

*Appendix II*  
**Montane Anuran Conservation Center (MACC)**

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Photos by T. Sprankle

The Montane Anuran Conservation Center (MACC) facility was recently used at The Phoenix Zoo for the captive rearing of native Arizona leopard frogs (Figures 1, 2, and 3). In use since 1997, the facility consists of two 20 ft (6 m) long refrigerated cargo containers [containers are available in 40 ft (12 m) lengths as well]. The following standards and recommendations are based on the Zoo's experience.



**Figure 1.** Front View of MACC with shade structure.



**Figure 2.** Wide view of MACC and its concrete pad stoop.



**Figure 3.** Back view of the MACC shows where water is plumbed into both buildings via pipe.

To begin, one important adjustment was made to the containers' structure. The original doors (Figure 4) were very heavy and unwieldy and therefore were quickly removed. A simple wooden frame was installed in that area; made and covered with plywood on the inside and wooden paneling on the outside for aesthetics. The seams were sealed with caulking and a regular hollow-core door was installed for entrance to the container (Figure 5).



**Figure 4.** Original exterior doors before removal.



**Figure 5.** Inside view of front wall replacing swing doors

A few simple adaptations were made to prepare the interior of the structure for exposure to water and to provide access to source water and electricity. Insulated or refrigerated containers must have either a plastic laminate or aluminum lining in order to avoid rusting and also to help control temperatures. Water and electricity were run to the containers once they were installed on zoo grounds (Figures 6 and 7). The plumbing runs horizontally around both sides of the inside of the building, midway up the wall. There are two hose bibs on each side for a total of five per container. The layout for water and electricity was originally placed with the use of large round plastic aquaculture tubs in mind (Figure 8). We now use a rack system with plastic food storage containers instead, making the existing water and electrical layout impractical.



**Figure 6.** Water supply and filter into MACC



**Figure 7.** MACC's water pipe and hose bib.



**Figure 8.** Example of shelving with tadpole tubs.

Additional adjustments were made to maintain constant indoor temperatures and control lighting. The MACC containers came with a refrigeration unit but, because we were not confident it would last, we replaced it with a standard home-use window air conditioning unit (Figure 9). The air conditioning units were installed in the walls (Figure 5); we believe that they have each been replaced once since the facility was built in 1997. Despite our extremely high temperatures in Arizona, we have been able to maintain temperatures between 70-74 F (21-23 C) without too much difficulty. A standard pool timer controls the lights (Figure 10).<sup>1</sup>



**Figure 9.** A standard household window A/C unit was installed in the wall of each container.



**Figure 10.** Pool timer used to program lights.

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<sup>1</sup> An Intermatic® manual pool timer was used in the MACC.

These buildings were meant to be temporary, but were in use for ten years. We had no designated budget so we could not install floor drains, requiring all of our water to be removed manually and dumped. Since we are raising a native species we have not had to worry about as strict a quarantine situation as would be required if we were working with non-native species. Each container originally cost ~2,000 USD. Because of the age of the facility and staff turnover, the information on original expenses for the facility is unavailable. The overall cost of the project was reduced because animal staff, rather than facilities staff, performed most of the labor.

The leopard frogs have recently moved into a new permanent building that is specifically devoted to conservation and temporary holding for Arizona natives. The container units are currently being utilized for winter housing for other reptiles and amphibians and will be used as emergency holding or storage in the future.