

# Frogmouth Management at SeaWorld Orlando

By

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## Introduction

Tawny frogmouths, *Podargus strigoides*, belong to the order Caprimulgiformes. They are often mistaken for owls because of their similar appearance. They resemble owls with their large eyes and body shape and are nocturnal and silent in flight. Unlike owls who hunt with their talons, tawny frogmouths hunt with their mouth. Prey is either caught on the ground or they sit and wait for prey to come to them, using the feathery vibrissae around their bills to direct insects into their mouths. Frogmouths are native to Australia, coastal islands and Tasmania. They are found in heavy forests, but are also common in suburban areas. They are rarely seen, being nocturnal and solitary.

The breeding of frogmouths at SeaWorld Orlando has always been encouraged and there was a burst of reproduction in 2000 from a very prolific pair. Today, we have five pair set-up for breeding and in the past twenty-four months have had chicks or eggs from all five. Care, exhibit set up and hand rearing of the chicks has involved the entire Aviculture staff from both SeaWorld and Discovery Cove.

Since 2000, the North American population of tawny frogmouths has declined by 29%. Over the last decade (1999-2009), fifty-four frogmouth hatchings have occurred and twenty-two of those hatches (41%) occurred at Sea World Orlando. An overall 35% chick mortality (death at <30 days of age) has been observed during this ten-year period. By employing and refining hand rearing techniques for the species, SeaWorld Orlando has increased the survival (<30-day) rate of chicks by 12%. The current intense program will continue until the North American population becomes stable. At that time, breeding pairs may be relocated to other institutions to free up space for additional species. The long-term sustainability of captive bird populations has been the subject of much discussion over the last five years. A steady and sustained decline in the North American tawny frogmouth population, coupled with a low reproductive rate, prompted the PMP to identify captive-breeding as the program's top priority. SeaWorld Orlando recognized this goal and devoted important off-exhibit space to work with multiple breeding pairs. Genetically important frogmouths, which were otherwise being utilized for Education/Presentation purposes within the SeaWorld organization, were re-allocated for breeding purposes and other frogmouths identified through the PMP were brought into the collection in 2007 (Myers, 2009)

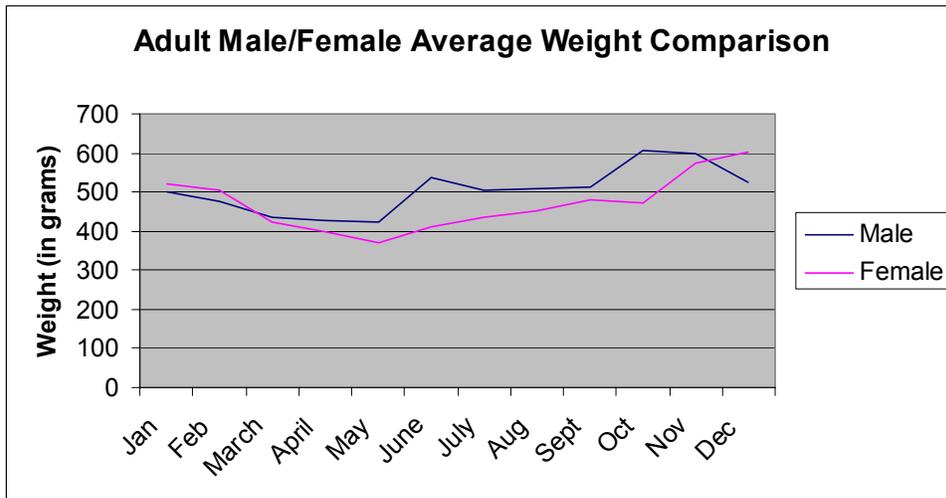
## Enclosure

Tawny frogmouths in our collection have been housed in a variety of habitats. Due to their docile nature, they can be exhibited with almost any other species of bird. They have thrived in free-flight aviaries, large walk-through exhibits and smaller aviaries on and off display. In the past, we have seen successful breeding by certain pairs regardless of where they were housed. However, with the recent commitment to breed frogmouths, every attempt has been made to isolate pairs in their own aviaries that offer the least amount of distraction. These off-exhibit areas are fairly simple, wire-framed aviaries of different sizes with substrates of concrete or mulch. Foliage ranges from a single potted palm to a fully planted aviary. All are outdoors and offer an ample amount of flying room. Aviaries are perched in such a way that natural light can reach the birds, as frogmouths love to sun themselves. Perches don't need to be plentiful, but varied in height. Some birds like to perch as high as the rafters; others prefer to be at lower levels.

## Diet

Historically, frogmouth diets have been offered by hand rather than from a food pan. In the past, the birds were fed twice a day with staff going out of their way, even climbing trees, attempting to feed them. With experience came the realization that frogmouths do well on one feeding a day and our procedure changed to hand feeding only in the mornings, until the birds were satiated. It is not uncommon for some birds to refuse food for days and still

thrive. Mice, typically peach fuzzy and hopper sizes, bugs, including frozen crickets (thawed out) and mighty mealworms, were given as part of their daily diet. Most birds have their preferences on the size rodent they will accept; some will even refuse the larger mice, preferring only the smaller sizes. Some tawny frogmouths can be enthusiastic feeders, making it almost impossible to hand feed bugs. They snap at the food items and sometimes get a finger instead. These birds can be fed using large tongs to prevent this. Even without the bugs, the rodent diet, sprinkled with calcium carbonate and Vionate\* in a fifty-fifty ratio, is sufficient. For enrichment, tawnys will hunt live crickets offered by the aviculturists. Appetites fluctuate often, even daily. Some birds may be hunting at night in their aviaries without us knowing, which would explain their appetite flux. However, it is important to be familiar with the birds' eating habits. Where it may not be unusual to go off food for some individuals, it could be concerning for others. Keep in mind it is not uncommon for adults to refuse eating at times, especially when they are handled or moved to a new area. Along the same lines, weights will also fluctuate throughout the year.



Because our frogmouths were hand feeders, they were never been given the opportunity to raise their own offspring. This year a plan of action was put into place to modify their eating habits and condition them to eat from a pan. We wanted them to be self-sufficient and no longer rely on the aviculturists as their source of food. Before the process was implemented, all birds were weighed and then monitored closely during the transition period. Hand feeding was eliminated right away. The birds are most active in the early morning before the sun comes up, and diets were offered at this time. Food items were placed in a shallow pan and held in front of the birds so they could help themselves. Using live mealworms stimulated them to lunge for the food, so a healthy amount was placed into the bowl. About fifteen to twenty-five worms were given, depending on the skill and interest level of each bird. The birds that caught on quickest got fewer worms than those who were slower to figure it out. Peach fuzzies were also in the shallow pan and often appeared to be picked up accidentally, as they would get covered by the worms. Any leftovers were placed in a ceramic crock with more meal worms added, then placed below the perch so they could see the movement of the worms. Once the birds caught on to picking up food on their own from the crock, the crock was then placed directly into a stand. Crickets were initially included as they were items hand fed, however, they were never eaten. Although some birds took longer than others to figure it out, the transition only took a couple of weeks. Their diet is now placed in a ceramic crock (as plastic feeders get flipped over). The crock is placed in a larger, rectangular stainless steel pan lined with a mat so the birds don't slip when landing. This pan is on a stand raised off the ground. It is important to leave a clear flight path to the food stand. The diet is offered in the evening, left overnight and picked up in the morning. The remaining food items are recorded. Presently, the diet per bird is one hopper, six peach fuzzies and mealworms. The amount of rodents for each diet varies. Not only do individuals have different appetites, but throughout the year appetites fluctuate. Amounts are adjusted as is deemed necessary. Today all of our tawny frogmouths pan feed. With this new feeding protocol in place, we hope to give the birds a chance to raise their own offspring.



**Feeding stand**

### **Introducing pairs**

Introducing tawny frogmouths is much less dramatic than many other species. Initially birds are placed side-by-side in howdy cages. We used hanging cages, measuring 4x4x4 suspended from the ceiling. The next step is placing them in a cage together with limited perches so they are encouraged to be near each other. Sitting side by side is usually the first indication of pair bonding. One pair was introduced by this method and after two months of perching on opposite sides of the enclosure, it was decided they were an incompatible pair. There was also one opportunity to house the male with two females. This worked to the male's advantage as he did choose one female for his mate. If using this method, monitor the birds closely and remove the extra female once the male makes his choice to avoid aggression. Even with our successes, because they are nocturnal, frogmouth breeding is still somewhat mysterious to us. A pair is put together, a nest given and eggs are found. No courtship is seen and no bonding behaviors are observed. Occasionally the birds will be witnessed adding nesting material to their nest site. The only indication we've seen that a pair has perhaps bonded prior to egg laying is perching in close proximity to each other and vocalizing back and forth. Both sexes vocalize, but the females are often more vocal than the males. They are most vocal in the early morning, evening, and before breeding season. Birds seem to be quite vocal if they are within sight of any other tawny frogmouths.

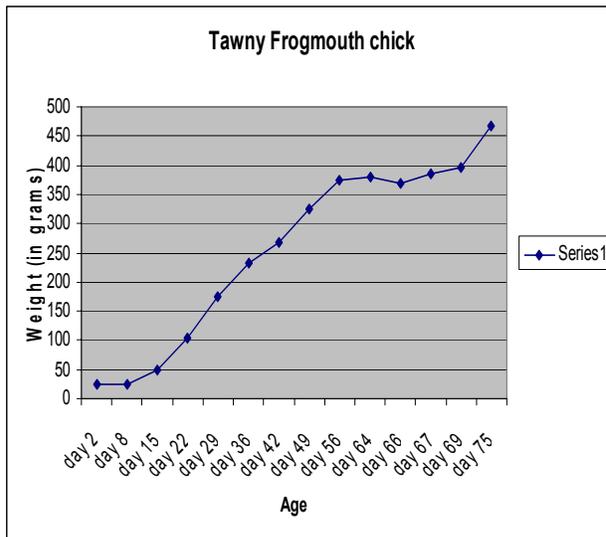
### **Nesting**

Nests given are constructed with a grapevine wreath cable tied to a shade cloth bottom, just large enough for them to fit in, about the size of a salad plate. The nests are secured to perches or in areas that the birds seem to occupy frequently. Multiple nest sites are offered, as they may be particular about where they decide to nest. Pairs have also utilized upright palm logs that were in the exhibit as décor. Both tall and short logs, with either a slight depression or a rotted-out interior, have been chosen and occupied as nests. The amount of nesting material used seems dependent on the individual. One aviary had only one potted palm plant and broken and stripped leaves were found in the nest. It is unknown whether the female builds, but males definitely do. One male, who was unpaired, chose an empty hollow palm log as his perch of choice. One spring he made it into a nest, filling it with twigs and leaves, and occupied it comfortably until we dislodged it. With one pair, the male dominated the nest site, often sitting on it days prior to eggs actually being laid. It was even unknown if the female did any incubating, as the male was on the nest when we left at night and upon arrival in the morning. However, with one of the newer pairs, both male and female were seen randomly on the nest and after eggs were laid, both were seen on the nest incubating.



### Incubation and hand rearing

Tawny frogmouths have laid eggs from December to May. They usually lay two eggs per clutch and some will re-clutch if given the opportunity. With inexperienced birds there is often hesitation leaving valuable eggs with them. Eggs are pulled from the nest and placed into an incubator and a dummy egg is left for the birds to tend to. The artificial incubation parameters for the Orlando climate are 99.5°Fahrenheit for the dry bulb and 44-48% relative humidity. If a pair proved to be diligent in incubating the dummy eggs, their real eggs were given back to them, and any future eggs left with them. They will only be put in an incubator if absolutely necessary; for example, abandonment of an egg, or a pair that consistently breaks eggs. Because the birds have yet to raise chicks, the eggs are left in the nest until day twenty-five of the first egg. This is three days prior to that egg's predicted hatch date. They are then candled and placed into an incubator until hatching. Once externally pipped and placed into a hatching bowl or tray, hatching may take 36-48 hours. All incubator-hatched chicks are set up in a brooder to be hand raised by an aviculturist. The chick is placed in a small bowl appropriate for its size, lined with a paper towel so the consistency of the feces can be easily monitored. (We use Wypall brand\* towels). The size of the bowl will grow with the chick. Temperature of the brooder is started at 96 degree Fahrenheit. A specimen cup, with holes punched in the lid, filled with a wet sponge maintains the humidity. If the chick needs a higher humidity, a warmed, damp towel can be placed in the brooder. It is important to keep the temperature and humidity high until the chick's first defecation. A tawny chick may not defecate for three days, which is not unusual. Stimulation may be necessary at this point, but not beforehand. Brooder temperature should be dropped as necessary, as the chick grows feathers. Allow the chick's comfort level to determine the temperature.



The first feeding is given twelve hours after hatching. Some chicks will give strong feeding responses right away, while others may need to be stimulated with a tap on the side of their bill. Use tweezers to feed the chicks, as initial food items are rather small. The chick is fed pinkie viscera initially, graduating up to cut pinkies, and eventually whole pinkies as the chick ages. The chick is fed until satiated. However, the first day, or until it defecates, we are more conservative with the amounts. The first two days soak the viscera in warm lactated Ringers injection, USP \* and then just warm water from that point on. Calcium carbonate and Vionate\* at a fifty-fifty ratio, are sprinkled on food items at every feeding. Chicks need to be fed with a heat source, as they chill quickly when out of the brooder. Heat lamps may cause retinal damage in a nocturnal bird, so using a heating pad or ceramic bulb is preferred. To measure the small amounts fed, obtain the weights of the chick before and after feeding. Chicks are fed five times per day, three and a half to four hours apart. At approximately two weeks of age, or as a chick loses interest in one or more feedings, the feedings will drop to four per day. Again, at about three weeks of age, the chick should be down to three feedings per day and comfortable at room temperature. Aside from temperature, humidity and feedings, it is important to pay attention to the chicks' legs. The bowl bottom should be lined with a substrate, such as Enkamat\*, to give the chicks' feet something to grip on to. This needs to be implemented no later than one week, as splaying of legs has occurred. One peculiarity that appears in some frogmouth chicks is a milky coloration to their eyes. This is normal and should not be a cause for concern. By necessity we have become proficient at hand-rearing, however, the ultimate goal is to be hands off, allowing the parents the opportunity to care for their young. Now that all the frogmouths are self feeding, there is hope that future chicks will be parent reared. Close monitoring of the chicks will take place and they will be pulled for hand rearing or supplemented, if necessary. However, the breeding pairs are very attentive to their eggs, so we are hopeful that they will be successful in rearing their own young.

**Data from four chicks from 2007-08 ages 1 to 15 days.**

Age	Average weight of chicks(g)	Average amount fed per day
1	15	0.73*
2	15	1.13
3	20	1.15
4	22	1.49
5	24	1.64
6	27	2.2
7	32	1-8**
8	39	2-8
9	48	4-9
10	58	2-6
11	66	1-11
12	81	4-8
13	90	3-10
14	100	4-10
15	114	3-10

\*grams of pinkie viscera

\*\*at this point pinkies can be fed with heads, tails, feet cut off and into 1/3's or 1/2's, depending on the size of the pinkie and chick. These numbers are how many pinkies are used and are ranges of how many are fed at each feeding.

TM or R mentioned with\* include full name and address of manufacturer of the product, incl. Website or email address.

Myers, Mark. 2009. Long-term Propagation Program. Plume Award. AZA Avian scientific advisory group.