How to Build an Aviary for Endangered Macaws

by Laney S. Rickman, Cuero, TX

It started as Bird Farms Macaw Habitat Proto '96. Because of conception problems and a much longer than anticipated gestation, it came to be known as Proto '97, more accurately reflecting the birthing date.

The Proto part of the name says that this is still a design in progress. What it means is "we think we're doing it right, but we might change our mind." While the design incorporates our best thinking at the time, we know it is an evolutionary process as we move toward Proto '99. But that we live long enough, we may arrive at Bird Farms Standard Macaw Habitat. Given the circumstances, that "ultimate" habitat primarily will provide the best possible situation for our captive breeder birds and their fledglings. Secondarily, the consideration is on the greatest ease for the keeper, within the foregoing parameters.

Why It's Not Proto '96

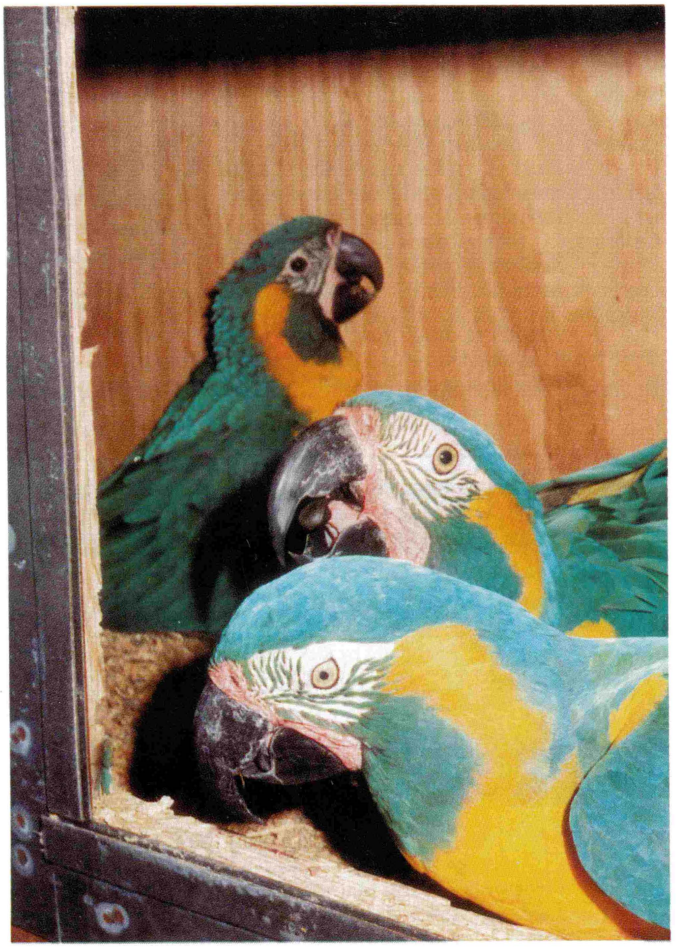
Initial detailed drawings on Proto '96 were based on a variety of earlier experiences, including observations at zoos. Each element we incorporated seemed right at the time. After all the design and drawing time invested on Proto '96, the plan was totally rejected. It incorporated three flights radiating from an enclosed central service hub. A concrete slab at ground level served as cage bottoms and service area floor. It fulfilled a lot of our "wants:" a minimum 2,000 cubic feet of flight space; no visual contact between breeding pairs; easily adjusted for the vagaries of South Texas weather; efficiency for the keeper.

Where it failed, primarily was in biosecurity.

It continued to cluster groups of birds in close proximity, as do our first aviaries. These are two rows of side-by-side suspended cages (160 cubic feet each) backed on a central service aisle. All are inside an iron structure with metal roof over the nest boxes and feed stations with the rest enclosed by one inch, 14 gauge wire.

With acreage available, there was no reason to continue the disease risk inherent in such clustering of birds. We spend about $300 on testing incoming birds (which are few) even before bringing them into the facility quarantine area. We also spend as much on outbound birds as a barometer on flock health. We always have been and remain today a disease-free facility. However, even this regimen is no sure thing against spread of disease in a facility with more than one bird.

"The ultimate quarantine lasts for the bird's entire life and anything less is a compromise," says David Phalen, DVM, Ph.D. at Texas A&M School of Veterinary Medicine.



Parents protect a fully feathered, ready-to-fledge offspring (back). Our commitment to parent rearing is to produce the best possible future breeders. This is the major motivation for the large habitat design. In our older breeder cages (four by four by ten feet), it becomes crowded with just one clutch remaining with the parents for a year. Our objective is that they remain while the parents raise the next clutch, to be socialized with and taught by siblings as well as parents.

Reason No. 1 for rejection of Proto '96

We would establish a minimum distance of 150 feet between each breeder pair. Each future habitat would be positioned so that prevailing winds do not blow across one and then on through another.

The ground level design presented other problems. Even in the aviaries with suspended cages we fight ants on an ongoing basis with diazinon watered into the ground in and around the facilities. Heavy marine grease is strategically used to isolate the pipes from which the cages are suspended. Proto '96 assumed the use of diazinon to continue, even heavier in application. We would like to phase out use of this pesticide before it is banned along with its common alternatives (most likely within a couple of years).

The same on-the-ground design did nothing to decrease control problems related to rodents, opossums, domestic cats, and coyotes.

Reason No. 2 for rejection

We would elevate the habitat in such a way as to facilitate greater ease of control of pests, rodents, vermin, and varmints.

New Plan, New Name

After rejecting the '96 plans, redesign pushed us into the next year on the construction phase. The concept of a large suspended cage was our starting point on the redesign for what would be Proto '97.

Fresh out of skyhooks, we used legs to elevate the habitat above ground level, not wholly unlike our conventional suspended cages (except that 12 of the old ones could fit inside just this flight area).

The habitat was sited only after plotting an extensive acreage to assure maximum future habitat locations at least 150 feet apart in all directions and with none sharing the same prevailing wind vectors. We established three north-south lines to build on. Proto '97 is canted about 20 degrees northwest-southeast along that line. We wanted the northern end of the structure sheltered from the north wind and west sun but still be able to maximize the cooling southeasterly coastal winds in the summer.

Also, we had decided not to use a double enclosure approach to the escape risk. We were concerned, however, that for some of our macaws, 12 gauge wire is like a popsicle on a South Texas summer afternoon. Given these two factors, we selected a six gauge wire with two inch by four inch openings, which was the only size available. We knew the macaws could not get out of that size opening. At the same time, we were aware that wild birds might get inside the habitat.

"Wild birds are potentially a source of disease. Here in Texas, both the White-winged and Inca Doves are commonly infected with chlamydia," said Dr. Phalen of A&M.

While we have wild birds on the property year round, they have never been attracted to our other aviaries. One small building has a wooden trellis skin with two inch openings. We have never seen a wild bird inside it. We weighed the two by four opening against the heavy duty wire. We stayed with six gauge.

These "horse panels" were available at our local farmers co-op in various sizes up to five by 20 feet. This size combined easily to give us the minimum 2,000 cubic feet (10 X 10 X 20 feet) of flight space we wanted. Four panels welded together lengthwise would form sides, top and bottom.

This caging fabric, with a total weight of more than 1,200 pounds, dictated extensive structural support. Due to pricing at design time, we selected "used" 2 3/8 inch heavy-wall oilfield tubing for the structure. (During the construction phase, prices of this material dramatically increased. It turned out we would have been better off cost-wise to have used new three-inch-square, medium wall tubing, which would have resulted in labor savings. We wound up sticking with the oilfield tubing stipulated in the drawings.)

Three "H" structures of the heavy tubing would be set in the ground with four feet of concrete. The bar of the "H" at five feet above ground would allow cleaning beneath the flight. To help carry the weight (and sag), tubing supports at the bar level of the "H" would join all three structures on the lower perimeter.

The design called for the bottom panel being laid in first and welded around the perimeter. The sides were then set on top of the bottom and welded in. Next, crosspieces would be welded in at the top of each "H" where the sides ended, allowing a way to hoist the top panel into position as well as supporting the top when welded to them and the side panels.

On the south, or unsheltered, end of the flight, the caging fabric was installed in two pieces. The top piece is welded in place with angle iron at the lower edge. The bottom piece (10 by five feet) is framed in angle iron and hinged on the crossbar of the "H" structure. The door is held in the closed position by two padlocks through the top and bottom angle iron pieces. When open, this size door allows almost entire mesquite trees to be placed in the flight for perches. Of course, when it's open the birds are locked in the sheltered enclosure at the north, or opposite, end.

Photos by Laney S. Rickman

Diana abides an intrusion as she feeds two-day-old chick. All macaws are dangerously threatened in the wild and should be given the opportunity in captivity to raise at least some offspring as closely as possible as they would in the wild.

Photos by Laney S. Rickman

Closed for Winter. The winterizing metal panel has been closed and the sliding door is adjusted for movement between the protected area and the open flight. Both can be returned to the open position in less than a minute. The discolorations on the legs just below the bottom of the flight are marine grease, used to deter would-be climbers. The end panel is in two pieces, the bottom dropping to allow a five by ten foot opening used to replace the large mesquite perches inside the flight. The door is held in the closed position by two padlocks.

Open all Summer. The hinged winterizing panel is swung to overlap the center portion of the interface. The sliding access door is fully opened between the interior cage and the open flight. The vent on the east side is fully open and the flexiglass panel has been removed from the keeper's entrance door.

Ah, the Enclosed Area

As the cliche goes, the delay is in the interface. That is, designing a weatherproof (bottom included) enclosure with a caged area, nest box and food station with service area around each — all maintaining biosecurity "suspended" above ground level. And don't forget; we want the most wind possible during the summer, and the ability to close off all airflow during the winter.

What we finally arrived at was a concrete slab floor, with no ground contact other than the supporting "H" legs. We added a fourth "H" positioned to yield a 10 X 8 foot, three-inch thick slab floor at the north end of the structure. Cross pieces were welded into the 10 X 8 foot floor space and rebar was welded between the cross-pieces. This bracing was intended to support the elevated slab as well as serving as a "stiffening" element to the entire structure.

To facilitate cleaning drainage, the slab is sloped and formed toward the opening for a sliding door between the enclosed area and the open flight.

This sliding metal-skinned door comprises part of the solution to the bedevilment presented by the interface between flight and interior cage. As eventually worked out, the other elements are a fixed metal skin in the middle of the interface and a hinged door inside the flight that folds back onto the fixed portion in the summer. In the winter, this hinged door closes over a portion of caging wire separating the flight from the interior enclosure.

This arrangement gives us about 55 square feet of open area collecting the summer breeze on the face of the enclosure. On the easterly wall there is a doorway and window area that add another 35 square feet of collecting area. On the north are two window areas with 32 square feet allowing the heat to ride out on the crosswind. The west wall is a solid metal skin to protect the inside from the evening sun.

The window spaces (four by four feet each) feature industrial air handler exhaust vents with manually adjustable louvers. The door is made of one-inch-square steel tubing. All of these openings are covered on the inside with one inch, 12 gauge wire to secure the enclosed work area.

Sitting on the slab, and using it as the floor, is a six by seven foot cage enclosure that's eight feet tall and constructed of the same six gauge wire. This allows a two-foot service aisle along the north windows to facilitate adjustment. The food station is also on this aisle. It consists of an open metal rack welded in place and accommodates four two-quart stainless steel bowls.

Inside the protected area, the interior cage incorporates the concrete slab as a floor. The caging fabric, with its two by four inch openings, is used for stair steps and landing. This discourages critters that climb. To stop ants, marine grease is also used on the supports between landing and building and at the two points where the handrail attaches to the stairs.

Across the rear (north end) of the enclosure is a four by eight foot bank of louvered vents, opened here to provide wind flow through the enclosed area for relief from the summer heat. The oak tree surrounds the enclosure, but with hardly any overhang. The roof has enough slope, and the galvalum material is slippery enough, to retard critters that might be inclined to drop down from the tree. The proximity of the tree is for shading from the South Texas summer sun.

This aisle also provides access to the nest box lockout, which is a sliding wood panel set in tracks. The corners of the leading edge have a three-inch-radius curve for ease of movement. The open-close throw is six inches. The door is locked in either position by a tamper-proof sliding bolt lock.

The other service aisle, which is three feet wide, provides door access to the interior cage and also to the flight. As well, nest box access and inspection is located on the aisle.

Keeper Response

The facility can be adjusted for hot/cold/hot weather changes in five minutes. This is a major change from the other aviaries where winterizing is a labor-intense task. Once winterized, they stay that way until spring. In the cluster aviaries there is only about 100

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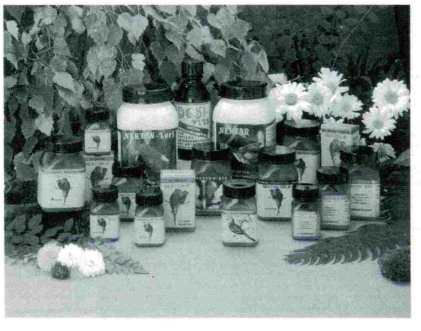

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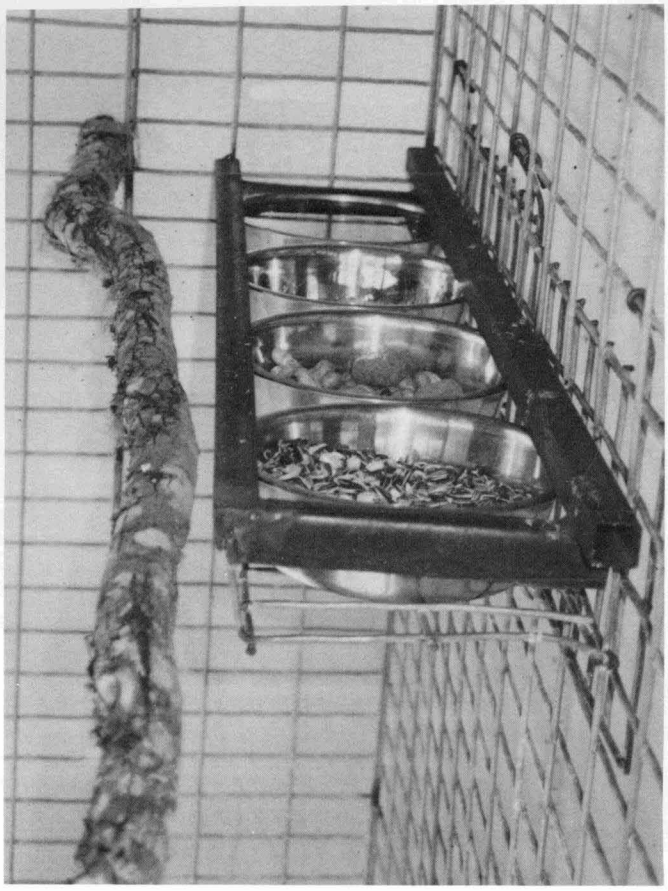
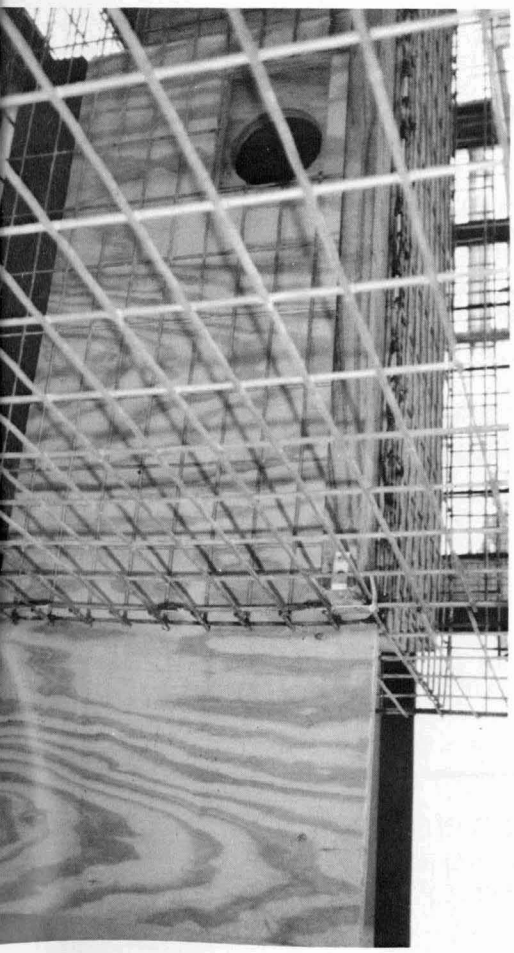


The feeding station is located in the enclosed area and well protected from contamination by other animals. The welded rack secures four bowls (two-quart size) which always have an offering of water, soft foods (fresh twice daily), nuts and monkey biscuits, and sunflower seeds.



The only processed lumber perch (two by four pine) is located in front of the nest box entrance. The plywood panel protruding from the cage is a lockout. Set in metal rails, the panel slides over the entrance hole with a throw of six inches. A sliding bolt, behind the panel and out of reach of the birds, holds the lock out in the selected position.

square feet of weather adjustable surface after winterizing. This often is not enough to compensate for hot winter days.

Cleaning is much easier. The interior slab, seldom soiled so far, is easy to scrub and hose off. The birds mostly roost in the flight and not always at the same perch. This means, in a 200 square foot area below the flight, there is no concentration of droppings.

And those questioned two by four inch openings. Most droppings fall through without even touching wire.

The habitat is worth its $80-a-year cost just in saved labor.

Looking At Proto '99

We have come to conclude that the primary reasons birds fly are for Sex, Shelter and Survival. We say survival instead of sustenance to include fleeing danger as well as the sustenance of food. While these adults don't fly as much as we would have thought, the fledglings of this species will attempt to fly when climbing might be easier.

Because it is our objective to have two consecutive clutches with the parents at the same time, we will increase the minimum of 2,000 cubic feet of flight space in Proto '99.

The vertical movement of the birds is within the upper six feet of the flight. In Proto '99 we will look at reducing the vertical and increasing the horizontal space in the cage. Anticipated flight measurement is 8 feet tall by 15 feet wide and 20 feet long. This will result in a 15 percent increase in caging fabric usage, but will net a 20 percent increase of enclosed space. When considering that the birds already are not using the bottom two feet of vertical space, it is actually closer to a 50 percent increase in anticipated useable space.

On the enclosed area of Proto '99, we intend to substitute glass jalousied windows or crank out metal frame windows instead of the air handler vents. These options still allow 100 percent venting of the wall square footage used. Hopefully, they will prove more airtight.

We intend to combine labor and material costs when comparing used round tubing and new square tubing. We anticipate using all square tubing on Proto '99.

Instead of pop-riveting the seams on the metal skin of the enclosure, we will back the seams with structural square tubing and use screws to secure the seams.

There will be some changes on the interface. If we can figure them out before 1999.

Name Change for Proto '99?

If all goes well, the Proto '99 name could easily become The Bird Farms Standard Macaw Habitat. Well, maybe.

(Laney S. Rickman is the owner of The Bird Farms, a for-profit business affiliated in conducting breeding and parent-rearing research for The Bird Endowment Inc., a 501 (c)(3) organization.)