



Smithsonian
National Zoological Park

Bornean Orangutan (*Pongo pygmaeus*) Birth Management Plan & Hand-rearing Protocol



Summary

Bornean female orangutan “Batang” (113934, SB#2758) is believed to be pregnant based on a combination of physical indications (e.g. labial swelling, enlarged nipples), a positive human pregnancy test, and fetal observation via abdominal ultrasounds. Based on last observed copulations between Batang and Bornean male “Kyle” (113933, SB#2757), the **expected due date is September 15, 2016 (+/- 12 days)**.

Every effort will be made for Batang to give birth at the Great Ape House and for her to fully rear her infant without human intervention. In the event that partial or full hand-rearing is required, one of the off-exhibit enclosures at the Ape House will serve as a primary nursery in order for the infant to retain opportunities for visual, olfactory, and tactile interaction with Batang with the goal of re-uniting mother and baby as soon as possible. Two hybrid orangutans housed at NZP, Bonnie (103823, SB#1545) and Iris (107579, SB#2121) have received maternal training so they may be considered as potential surrogates in the event that Batang does not rear her infant.

****This birth plan is written as a guide; any or all parts may be modified as necessary throughout the birth event****

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Overview

Batang, a 19 year old female Bornean orangutan, resides at Smithsonian's National Zoo (NZN) in the Great Ape House along with five other orangutans, including Bornean male Kyle (19 yrs old), hybrid male Kiko (28 yrs old), hybrid female Bonnie (39 yrs old), hybrid female Lucy (42 yrs old), and hybrid female Iris (28 yrs old). The orangutans at the National Zoo have access to indoor and outdoor spaces, and are housed in flexible social groups. Females are housed with one male at a time, and choice plays a large part in which orangutans are together at any given time. The outdoor space also includes access to the Zoo's O-Line, which is a series of towers and overhead cables that allow the orangutans not only the choice to travel on the O-Line, but also the choice of spending time in the indoor space at Think Tank.

History of Breeding Female

Batang (Bornean female, SB#2758) has a breeding recommendation from the Orangutan SSP to breed with Kyle (Bornean male, SB#2757).

History – Batang was born at the Lincoln Park Zoo on December 27, 1996 to female Batu. Batu and infant Batang were transferred to Topeka on July 18, 1997. During her time at Topeka, Batang was introduced to several orangutans, most notably an older female Paddi and another older female Daisy, who helped raise Batang while she was young. Younger orangutans Robert, Rudy and Elijah were also introduced to Batang while she was in Topeka. Batu, Batang's biological mother, died in 2003 from tularemia. Batang was transferred to the National Zoo in October 2004 on a breeding loan.

Reproductive History – Batang was started on oral contraceptives on November 20, 2004 upon leaving quarantine and having free access to breeding male Kyle. She remained on oral contraceptives until her most recent physical exam was performed in April 2014.

Medical History – Batang's medical history has been fairly unremarkable. She has been treated for a urinary tract infection in 2011 and again in 2013, both successfully treated with oral antibiotics. Blood-tinged vaginal discharge was noted in 2013 and was believed to be menses.

Current social situation – Batang easily manages her time between all social orangutan groupings at the National Zoo. She splits her time between the two pairs, Kyle and Bonnie and Iris and Kiko, and is the only female that seeks out social contact with hybrid female Lucy. Batang travels the O-Line often, and spends time at both the Great Ape House and Think Tank.

SSP Breeding Recommendation

The initial breeding recommendation for Batang and Kyle was made in 2010. Due to Batang's social immaturity and changes in management of the Primate team over several years, the recommendation was delayed. All other orangutans at the National Zoo are hybrids have been permanently contracepted, so Batang will only be able to conceive with male Kyle.

Batang will be a first time mother. Training is in place to help her manage an infant, as maternal training can help an inexperienced mother provide appropriate care for an infant. Two potential surrogate orangutans at the National Zoo have also been identified and are being trained simultaneously to

manage the infant in case Batang is unable or unwilling. Hand-rearing by the primate team is a last resort, and with the goal of returning the infant to its mother or a surrogate as soon as possible.

Previous Orangutan Breeding History in the Great Ape House

The Smithsonian's National Zoo has been successful in breeding orangutans since the late 1970's. The first orangutan breeding at NZP occurred in 1976, and was a female infant born to orangutans Pensi and Junior. This infant only survived 2.5 days. The second orangutan birth was from the same pair of orangutans and was a male infant born in 1977. This male infant, Azy, was pulled from his mother Pensi at 10 days old due to the infant having an infection that needed to be treated. Azy was sent to Albuquerque where he was peer raised with surrogate female Bonnie (currently residing at NZP) and Azy and Bonnie returned to the National Zoo when they were between 2 and 4 years of age to be integrated back into the Zoo's orangutan population. The next birth at NZP was again between Pensi and Junior, resulting in a female infant, Indah. Because the infant was born on the same day that orangutans were being moved into the new Great Ape House and Pensi was suffering from an infected wound that needed to be aggressively treated, the decision was made to pull and hand-rear Indah. The decision to pull ape infants for hand-rearing was commonly made in zoos in that era as standard practice, as advanced techniques for behavior modification for optimal maternal care were, as yet, under-developed. Indah was hand reared outside of the Great Ape House and she returned to the building a few years later. The next two births from Pensi and Junior were in 1983 (male infant, Tucker) and 1987 (female infant, Iris). Pensi was allowed to rear these infants on her own and proved to be a very capable mother. Female Bonnie was bred with male Junior, which resulted in the birth of Kiko, another male infant, in 1987. Though Bonnie was a first time mother, she successfully raised Kiko without human intervention or maternal training. The last infant born at NZP was male Chang Jr, born to female Pensi and newly acquired male Chang. Pensi again proved to be a capable mother, and raised Chang Jr without human intervention. The Great Ape House has proven to be suitable for infant orangutans with minimal modifications.

General Species Information (Taken from Zoo Atlanta's Breeding Plan)

Estrous Cycle

The length of the menstrual cycle is calculated from the onset of menses in one cycle to the onset of menses in the next cycle. Menstrual cycles have been reported from 23 to 33 days in length in mature, captive individuals (11-22 years old) with a mean of 27.8 days (Nadler 1981). Most sources list typical cycles lasting for a duration of between 28 to 30 days, but sample sizes are small.

Menses last from one to four days. The flow of blood is slight and only seldom apparent. The use of Hemastix reagent strips are the most reliable method of detecting menses. A clean urine sample should be used since contamination with feces may indicate a false positive for blood occult (Wells et al. 1990). Cycle status should be regularly recorded for all potentially breeding females.

Gestation

Orangutan pregnancies are best confirmed by the presence of labial swelling that begins 2-4 weeks after conception. Human pregnancy tests that detect the present of Human Chorionic Gonadotropin (HCG) and ultrasounds can also be used to confirm pregnancy. Human pregnancy tests used at other institutions during the first trimester include E.P.T., Clear Blue Easy and One Step. All used fresh, morning urine that was free of contaminants.

Human Pregnancy tests (Human Chorionic Gonadotrophin – HCG)

Test Kit	1 st Trimester	2 nd Trimester	3 rd Trimester	Used By
OvuQuick	Yes		No	Brookfield Zoo
ICON II HCG	Yes		No	Brookfield Zoo
Cards Q.S.	Yes		No	Brookfield Zoo
Abbott TestPack Plus	Yes	No		Brookfield Zoo
E.P.T.		No	No	
Clear Blue Easy	Yes			Kansas City Zoo, Chester Zoo
One Step	Yes			Kansas City Zoo
Osco	Yes			Kansas City Zoo
Assure	No			Kansas City Zoo

Gestation lasts an average of 8.16 months (245 days, +/- 12 days), and is frequently accompanied by both behavioral and physiological changes. Loss of appetite, lethargy and personality changes are all reported as having been observed in pregnant orangutans by the SSP© Orangutan Husbandry Manual. It is also noted that “during the later stages of pregnancy, females may appear agitated, restless, [...] avoiding interactions with conspecifics” (Sodaro et al., 2006). Around one month into gestation the mammary glands begin to enlarge and the nipples swell. Some females have been observed to self-nurse. Constipation has also been observed during the later stages of pregnancy.

Parturition

Reports on the duration of labor vary from 25 minutes to 4 hours depending on the health and reproductive status of the female, as well as the number of offspring she is carrying (although twinning is rare). The labor process is generally comprised of three stages. During the first stage, the female shows signs of discomfort, her activity level increases, and a clear vaginal discharge may be observed. The second phase constitutes the actual birthing process; the frequency of the contractions increases, the female may lie down (dorsally or ventrally), and the infant is expelled in a head-first orientation. The umbilicus is usually severed by the female with her teeth. Finally, during stage three, the placenta is passed. This may occur immediately or as late as several hours after parturition. It is no unusual for the female or other members of the orangutan group to eat the placenta. Minor vaginal bleeding or continued contractions may be observed for up to several days after the birth (Sodaro et al., 2006).

Mothers generally clean the mucus from the infant’s face immediately following parturition. A variety of sexual behaviors may also be exhibited by the female towards her neonate, including “dorsal-dorsal mounting, oral-genital inspection and manipulation and insertion of fingers into anal-genital areas” (Sodaro et al., 2006). Infants should begin to nurse within 4 to 6 hours after birth, but in some cases it

has been observed to take up to 2 days. The female should keep the infant in cling to her body at all times, usually either to her upper back and head or to her side. She may also spend more time resting than usual during the first few days after parturition, and change in appetite (either increases or decreases) have been reported (Sodaro et al., 2006).

Infant birth weights vary considerably, ranging from 1420 to 2040 grams, averaging 1720 grams. They have minimal body fat at parturition, so “the rib cage is prominent and the abdomen may appear sunken” (Sodaro et al., 2006). Passage through the birth canal may cause the infant’s head to initially appear slightly misshapen (Sodaro et al., 2006). The first bowel movement is usually composed of meconium, a thick, dark stool produced *in utero*. Once the infant begins nursing, the stool becomes softer and pale yellow.

Signs of Possible Pregnancy Complications Observed in Orangutans

Observation	Possible Problem
Bloody vaginal discharge (especially large quantities observed late in pregnancy)	Placenta previa or placenta abruption
Signs of labor that lasts more than 6 hours	Dystocia or placenta abruption
Thick, creamy, odiferous, or discolored vaginal discharge	Uterine infection
Lethargy or anorexia that lasts for more than 6 hours, missing a meal	Pregnancy toxemia

(Wells et al, 1990)

History of Potential Surrogates

Bonnie

Bonnie, a hybrid female, has been identified as the best potential surrogate for an infant orangutan born to Batang.

History - Born in 1976, she was hand-reared after her mother’s death shortly after childbirth. She was brought to the National Zoo in 1981 where she lived with several other orangutans housed in the Great Ape House. While at the National Zoo, Bonnie has been integrated into many social situations with other orangutans, most often playing a submissive and passive role during introductions. Rio Grande Zoo donated Bonnie to the National Zoo in 2005.

Reproductive History - In 1987 Bonnie gave birth to a male, Kiko, who was sired by hybrid male Junior. Though hand reared herself with very limited training, Bonnie raised Kiko without incident at the Great Ape House. Due to her hybrid status, Kiko is her only offspring based on recommendations by the SSP. After Kiko’s birth, her reproduction was controlled by Depo Provera injections and oral contraception, followed by a tubal ligation in 2008.

Medical history - An undiagnosed medical condition in February and March of 2005 led to two anesthetic procedures to perform diagnostics. Lab work and diagnostic tests were fairly inclusive and

failed to explain the cause of Bonnie's lethargy and dullness over the course of a few weeks in 2005. Bonnie's condition seemed to resolve on its own, and other than a few treatments for ballantidium, her medical history has been fairly unremarkable.

Current social situation - Bonnie is most often paired with male Kyle and is usually found at the Ape House, though does spend some time at Think Tank. Batang spends an equal amount of time with this pair, as she does with Iris and Kiko.

Iris

Iris will go through surrogate training with Bonnie, although Bonnie seems the more likely candidate since she has successfully reared an offspring of her own.

History - Iris was born to Sumatran dam Pensi and sire Junior at National Zoo on April 15, 1987. She was parent reared until she was permanently separated from her dam in October 1989.

Reproductive history - Iris was placed on Depo-provera contraception injections starting in 1992, followed by the use of oral contraceptives and a tubal ligation in 2008. Iris has had no opportunities for reproduction based on SSP recommendations due to her hybrid status.

Medical history – Iris has a history of gastrointestinal issues over the years, resulting in several endoscopies and biopsies of her GI tract in an attempt to diagnose the cause. These gastrointestinal issues, which mainly presented as lethargy and diarrhea, continued for years until they seemed to resolve on their own by early 2005. Iris continues to remain on antibiotics and probiotics.

Current social situation – Iris is housed with male Kiko, spending time with Batang and Lucy as well. She tends to split her time between the Great Ape House and Think Tank, spending about equal time in each building.

Training Plan for Breeding Female

Amanda Bania – Primary Trainer

Becky Malinsky – Secondary Trainer

Cindie Erickson – Vet Tech Trainer

Station training – ability to shift Batang using her Frisbee station from one cage to another when asked

Urine collection for blood or glucose detection – ability to have Batang urinate on command (specifically first morning urine) into urine collection container for diagnostic Hemastix

Charting – collecting daily Hemastix results, monitoring labial swelling, and sexual behavior on the following chart:

BATANG (113934) Reproductive/ Menstrual Chart

Date	Hemastix result	Labial swelling	Other	Initials

Codes:

Hemastix

- n = negative
- ht = hemolyzed trace
- hs = hemolyzed small
- hm = hemolyzed moderate
- hl = hemolyzed large

Labial Swelling

- 0 = no swelling
- 1 = swelling

Other

- M = menstruating
- CKY = copulation w/ Kyle
- CKO = copulation w/ Kiko
- SKY = solicit Kyle
- SKO = solicit Kiko

Hand injection for anesthesia for physical as well as any meds needed after birth – ability to have vets hand inject Batang with necessary drugs or anesthesia when asked

Blood sleeve for voluntary blood collection – ability to collect a blood sample while Batang is awake using the blood sleeve, enabling blood diagnostics to be performed, and also bank blood in case a transfusion is needed for the infant

**See Training Appendix

Abdominal Ultrasound to detect fetal heartbeat and movement, and to assess amniotic fluid levels – ability to have vets perform routine ultrasounds on Batang while she is awake

Get baby – retrieve baby from another cage and carry

**See Training Appendix

Give baby – place baby in an empty cage through a crept door

Baby Box – retrieve and/or place baby in baby box for keeper retrieval

**See Training Appendix

Manual expression of mammary glands or use of breast pump – to aid in supplemental feedings if necessary

Orientation of baby – to turn baby if face is not near nipple or bottle

Present baby to bottle – bring baby to mesh to allow for keepers to feed from a bottle

Training Plan for Potential Surrogates

Erin Stromberg – Primary Trainer

Though many behaviors are repetitive for Batang and the potential surrogates, some behaviors are not necessary since the surrogates will not be pregnant or lactating

Station training – ability to shift Bonnie and Iris using their Frisbee stations from one cage to another when asked

Hand injection for anesthesia for physical - ability to have vets hand inject Bonnie or Iris with necessary drugs or anesthesia when asked in case

Blood sleeve for voluntary blood collection – ability to collect a blood sample while Bonnie or Iris is awake using the blood sleeve, enabling blood samples to be banked in case a transfusion is needed for the infant

Get baby – retrieve baby from another cage and carry

Give baby – place baby in an empty cage through a crept door

Baby Box – retrieve and/or place baby in baby box for keeper retrieval

Manual expression of mammary glands or use of breast pump – to aid in supplemental feedings if necessary

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Training Appendix

Baby – During pre partum training sessions the baby used will be a “fake baby”. The “fake baby” refers to a plush fabric, peanut shaped toy that has stitching on one side to represent correct orientation (front of the baby). The “fake baby” is used to train the behaviors needed to give and retrieve a real infant.



Baby Box – metal mesh box that has sliding doors for both keeper and orangutan access to the box. General concept is to train orangutans to retrieve and place objects in the box. Pre-partum training will use a “fake baby” with the hopes that the behavior can then be transferred using the real infant when it is born. Objective is to be able to have keepers and vets easily remove the infant from a female without sedation, and also placing infant back with a female without much effort.



Bloodsleeve – to use for voluntary blood collection from Batang and the surrogates to monitor basic blood chemistries, but to also use in case a blood transfusion is needed for the infant



Events

January 9, 2014 – Batang started receiving prenatal vitamins

February 19, 2014 – Batang had a complete physical exam including a gynecological assessment

April 26, 2014 – Batang received her last dose of birth control pills

July 3, 2014 – Batang observed soliciting Kyle for the first time

August 27, 2014 – Copulation observed for the first time between Batang and Kyle

October 10, 2014 – Batang started receiving flaxseed oil for her dry skin

January 13, 2016 – Copulation observed between Batang and Kyle

January 14, 2016 – Copulation (x3) observed between Batang and Kyle

January 15, 2016 – Copulation observed between Batang and Kyle

January 31, 2016 – Nipple enlargement

February 1, 2016 – Labial swelling appeared

February 2, 2016 – ClearBlue Easy positive pregnancy test – ultrasound performed – could not determine pregnancy – blood collection sent to outside lab for hormone analysis

March 22, 2016 – Fetus believed to be seen on ultrasound

****Expected parturition: September 15, 2016 (+/- 12 days)****

Physical Facility Review

The temperature set point will be boosted on the orangutan line to 80 degrees one month prior to Batang's projected birth window, in order to reduce the risk of hypothermia to an abandoned infant.

Temperatures will be adjusted as necessary post-partum. Additional hay will be added to Enclosure #4 one month prior to the birth window.

Work tickets have been reviewed and all tickets will be completed one month prior to Batang's due date. Work tickets (unless an emergency or needed for Batang's infant) will cease until 3 months after the infant is born. If hand rearing or surrogacy is needed for the infant, this time frame may be extended.

IT Review

The goal is to have camera equipment installed in the Ape House, specifically around enclosure #4, so that labor and delivery can be monitored remotely. A back-up option may be camera installation with the ability to monitor within the building. NZP's IT department is currently working on a remote camera set-up to be completed one month prior to Batang's expected due date.

Hand-rearing Equipment Review / Needs

All equipment required in the case of intervention and hand-rearing will be on hand 2 months before the expected birth window (see list of Hand Rearing Equipment below). Key staff must review the Orangutan SSP Husbandry Manual's "Hand Rearing" chapter prior to parturition (hard copies of the "Orangutan Birth Management/Surrogate/Hand-rearing Packet" are located in the offices of the Great Ape House and primate curator).

Animal Management Plan for Onset of Labor

Prior to delivery, we can anticipate that Batang will exhibit specific behaviors that may indicate that she is nearing labor. Preparations for delivery should be taken if any of these behaviors are observed:

- Unwillingness to shift, although she is historically inconsistent in this regard
- Spending more time in a lateral position, which is typical for Batang when she is uncomfortable, scared, or not feeling well.
- Increased agitation/activity once labor begins
- Clenching of hands and feet in response to contractions

Preparations for delivery include:

- Separating Batang from conspecifics
- Heavily bed enclosure # 4 with hay
- Keeping Batang inside the Great Ape House
- Notification of veterinary staff at first indications of labor

It is possible that we will not be present during the birth and accept the risks associated with this possibility.

Day/Night of Birth:

Equipment for emergency intervention should be gathered and set up as soon as veterinary staff is notified of labor or a birth.

If Batang is in labor or there are signs that labor may be imminent at the end of the workday, at least one primate staff member will remain after hours to provide continuous observation. The need for other (e.g. veterinary) staff to remain on site will be decided at the time based on the details of the situation.

All individuals on the notification list (see list below) will be notified.

Keepers or other staff will begin videotaping the birth, if possible.

Once labor begins or an infant is born, traffic through the orangutan line will be limited to Primate staff and others only as necessary so as to not distract or disturb Batang. Foot traffic and deliveries will likely need to be rerouted through the gorilla line, in order to prevent disturbing Batang.

The Ape House exhibit (or Think Tank) may be closed if deemed necessary by primate staff to limit distractions/noise when labor begins or after an infant is born

Primate and appropriate veterinary staff will visually assess the infant's condition (hydration, strength, urination, defecation, etc.).

Primate and/or appropriate veterinary staff will observe Batang continuously during regular work hours on the first day post-partum, in particular to monitor for appropriate general maternal behavior and nursing. We will need to assess whether Batang gets "tired" of continuous observation and balance the benefits of continuous observation with any discomfort this causes Batang (i.e. if there are no worrisome signs and regular nursing has been confirmed, continuous monitoring may be less important). Need for continuous monitoring after the first day post-partum will be evaluated by primate and veterinary staff based on details of the situation.

Unless Batang's behavior dictates otherwise, at least one keeper staff member will remain after hours to provide extended observation on the first day post-partum. Duration of observation and the need for after-hours monitoring on subsequent nights will be evaluated based on the situation, as will the need for other (e.g. veterinary) staff to remain on site on the first and subsequent nights.

PHONE NOTIFICATION LIST

NAME	ROLE	PHONE NUMBER
Meredith Bastian	Primate Curator	[REDACTED]
Becky Malinsky	Primate Assistant Curator	[REDACTED]
Erin Stromberg	Keeper	[REDACTED]

NAME	ROLE	PHONE NUMBER
Amanda Bania	Keeper (Batang's primary trainer)	[REDACTED]
Heather Harl	Keeper	[REDACTED]
Melba Brown	Keeper	[REDACTED]
Elliott Rosenthal	Keeper	[REDACTED]
Alex Reddy	Keeper	[REDACTED]
Matt Spence	Keeper	[REDACTED]
Dennis Kelly	Zoo Director	[REDACTED]
Brandie Smith	Associate Director (Animal Management)	[REDACTED]
Ed Bronikowski	Senior Curator	[REDACTED]
Don Neiffer	Chief Veterinarian	[REDACTED]
Jess Siegal-Willot	Veterinarian	[REDACTED]
Katharine Hope	Veterinarian	[REDACTED]
James Steeil	Veterinarian	[REDACTED]
Kendra Bauer	Veterinarian	[REDACTED]
DAH Hotline		[REDACTED]
Tim Walsh	Pathologist	[REDACTED]
Mike Maslanka	Nutritionist	[REDACTED]
Erin Kendrick	Nutritionist	[REDACTED]
Pamela Baker-Masson	Public Affairs	[REDACTED]
Mandy Murphy	Registrar	[REDACTED]
Laura Morse	Registrar	[REDACTED]
NZP Police		[REDACTED]

Nursing Issues

While maintaining continuous observation in the first day post-partum, keepers should note time and duration of all nursing bouts. Infant jaw movements and a rhythmic pattern of suckling are indicators of nursing.

If Batang is not nursing the infant but the condition of the infant remains stable (and Batang is not harming the infant), baseline assumption is that the infant will be left with Batang through the first night. If her training is sufficiently advanced at the time, primate keepers will attempt a training session with Batang to encourage maternal behaviors. **Nursing is typically initiated between 4-6 hours after birth, but can take up to 2 days for the first bout to occur** (Sodaro et al., 2006).

Consideration to remove the infant will be based on the physical condition and behavior of both the mother and the infant. If it is determined that the infant must be evaluated, we will remove the infant for an examination, which may require a chemical sedation of Batang (if she is not willing to “trade” the infant via the baby box).

When to pull/evaluate the infant:

- Batang is ignoring the infant or is not showing interest in carrying it. Keepers should first attempt a training session to encourage Batang to pick up the infant and hold it in a nursing position. If this fails, it may be necessary to remove the infant.
- Batang is aggressive towards the infant and primate staff fear for safety of the infant.
- Batang does not clear the infant’s face (nose & mouth) of mucous, leading to compromised respiration of the infant.
- The infant is unable to nurse for whatever reason for more than 72 hours.
- The infant is left on the floor and there is concern of hypothermia.
- If the baby is left on a shelf alone (the floor has been heavily bedded in case the keepers cannot assist fast enough).
- The infant appears seriously ill, e.g. if it is limp, unable to cling, or blue/grey in color.
- Batang is unable to pass the placenta or develops other medical complications.

When to give the infant back to Batang:

- We will encourage the infant to nurse from Batang (while she is under sedation), if possible. If not, we will attempt to bottle feed and ensure that the infant receives colostrum. Batang is acclimated to a breast pump. (Note that early post-partum breast milk may only be colostrum and appear thin and watery. Some institutions have interpreted early milk as being poor quality, expecting it to look like cow’s milk. It may take a few days to get “real” milk in and for breast tissue development). If the infant’s condition seems to improve after feeding (and assuming that Batang’s behavior up to this time has been appropriate), **we will return the infant to Batang and continue to observe and document.**
- Although the particular situation will have to be assessed at the time, the default intent will be to reintroduce the infant to Batang without resorting to sedation.

If all above attempts fail: The veterinary and curatorial staff will need to evaluate the medical state of the infant in order to determine the immediate course of action.

If none of the above attempts are possible or advisable for any reason, we have the following options to pursue, which we will assess based on the particulars of the situation (*The decision will be made based on an assessment of what is best for the infant* and the protocols set forth by the Orangutan SSP Husbandry Manual's "Hand Rearing" chapter will provide general guidelines):

- **Option 1: Sedate Batang.** Put the infant on Batang to nurse and allow her to recover from anesthesia with the infant clinging to her. During Batang's recovery, a continual watch would be done to assess the infant's condition and Batang's maternal skill level.
- **Option 2: Remove the infant for hand rearing, with the intent of a later reintroduction.** Begin working with the infant to take a bottle through the enclosure mesh. During the infant's training, we would work with Batang to allow us to feed the infant through the mesh. This may take several months of hand-rearing and infant training prior to reintroduction. Department of Nutrition staff would be consulted for formula concentration and feeding frequency.
- **Option 3: Utilize Bonnie and/or Iris as surrogates.**
- **Option 4: Send the infant to another institution for surrogate rearing** if an appropriate surrogate is available.

If any duration of hand-rearing is warranted:

- Initial hand-rearing will be carried out by the Hand Rearing Team (see below).
- Work day and overnight care will occur on the orangutan line as much as possible in sight of Batang. Enclosure #1 has been identified as a space that would allow good visual access between the infant and the adult orangutans. Intent during this period is to maintain essentially continuous human contact with the infant. If extended hand-rearing becomes necessary, a plan will be developed detailing procedures and responsibilities.
- Decisions regarding all of the above scenarios will be made through discussions amongst Zoo management, primate staff, and vet staff.

Dietary Changes

Any additional dietary changes will be based on calculations of metabolic needs during the lactation period.

Reintroduction to conspecifics

Regardless of the outcome of Batang's pregnancy, she will likely be separated at some point, and a reintroduction plan will be necessary. Fortunately, the other orangutans will have opportunities for auditory and visual access with Batang and the infant during and after parturition. Specifics of a reintroduction plan will be developed after parturition.

Outdoor access and access to the O-Line

Every attempt will be made to have Batang located at the Ape House for birth. However, if labor is imminent while she is located at Think Tank (which is not the preferred location; every effort will be made to ensure that Batang gives birth at the Great Ape House), Batang will remain there for *at least* the first week of the infant's life to assess the its condition and ability to cling unsupported as well as Batang's mothering skills if deemed necessary to relocate Batang and her newborn to the Ape House. If the infant is clinging normally, full regular outside access, including access to the O-Line, may be given after an assessment by the Primate Unit staff in consultation with the Senior Curator and veterinary staff.

Media Access

Without exception, all Behind-the-Scenes tours will cease for 3 months post-partum, but this may be extended if hand rearing is necessary. Once tours resume, visitors may be asked to provide evidence of MMR (Measles, Mumps, and Rubella) vaccine as well as a negative TB (Tuberculosis) status. The primary reason for this restriction is that the infant orangutan will not likely receive vaccines for at least several months after birth. This is also Batang's first pregnancy, so we must minimize possible stressors, which include unfamiliar humans.

No Office of Public Affairs personnel will be allowed on the Orangutan line. All behind-the-scenes photography and filming will be done by primate staff. OPA may obtain images from the Ape House public area or outside.

No outside media personnel will be allowed behind the scenes after the 3 month period unless approved by the Primate curator. This will be based on Batang's reaction to unfamiliar people at that time.

If requested, primate staff can provide updates for the Zoo's website, including a written blog, photos and videos to document the infant's birth and development.

Professional Resources / Contacts

Lori Perkins, Orangutan SSP Coordinator/Orangutan SSP Chair
lori.a.perkins@disney.com

407.939.6221 (work)

404.624.5841 (fax)

404.909.2917 (cell)

****CALL HER FIRST IF SURROGACY NECESSARY****

Carol Sodaro, Orangutan SSP Husbandry Advisor

Carol.sodaro@czs.org

708-688-8706 (work)

708-334-9045 (cell)

Dusty Lombardi, Ape TAG Birth Management Advisor

Dusty.Lombardi@columbuszoo.org

Maternal Training & Hand Rearing Contacts (in addition to Carol Sodaro):

- Melanie Bond, Center for Great Apes (formerly National Zoo), melbond7@embarqmail.com; 571-277-1713 (c); 863-773-4419 (w)
- KC Braesch, (formerly National Zoo); kbraesch@gmail.com, 571-344-1651
- Jennifer Mickelberg, Zoo Atlanta jmickelberg@zooatlanta.org; 703-981-7387
- Lynn Killam, Houston Zoo lkillam@houstonzoo.org (recommended by Carol)
- Dina Bredahl, Cheyenne Mountain Zoo dbredhaul@cmzoo.org (recommended by Carol)
- Rob Liddell, MD Radiologist and Volunteer, Woodland Park Zoo robliddell@comcast.net
- Beth Schaefer, Houston Zoo (formerly Kansas City and Disney) pongopower@earthlink.net, bschaefer@houstonzoo.org; 713-533-6523
- Megan Fox, Los Angeles Zoo maefox@earthlink.net
- Angela Shoffstall, Busch Gardens Angela.Smith@BuschGardens.com; 813-987-5621
- Angie Selzer, Ft. Wayne's Childrens Zoo indo@kidszoo.org, angie.selzer@kidszoo.org
- Megan Elder, Como Park Zoo megan.elder@ci.stpaul.mn.us
- Cindy Cossaboon ccossaboon@denverzoo.org

SSP Vet Advisors:

Dr. Joe Smith (Fort Wayne Children's Zoo, vet@kidszoo.org)

Dr. Nancy Lung : jzwmeditor@gmail.com

NZP Hand Rearing Team

First tier – NZP Primate Curator, NZP primate keepers, NZP veterinarians and vet technicians, other personnel deemed appropriate by the Primate Curator.

Second tier – Unofficial NZP hand rearing team – Dell Guglielmo, Mindy Babitz, Stacey Tabellario, etc.

Potential Surrogates

Proven surrogate orangutan females in the SSP population may be considered by the Orangutan SSP by the time Batang gives birth in the event that neither Bonnie or Iris prove to be effective in-house surrogates.

Hand Rearing Equipment

Scrubs, gloves, masks

Disposable gowns

Disposable foot covers

Diapers (neonatal/preemie)

Diaper Wipes

Wet Wipe Warmer

Bottles (4 oz and 8 oz)
Infant Stethoscope
Infant Thermometer
Tape Measure
Formula (Similac Advance (preferred by SSP), Isomil, Enfamil, SMA, Prosobee) -Simethicone (Infant anti-gas drops)
Sterile Water
Glucose Water
Pedialyte
Sheets/towels/blankets
Small refrigerator
Heating Pads
Hot water bottles
Baby cap
Infant Tylenol
Nipples (Disposable)
Bottle Sterilizer
Drying Rack for Bottles
Bottle warmer
Infant scale
Incubator
Oxygen Tank