No Wake Zone

St. Catherines Island — Research, Conservation, Education Volume 5, Issue 2 February 2010

American Oystercatcher Banding

Working with GA DNR, Manomet Center for Conservation Sciences and Massachusetts Audubon, St. Catherines Island staff made an effort to band winter and resident populations of birds along the shell rakes (the habitat shown in photos here). This is part of the American Oystercatcher Working Group's effort to understand the movement, habitat requirements, and survival of these birds along the Atlantic Coast (Oystercatchers range from Massachusetts to Florida).

Cannon-netting is one of the primary techniques for catching shorebirds in the winter. We have used it here on St. Catherines Island in winter 2009 (see Volume 4, Issue 2) to catch long distance migratory shorebirds to test for Avian Influenza. As before, working with a cannon-net requires first finding a roosting site at high tide and hoping the birds will return there during the next high tide. The net is set-up at low-tide, getting everything prepared long before the birds will come into roost. On our planned cannon-netting mornings, we bundled up like we were in the Arctic, as it was so cold there was ice on the shell rakes!! We dug a trench, set the net up (see photo below) and backed off and waited for birds to come in. It took 3 days for all the various factors to be right (wind, tide, waves, birds, etc.). Finally, we were primed, we had 45 birds in the 'net zone' and were just about to set off the cannons when a Bald Eagle flew over and scared them away. Thankfully the birds came back, albeit in lesser numbers, within the hour and we shot the cannon. The cannon went off at an angle (see photo) but we still managed to catch 15 Oystercatchers!! After fishing them out of the net, placing them in holding boxes, we began the process of banding. Researchers working with the oystercatchers have agreed on a common banding protocol, with each state having its own color bands. A combination of band color and engraved codes identifies the individual birds. Georgia's color is red, and engraved codes are horizontally oriented or vertically oriented (see photo). We place two identical bands on each bird to increase chances of reading the bands and guarding against loss. There is also a metal USGS band placed on the lower leg. St. Catherines Island staff have made 2 re-sighting attempts, and as of the middle of February, we have located all of the banded individuals. Some of these will make a Northern migration in the spring, and hopefully a good number of them will stay in Georgia to breed this spring/summer.

Brad Winn pointing at the ice on the rake

Brad Winn (GA DNR) and Stephen Brown (Manomet) geared up for work in not-so-balmy Georgia!

Shiloh Schulte and Stephen Brown setting up the net.

Editor-in-Chief Jenifer Hilburn

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Curator David Hurst Thomas Tests Darwin in Archaeological Sites

By: Kristin Elise Phillips, Science Publicist, Communications, American Museum of Natural History

Scientists at the American Museum of Natural History continue to celebrate the 200th anniversary of Charles Darwin's birth and the 1859 publication of On the Origin of Species with a collection of vignettes describing expeditions and ideas with links to Darwin's seminal work.

Part of the St. Catherines archaeology team shucking oysters to determine the amount of energy (in calories) that people can retrieve in relation to the amount of energy spent collecting and processing. Credit: Lorann S.A. Pendleton.

Deer, clams, oysters, alligators: if you walked the length of St. Catherines Island off of Georgia, what would you pop into your mouth? David Hurst Thomas, curator in the Division of Anthropology at the Museum, uses optimal foraging theory to interpret the remains of thousands of meals left behind in archaeological sites across the island.

Optimal foraging theory puts an evolutionary spin on what people chose to eat. The assumption that individuals decide what to consume in a way that maximizes the total energy return and minimizes the energy they must spend to search for, collect, and prepare food items in their environment. This approach is known as the "diet breadth model," a series of testable hypotheses about what an efficient forager will pick (and not pick) from the array of available food.

"Darwinian evolutionary ecology allows us to frame some concrete expectations about what a forager should choose to gather," says Thomas. "Suppose someone dropped a pot of coins. Some would be selective, picking up only silver dollars, and others would rush to pick up everything, from pennies on up. The diet breadth model allows us to distinguish between these strategies in archaeological sites."

Thomas and his team have spent more than 30 years excavating different archaeological sites throughout the island's 14,000-plus acres. Recently, the team conducted a series of foraging experiments that, as Thomas puts it, "hook theory to dirt archaeology" by mapping the most efficient strategies for harvesting the available foodstuffs. They harvested oysters, dug up clams, butchered diamondback terrapins, and drank periwinkle soup. For each food type, the archaeologists recorded the length of time and amount of energy expended for collecting and processing. These data were then compared to the amount of available energy gained from food to answer a key question: if I invest one hour in foraging, what is the energetic return on that investment? The result, expressed as kilocalories per hour, allows researchers to compare different food types.

The experiments showed that one of the highest-ranking food items on the island was white-tailed deer. If a forager spends an hour finding, pursuing, butchering, and cooking a deer, the return rate would be about 12,000 to 20,000 kilocalories per hour. This means that deer are like silver dollars in a pile of change. Archaeological sites throughout the island confirm venison's importance in the aboriginal diet since thousands of deer bones have been found. The American alligator likewise has an extremely high energetic return. Experiments conducted in commercial alligator farms in Florida demonstrate an energetic return of about 22,000 kilocalories per hour. But alligator bones are rare in the archaeological sites, suggesting that perhaps alligators were rarer before European contact or that, in this case, the experimental data or the optimal foraging model does not hold.

Elliot Blair excavating at the Mission Pueblo on St. Catherines Island in 2005. Credit: Anna Semon

The rate of return plummets, though, when people dig in the marshes for animal protein. The common eastern oyster (*Crassostrea virginica*) provides only about 1,000 to 1,700 kilocalories per hour; oysters are like quarters in the change pile. Tiny marsh periwinkles (*Littorina irrorata*) are like pennies, hardly worth the effort to harvest and prepare with a return of between 26 and 135 kilocalories per hour. Foraging theory, like the American monetary system, predicts what people should do if money (energy) is the only concern: If you bother to pick up the pennies (the periwinkles), you'll also grab every quarter (oyster) or silver dollar (white-tailed deer) that you encounter. Archaeological sites contain unequivocal evidence of such past decision-making, denoting the shifts in diet breadth through time and underscoring the point that efficient foragers can and do change their strategies to fit the circumstances at hand. For example, as population increases, high-ranking food items like deer will likely be overhunted and perhaps driven to extinction. It also might be that different age groups and genders use different foraging strategies.

"The Darwinian paradigm is like an atlas, showing the various roads available for somebody setting out on a driving trip. But the driver gets to choose whether the trip should be quick, scenic, or traffic-free," says Thomas. "Archaeologists use human behavioral ecology to map the options and understand the fitness benefits, making sense of the ancient stuff we find."

For additional information, please see "*Native American Landscapes of St. Catherines Island, Georgia*" (*Anthropological Papers of the American Museum of Natural History*, 2008).