

## NOTES ON THE FEEDING BEHAVIOR OF GULLS AND CROWS ON CLAMS AND CRABS AT THE YAQUINA ESTUARY, OREGON

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Crows (Grobeck and Pietsch 1978, Zach 1979) and gulls (Tinbergen 1961, Barash et al. 1975, Ingolfsson and Estrella 1978, Kent 1981, Maron 1982, Rockwell 1982) often drop hard-shelled food items to open them. Here, I describe some techniques that gulls and crows used to find and break naturally occurring clams (i.e., clams that were not made available by human clambers) and that gulls used to eat crabs.

I observed clam-handling behavior of gulls and crows for approximately 60 h during April and May 1974. Observations of gulls' crab-handling behavior were made sporadically from 1974 to 1977. All observations were at the Yaquina Estuary, Lincoln County, on the mid-coast of Oregon. The bird species involved were the Common Crow (*Corvus brachyrhynchos*), Western (*Larus occidentalis*) and Glaucous-winged (*L. glaucescens*) gulls and Western x Glaucous-winged Gull hybrids (see Hoffman et al. 1978). As I did not detect any behavioral differences between gull species with respect to handling clams, their behavior is lumped, and, for convenience, I refer simply to gulls and crows.

By examining the shells of clams dropped by gulls or crows, I determined that only Cockles (*Clinocardium nuttalli*) and Littlenecks (*Venerupis staminea*) were captured. Both clams have short siphons and are found on or close to the surface of intertidal mudflats. All clams captured and broken by gulls and crows were between 2-8 cm wide (where width was the maximum anterior-posterior dimension) with 70% of all Cockles (N = 105) and 74% of all Littlenecks (N = 23) 4-6 cm wide.

Gulls used three techniques to locate and capture clams: they hovered about 2-5 m above shallow water (<0.5 m), alighted on the water, surface-dove and grasped the clams with their bills; secondly gulls waded in water about 10 cm deep while looking ahead and down into the water and picked up clams; finally, gulls walked on the mud and picked up or pulled out clams from the surface. I did not observe gulls dig into mud after clams. Gulls also obtained clams from other gulls or from crows by kleptoparasitism.

Crows located clams while walking on the mudflats and used their bills to pick up clams on the surface. To extract buried clams, a crow picked up sand with its bill and dropped the sand beside the clam, and/or used side-wise movements with an open bill to push sand away from the clam. Crows could dig down to about 2 cm and then pull the clam out of the mud with their bills. Crows also pirated clams from other crows or gulls.

I observed gulls attempt to break clams by flying almost vertically to an altitude of about 3-10 m, dropping the clam and then flutter-dropping down to where the clam hit. This flying-drop technique has been previously described (e.g., Tinbergen 1961, Barash et al. 1975, Kent 1981). I observed gulls use only flying drops to break clams, but Barash reported that gulls also dropped clams while standing on the substrate. Barash found that the flying drop, which was more efficient in breaking clams but also more subject to gull kleptoparasitism, was used when gull densities were less than about 12 gulls within 50 m. The absence of standing drops at the Yaquina Estuary may be a result of the low densities of gulls around a gull with a clam; I never observed more than five gulls within 50 m and often no other gulls were present.

## NOTES

Crows exhibited more behavioral plasticity than gulls in handling clams. Some crows used flying drops to try to break open clams, while others attempted unsuccessfully to peck open shells. One crow apparently cached a clam by taking a clam to dry sand, dropping it, then using its bill to place a 7 x 13 cm piece of wood and then sand on the clam (incompletely covering it) and then flying away. Finally, I observed crows several times take unbroken clams into an adjacent forest, presumably to their nests.

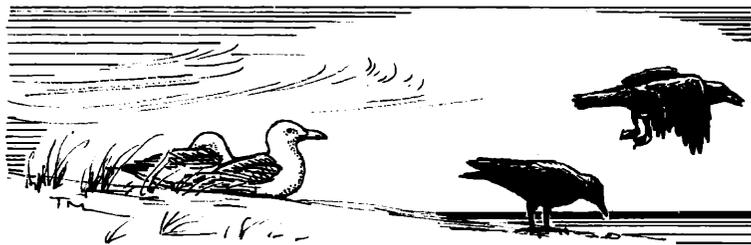
I observed gulls fly over shallow water, alight, dive and swim or fly away with live Dungeness (*Cancer magister*) or Red Rock (*C. productus*) crabs. On shore, gulls broke each leg off successively and pecked at the underside of the crabs. Although I have observed a Western Gull drop a large flounder on rocks, in 11 observations of gulls capturing crabs, I did not see a gull using flying drops to open crabs as reported for Herring Gulls (*L. argentatus*) by Ingolfsson and Estrella (1978).

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## LITERATURE CITED

- Barash, D.P., P. Donovan & R. Myrick. 1975. Clam dropping behavior of the Glaucous-winged Gull (*Larus glaucescens*). *Wilson Bull.* 87:60-64.
- Grobecker, D.B. & T.W. Pietsch. 1978. Crows use automobiles as nutcrackers. *Auk* 95:760-761.
- Hoffman, W., J.A. Wiens & J.M. Scott. 1978. Hybridization between gulls (*Larus glaucescens* and *L. occidentalis*) in the Pacific Northwest. *Auk* 95:441-458.
- Ingolfsson, A. & B.T. Estrella. 1978. The development of shell-cracking behavior in Herring Gulls. *Auk* 95:577-579.
- Kent, B.W. 1981. Prey dropped by Herring Gulls (*Larus argentatus*) on soft sediments. *Auk* 98:350-354.
- Maron, J.L. 1982. Shell-dropping behavior of Western Gulls (*Larus occidentalis*). *Auk* 99:565-569.
- Rockwell, E.D. 1982. Intraspecific food robbing in Glaucous-winged Gulls. *Wilson Bull.* 94:282-288.
- Tinbergen, N. 1961. *The Herring Gull's world*. Basic Books, New York.
- Zach, R. 1979. Shell dropping: decision making and optimal foraging in Northwestern Crows. *Behaviour* 68:106-117.

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Sketch by Tim Manolis