of Ancient Murrelets wintering in Washington undoubtedly consists of birds breeding elsewhere.

Cassin's Auklet (*Ptychoramphus aleuticus*)



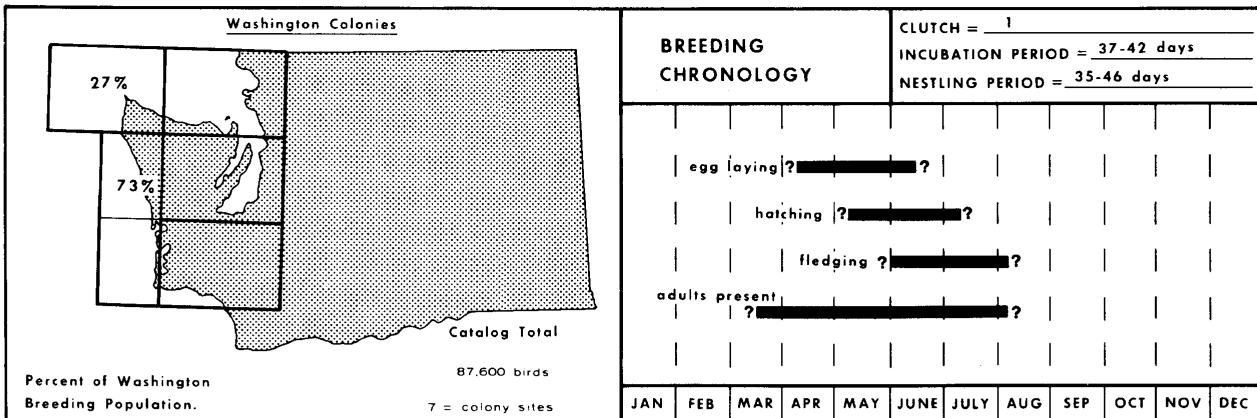
The Cassin's Auklet is one of the most widespread members of the family Alcidae in the North Pacific. Cassin's Auklets build their nests in burrows on offshore islands that have a sufficient mantle of soil. These tiny alcids are nocturnal at their breeding colonies and are likely to be among the most pelagic of alcids at that season when they are found well offshore at the outer edge of the continental shelf and the shelf edge (Wahl 1975).

Throughout their range, Cassin's Auklets usually nest in burrows but may also use rock crevices, debris piles, cracks under buildings, and large caves (Thoreson 1964). In Washington they are known to nest in burrows under trees and open salal and salmonberry shrub areas. Each female lays a single, creamy-white egg, but may lay a second egg if the first is destroyed (Manuwal

1974a). Adult Cassin's Auklets develop two incubation patches on the body, one beneath each wing (Manuwal 1974a). These incubation patches are found only among several species of alcids, including Xantus' Murrelets, Rhinoceros Auklets, and Tufted Puffins. Cassin's Auklets also develop a gular pouch used to store food for young that are fed by regurgitation at night (Speich and Manuwal 1974). Small fish and pelagic crustaceans form the mainstay of the diet of Cassin's Auklets (Manuwal 1974a; Hunt et al. 1979).

WASHINGTON COLONIES

Cassin's Auklets are the most numerous breeding seabirds in Washington, though they are seldom seen near shore because they visit colonies nocturnally and forage well offshore. The species nests



in just eight known locations, though some additional sites are likely. The largest colony is on Alexander Island where approximately 55,000 are estimated to nest. Jagged Island, Carroll Island, and the Bodeltehs have large colonies which make up most of the rest of the known population. We feel it is possible that as many as 20,000 additional birds could be nesting in Washington on other sites.

HISTORICAL STATUS AND VULNERABILITY

This species was recorded at several sites in 1906 and 1907 (Dawson 1908b), including Alexander and Carroll Islands and was apparently as common on those colonies as it is today. It is not known if Cassin's Auklets were nesting on Tatoosh Island in 1906-07, but it is now.

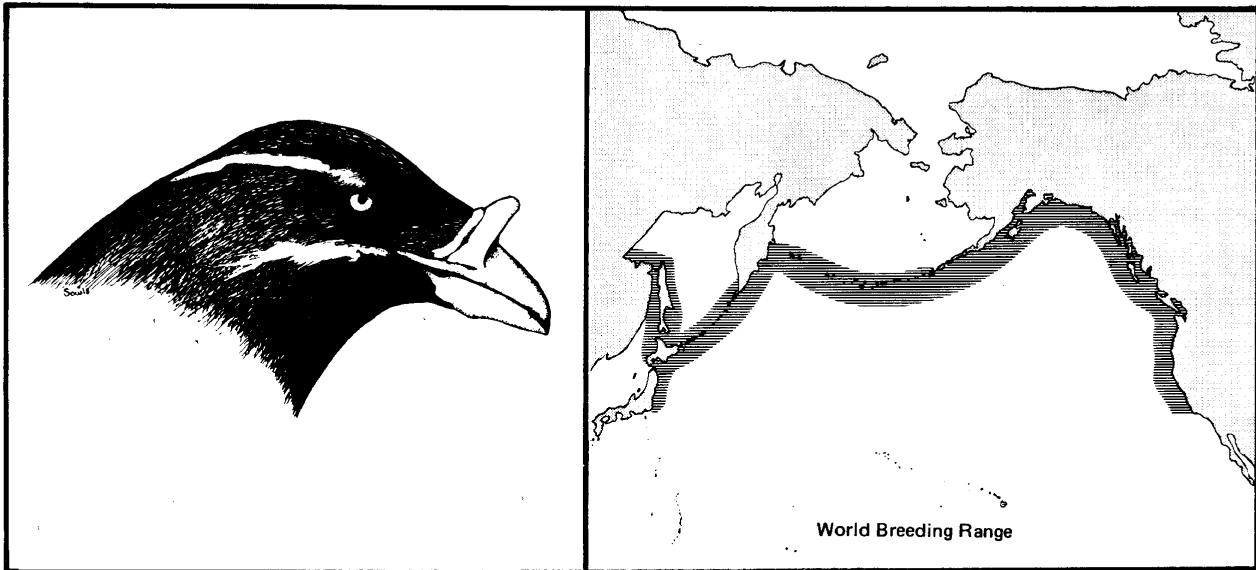
In California, Western Gulls prey heavily on Cassin's Auklets

at colony sites (Thoreson 1964). Chicks are pulled from shallow burrows by gulls, and adults are killed at night when they unfortunately land at the feet of roosting gulls (Thoreson 1964).

Cassin's Auklets are vulnerable to disturbance and to the depredations of introduced predators like cats. Cassin's Auklets may desert their nests if disturbed during incubation, and their burrows can easily be caved in by unwary visitors to their colonies. Fortunately, Washington colonies are protected by refuge status.

Cassin's Auklets feed from the ocean surface in flocks, concentrating in areas where their food is abundant but where they are susceptible to contamination by oil (Hunt et al. 1979). In Washington, Cassin's Auklets are vulnerable especially near nesting colonies and on foraging areas over the outer continental shelf.

Rhinoceros Auklet (*Cerorhinca monocerata*)

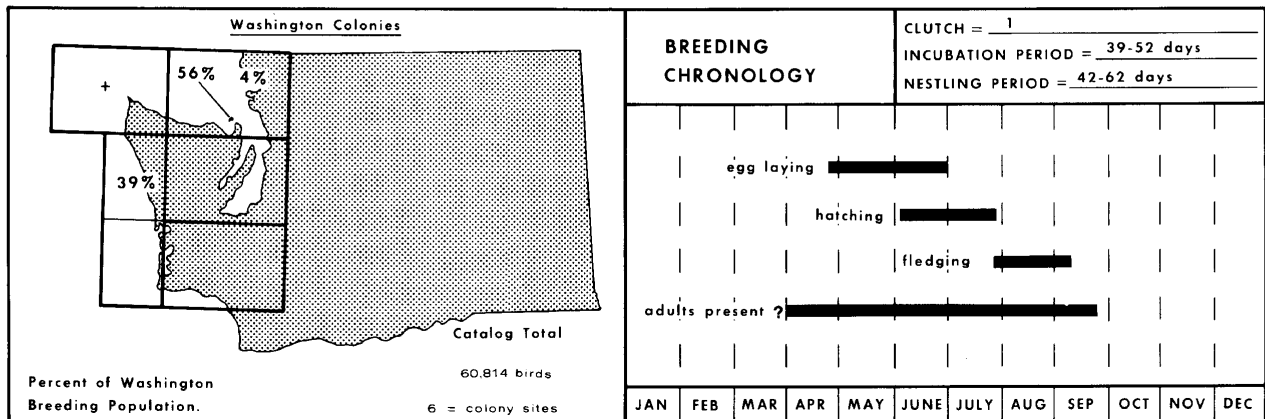


Rhinoceros Auklets are one of the most abundant seabirds breeding in Washington, where their southernmost large colonies in the eastern North Pacific are located. While the species breeds from California north around the rim of the Pacific from the Aleutians to northern Japan, it is abundant only around a few large colonies in Washington, British Columbia, southeastern Alaska, and Kamchatka, Siberia, and Hokkaido, Japan (Udvardy 1963).

The species derives its name from the keratinous "horn" found on its bill during the breeding season. Although this species' common name implies it is an auklet, it is more closely related to the puffins. Rhinoceros Auklets are excellent divers and feed on small fish and cephalopods (Heath 1915; Richardson 1961; Leschner 1976).

Rhinoceros Auklets nest primarily in burrows dug into the ground in both forested and unforested islands. Burrows may be up to six meters in length and often fork two or three times before ending in a nesting cavity (Heath 1915; Willett 1915). The recent discovery of Rhinoceros Auklets at Sea Lion Caves, Oregon (Scott et al. 1974; Varoujean and Pitman 1979), and at caves in the conglomerate cliffs at Point Arguello, California (Sowls et al. 1980), indicates that this species may also nest in rocky mainland habitats.

Rhinoceros Auklets almost always enter and leave colonies at night when feeding chicks. This predominantly nocturnal behavior may have evolved as a means of reducing kleptoparasitism by gulls. In California and Oregon, Rhinoceros Auklets may often be observed on or near colonies



during the day; but north of Washington they appear to be strictly nocturnal in visits to colonies, although some birds may be seen foraging near the colonies. This difference remains unexplained but may be related to the availability of food and its proximity to the colonies.

WASHINGTON COLONIES

Rhinoceros Auklets nest at three main sites in Washington: Protection Island (34,216), Destruction Island (23,600), and Smith Island (2,588). In addition, small numbers nest at Tatoosh Island, Alexander Island, and East Bodelteh. Reports of small colonies in other parts of the inland waters, particularly southern Puget Sound, have not been verified in recent field surveys (Wahl and Speich 1984). While a few more pairs nest in the State in limited suitable habitat, the total estimated nesting population is relatively accurate.

HISTORICAL STATUS AND VULNERABILITY

Rhinoceros Auklets are conspicuous in inland marine

waters of Washington near the Protection Island colony in particular and have been mentioned from the early days of field ornithology in Washington. Suckley and Cooper (1860) reported the species was nesting on Protection Island in 1854. However, little data are available as to population size in most sites and, while local residents state that the colony on Protection Island is larger than in the past, no census data exist prior to about 1956 (Richardson 1961). Certainly there have been variations in population size due to natural and human factors alike.

Rhinoceros Auklets are very sensitive to disturbance during the nesting period. Adults will readily desert their nests if disturbed during incubation or brooding. Their burrows are often near the surface of the ground and are easily collapsed.

This species has suffered in the past from ground predators introduced onto nesting colonies. Dogs brought by lighthouse personnel killed many birds (see Manuwal 1978), and while automated light stations have changed this

situation, potential introduction of dogs and other predators into Washington colonies is a serious concern.

Like all alcids, Rhinoceros Auklets are extremely vulnerable to oil spills. During the breeding season they concentrate around colonies at night, and they tend to forage in large flocks in areas of strong tidal currents, particularly in inshore waters where oil spills are perhaps of greater likelihood. During the winter, when Rhinoceros Auklets are present only in low numbers in Washington waters, large numbers

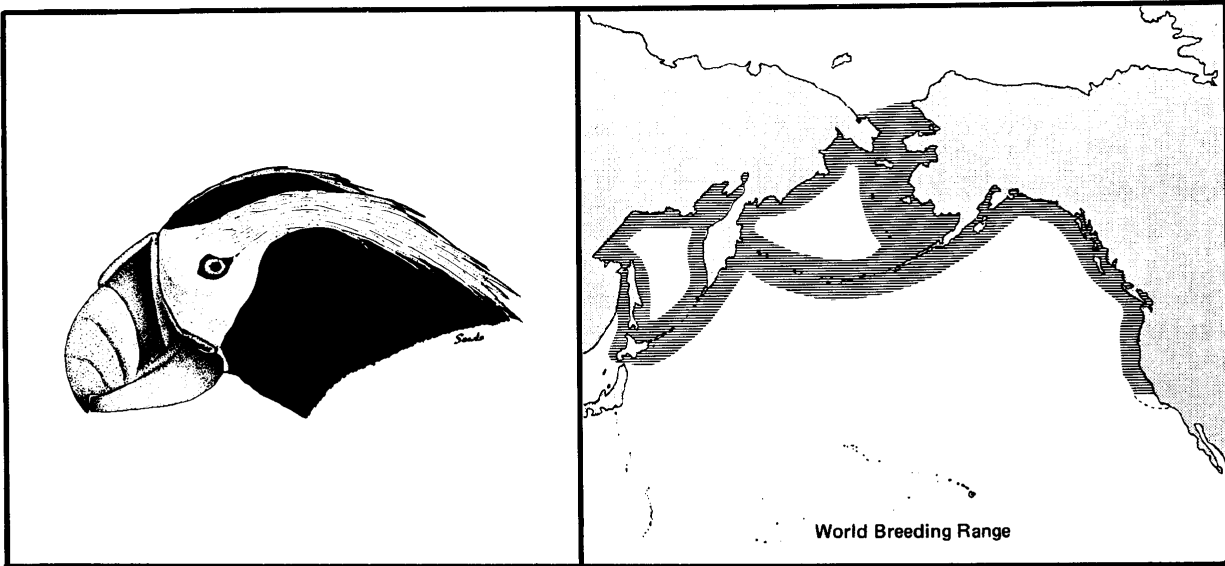
of this species, presumably many from Washington colonies, are present along the California coastline (Speich, pers. obs.).

While there are indications this species is increasing along the west coast of North America (see SOWLS et al. 1980), and while it may be that more Rhinoceros Auklets nest on Protection Island now than in 1956, there is no evidence in Washington that there have been any significant new colonies established. Populations in Washington may be reaching the limit of available nesting habitat.

FIELD NOTES

The authors would appreciate copies of your field notes for updates

Tufted Puffin (*Lunda cirrhata*)



Tufted Puffins are among the most abundant and conspicuous seabirds nesting around the North Pacific rim, with the center of abundance apparently in the western Gulf of Alaska and the Aleutian Islands (Sowls et al. 1980). Their spectacular appearance and their as yet unexplained habit of circling and investigating vessels at sea helps make the "sea parrots" among the most well known of seabirds. At colonies they can often be seen standing in front of their nesting burrows.

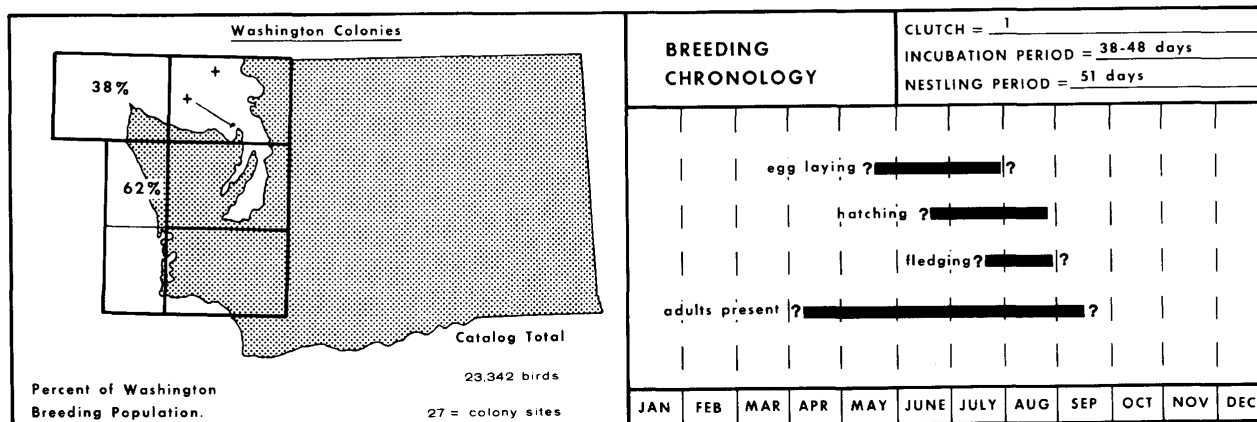
Tufted Puffins usually nest in earth burrows at the edges of cliffs or on the grassy slopes of islands. In Washington they nest on open, grassy slopes and near the top of vertical cliffs where edges erode. Habitat is limited or unavailable on many islands suitable for other species; consequently, in inland waters in

particular, puffins have probably always been restricted in nesting distribution in Washington.

Tufted Puffins can sometimes be observed carrying fish (up to 12 or more) crosswise in their bills to their chicks at colonies. Preferred foods include small fish, cephalopods, and crustaceans (Hatch et al. 1979). Although Tufted Puffins are diurnal, fledglings apparently leave their burrows and go to sea under cover of darkness. In fall, adult puffins lose their brightly colored bill sheathes. Both fledglings and adults head far offshore to winter in mid-ocean and during winters are only occasionally seen near land.

WASHINGTON COLONIES

Although Tufted Puffins are among the least-frequently noted



seabirds breeding in Washington, this attractive species is actually one of the most abundant. Few nest in the inland marine areas where most boating takes place, but on the outer coast there are large colonies. All told, the species breeds at 29 known locations with all but five of these along the outer coast from Tatoosh Island to the Point Grenville area. The largest colonies are on Jagged Island where 7,800 breeding birds are estimated and Alexander Island where 4,000 nest. In the inland waters the species nests only at Seal and Sail Rocks, Protection Island, Smith Island, and at Colville and Bare Islands. Because of inaccessibility of many sites where puffins nest along the outer coast and the fact that, though birds may be seen from a boat circling colony sites, standing outside burrows numbers seen compared with numbers actually present or foraging away from the islands may be at considerable variance. We feel actual numbers of nesting puffins in Washington may be 50% or more larger than the total estimated populations given here.

HISTORICAL STATUS AND VULNERABILITY

Tufted Puffins, like many other diving seabirds with specialized diets, are vulnerable to oiling and to contamination of food webs. Human disturbance on nesting colonies is another potential threat. Most of the colonies occupied by puffins in Washington are protected as wildlife refuges, and those on the outer coast are relatively inaccessible. The colony sites in the inland waters are much more vulnerable to disturbance by boaters, sightseers, and birdwatchers approaching too closely.

Tufted Puffins, like puffins elsewhere (Nettleship 1972; Nisbet 1973), may have decreased in numbers in Washington as populations of large gulls have increased over recorded time. Gulls prey on chicks at burrow entrances, steal fish from adults approaching the burrows, and can severely reduce the reproductive success of puffins. As late as the 1940's, puffins apparently nested at several locations (e.g., Viti Rocks) where they no longer

do. However, there have been a few more sightings in recent years near some old sites and, particularly since refuge status

protects islands in the San Juan Islands, small numbers of Tufted Puffins may reestablish themselves as nesting birds there.



Sand Island (174024) 1977 Caspian Tern chick and egg. S.G. Herman