[redacted]

From: [redacted]@massey.ac.nz>
Sent: Monday, 12 July 2021 9:11 am
To: [redacted] Ian Angus; [redacted]
Cc: [redacted]
Subject: RE: Orca calf in Wellington

[redacted] used to be in AKL Zoo but now is based with DOC down south - her cell is [redacted] and [redacted]

Ngā tauwhirotanga o te wā

[redacted]

[redacted]
Professor – Marine Biology
Rutherford Discovery Fellow – Royal Society Te Aparangi

Cetacean Ecology Research Group | School of Natural and Computational Sciences | Massey University
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[redacted] http://www.cetaceanecology.org

Cetacean Ecology Research Group
www.cetaceanecology.org

From: [redacted]
Sent: Monday, 12 July 2021 8:55 AM
To: [redacted]@massey.ac.nz>; Ian Angus <iangus@doc.govt.nz>; [redacted]
Cc: [redacted]
[redacted]@projectjonah.org.nz>; [redacted]@massey.ac.nz>; [redacted]
Subject: RE: Orca calf in Wellington

Thanks all. [redacted] do you have contact details for [redacted]? I gather she is in Auckland?

Not requesting her assistance at the moment but if we do go that route it would be good to have everything lined up.

Sent from Workspace ONE Boxer

On 12/07/2021 8:34 am, [redacted]@massey.ac.nz> wrote:
Thanks [redacted] – in the event euthanasia is the final option, video of the euthanasia itself alongside examination of the carcass afterwards would be invaluable. [redacted] has kindly agreed to the filming of other whales he has euthanized so I confident he would likely support this too if that request can be made known.

Thanks all – and let's keep fingers crossed for a better end result though I think realism is also important here.

[redacted]

From: [redacted]
Sent: Monday, 12 July 2021 8:24 AM
To: [redacted]@massey.ac.nz>; Ian Angus <iangus@doc.govt.nz>; [redacted]
Cc: [redacted]@projectjonah.org.nz>; [redacted]@massey.ac.nz>; [redacted]
Subject: RE: Orca calf in Wellington

Morning all,

I agree with what [redacted] has said. I don't know what plans are being made but I would think about asking for [redacted] to come down to ensure a smooth euthanasia once we are at that stage. We also have the budget to assist with necropsy by [redacted]

Cheers,
[redacted]

From: [redacted]@massey.ac.nz>
Sent: Monday, 12 July 2021 6:22 am
To: Ian Angus <iangus@doc.govt.nz>; [redacted]@doc.govt.nz>; [redacted];
Cc: [redacted]@projectjonah.org.nz>; [redacted]@massey.ac.nz>
Subject: Orca calf in Wellington
Importance: High

Morena,

I was sad to see on social media this calf never made it out to sea yesterday. Given the clear remnant foetal creases visible in the online images, I don't think this bodes well for this critter given it wont be weaned and its pod may be far away by now ☹ such sad news. With any luck a spotter plane may help if mobilised first thing this morning but that would need to happen quickly now as this calf will not have fed in > 18hrs so dehydration is a serious and imminent concern (don't listen to those who say you can hydrate orally with a hose – the IFAW strandings vets we work with disagree these fluids make any impact to bloody chemistry so at best it quenches thirst).

If the department intends to commit to intervention, I would recommend a vet with marine mammal experience such as Lydia Uddstrom be connected to get an IV line into the fluke to get saline in asap while efforts are made to relocate the pod. If intervention isn't being considered, I would further support the idea of rapid euthanasia sooner rather than later so we don't have a repeat of the poor welfare outcomes that occurred in Tauranga.

Kia kaha – today I suspect will not be a smooth sailing the department since we all know the complexities orca come with. Good luck folks, please shout out if I can help in any way or if I can connect you to [redacted].

In the sad event this calf doesn't make it today, we would be keen to examine it at Massey (at Palmy is fine – I can travel and it would be great to work with [redacted] on this critter). At the very least, I am keen to access blubber for toxicology.

Ngā tauwhirotanga o te wā

[redacted]

[redacted], PhD
Professor – Marine Biology
Rutherford Discovery Fellow – Royal Society Te Aparangi

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☎ [redacted] ■ [redacted] 💻 http://www.cetaceanecology.org

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[redacted]

From: [redacted]
Sent: Monday, 12 July 2021 1:49 pm
To: [redacted]
Cc: [redacted]
Subject: RE: Please contact Dave Lundquist (Juvenile Orca - Mana)

Hi All,

Just in case my current meeting goes overtime…

I have talked to a friend who is a stranded cetacean veterinarian for IFAW in the USA. Her thoughts – if possible IV fluids would be the best – 20ml/kg given as rapidly as possible especially given the calf was out of the water all night.

If IV not an option then yes indeed tube with fluids – electrolytes if possible but otherwise whatever they can get even tap water is better than nothing. 2cm orogastric tube. Estimating the calf is 3m long should weigh about 500kg – would aim for 2L initially and see how it goes.

Just a heads up – for a dependent calf, in not able to reunite quickly then recommendation is very much euthanasia unfortunately.

Hopefully talk soon but I feel this meeting will run late!

[redacted]

From: [redacted]
Sent: Monday, 12 July 2021 1:25 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Please contact Dave Lundquist (Juvenile Orca - Mana)

Hi [redacted]
I had a quick chat with [redacted] before she went to a meeting, and she's happy to help. She'll be on the 2 pm call, I believe.

She was comfortable with holding the animal in the water overnight, as am I, provided it is in a manner which is safe for everyone, including the calf. Getting the right barriers in place will be key to ensure the calf stays in place, doesn't tear itself up in a panic, and no person has to enter the water. I honestly don't know what the best option is for those barriers.

[redacted] was also comfortable with fluids being provided orally via a tube. As long as the calf's digestive system hasn't already shut down (which is unlikely), it should still be able to process the liquid and avoid more dehydration.

Chat more at 2.

Cheers,
[redacted]

[redacted]

From: [redacted]
Sent: Monday, 12 July 2021 12:48 pm
To: [redacted]
Cc: [redacted]
Subject: Please contact [redacted] (Juvenile Orca - Mana)

Kia ora [redacted]

TAG Lead – [redacted]**)**

TAG members
[redacted]

[redacted]

Regards

[redacted]
Supervisor, Biodiversity and Mana/Kapiti Islands (Kaitiaki Tauawhi, Kanorau Koiora)
Department of Conservation-*Te Papa Atawhai*
[redacted]

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Conservation for prosperity Tiakina te taiao, kia puawai

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[redacted]

From: [redacted]
Sent: Tuesday, 13 July 2021 6:13 am
To: [redacted]
Subject: Fw: Stranded orca calf in New Zealand
Attachments: IFAW Cetacean Health Assessment Form 2021_V6.pdf; In-house Dolphin Reference Ranges 2021 SMS.pdf; Smith 2012 pulmonary ultrasound dolphins.pdf

Morena [redacted] and [redacted],

Advice and resources from [redacted] below and attached. I will email the SeaWoeld veterinarians shortly but just wanted to get [redacted] assessment to you asap.

[redacted]

[redacted]@ifaw.org>
Sent: Tuesday, 13 July 2021 3:49 AM
To: [redacted]
Cc: [redacted]@ifaw.org>
Subject: RE: Stranded orca calf in New Zealand

Thanks for the great info, [redacted]. What a tough situation.

First things first – vets to contacts for continuing care/feeding for the calf, if it is decided to pursue this:

1) [redacted] University of FL – long time (past) SeaWorld vet with tons of experience with orcas:
2) [redacted] – now with San Diego Zoo Global, but also a long-time SeaWorld vet with tons of orca experience [redacted]
3) [redacted] – SeaWorld Abu Dhabi (just transferred from SeaWorld San Diego) – time zone might be a little better for you guys and Tre is great to work with and he likely has the most up-to date protocols for calf rearing: [redacted]

To be honest, if this stranding occurred here, I would euthanize that animal since the likelihood of success is almost non-existent based on my experience. Pods don't abandon calves without reason, so it is likely that this animal had a pre-existing condition that led to its stranding and abandonment. But I realize that the situation there may be different from a political and cultural standpoint. And, of course that is also easier said than done if IV access is questionable (although I know DOC has significant experience with ballistic euthanasia).

Was the animal listing to the left when put back in the water for holding? In the video it looked like the calf was maintained in left lateral recumbency on the trailer. If that occurred for a long period of time, the left lung likely collapsed under the weight and hopefully can reinflate, but the atelectasis can still last hours. By holding the animal in the water, more natural chest excursion can occur, hopefully allowing the atelectasis to correct itself and also allowing the calf to oxygenate more effectively. While holding in the water, trying to do physical therapy (up and down tail movements to simulate swimming) can help to minimize potential scoliosis that can develop from stranding (muscle contraction on one side, especially when in lateral recumbency). Also do range of motion with the pectoral flippers if possible. These exercises can be done for 10-15 min at a time a few times a day to start, depending on how the animal tolerates it. Based on how that animal was held initially this would be a significant concern of mine, that the animal would develop significant muscle contracture, which is often unresolvable. Muscle relaxants can be used (like methocarbamol), in addition to pain meds and anti-inflammatories (meloxicam) to help prevent/attempt to treat, but its not always successful.

If continued care is elected, a full workup is indicated. I attached our current physical exam form that can help guide the PE. I also attached our reference ranges for both PE and bloodwork. These are largely based on stranded short beaked common dolphins since that is what we see most frequently, but should be reasonably applicable to orcas.

For a calf I would be most interested in hydration status, glucose, liver values and a CBC – but a full CBC/chem panel would be best. I would think this calf is old enough to have stabilized glucose, but that would be high on my list to check, since septicemia is possible and the animal has been fasted. Muscle enzymes (CK, LDH, AST) and lactate should be monitored for trends (may be significantly high after the night in the trailer). Anemia is a consistent negative prognostic indicator for our stranded dolphins, as is marked neutropenia. Of course look for dehydration as well on the bloodwork to guide fluid therapy.

Ultrasound examination of the calf would be useful, especially to look at the lungs for any evidence of pneumonia. Great paper on pulmonary ultrasound in dolphins attached. The calf is small enough that it is a useful tool. Of course a hearing test (AEP or BAER) would be ideal, as deafness can be a reason for calf abandonment. But I don't think anyone in NZ has the equipment to do this. Our team does – so if there is serious interest in this, we could potentially discuss. Alternatively placing hydrophones in the water to see if the calf is vocalizing at all might be another possible tool. Although we haven't used this diagnostically, and it certainly wouldn't be a definitive thing, if the calf is not vocalizing, that would be a poor prognostic indicator in my book.

Any feces or urine production that they could appreciate?

It is important to point out in general, that cetacean rehab is expensive, labor intensive and has a very low success rate historically. I fear that this calf may die within a few weeks if held in care. If it does survive and regains its health, its most likely outcome would be permanent placement in a managed care facility since likelihood of successful reintroduction to a pod would be almost nil. I really hate to be the pessimist here, but I think it is important to be realistic when taking on such an endeavor. If the pod is not relocated in the next day or two, the decision should be made whether permanent placement or euthanasia would be the most humane outcome for this animal. As more time goes on, like you said, likelihood of reintroducing to a pod is getting smaller and smaller. So I would say holding for 3-4 days total with an absolute MAX of one week (obviously would have to tube feed it ASAP) is your window for releasing. And as I mentioned before, the likelihood that the calf was not accidentally abandoned is extremely high.

I cc'd [redacted] as well in case he has anything else to add.

Happy to continue to help as best I can from here. Please keep me posted if you can. Sure wish I could be there to help and so sorry you all are having to endure this really difficult situation!

Best, [redacted]

From: [redacted]
Sent: Monday, July 12, 2021 6:43 AM
To: [redacted]@ifaw.org>
Subject: Stranded orca calf in New Zealand

H[redacted]

Thank you again so vey much for answering my plea for help last night – so very much appreciated! Managed to get the calf kept in the water overnight which was a great initial step as they had been planning to trailer it again for the night.

A little more history…. Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependant on the mother. Unfortunately despite extensive searching today both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. For videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night.

A Zoo veterinarian was attending this afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended. I have not heard as to what the assessment was or how the procedure went.

We know the chances of a dependant calf being reunited with a pod are slim but have been requested to investigate options for supporting the calf to allow time for an attempt to be made. As such I was wondering if you were willing to provide advice on the follow points (or had any colleagues you could put me in touch with that would be willing to provide advice).

- Indicators for the health of the calf to assist in our decision-making – clinical exam? Behaviour? Any templates to assist in assessing the health of the animal?
- If the decision is to continue with oral fluids by tube is there any advice of how often this should be done?
- If the decision was to persist for longer then what are the feeding recommendations for an orca calf (I am assuming SeaWorld and Loro Parque would be the people to contact about this – do you have any direct contacts for them?)
- Also interested in what thoughts are around the releasability of an animal like this – presumably the longer it is held the lower the chances of successfully reuniting it with a pod.

Thank you so very much in advance for any thoughts or advise – It is so very much appreciated by us all.

Lydia

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand
http://kakaporecovery.org.nz/

Field #

Marine Mammal Rescue and Research

Cetacean Health Assessment Form

ifaw

IFAW#_____

Date: _____ **Stranding Site:**_____ **Species:** Dd La Gm Pp ____

Veh: Moby T1 R__ **Loc in Veh:** FR FL MR ML BR BL Other: ____

Str. Length: _____cm

Weight: _____kg est / act

Age Class: calf subad adult

HI: N Y CBD □ HI form

I. SUBJECTIVE:

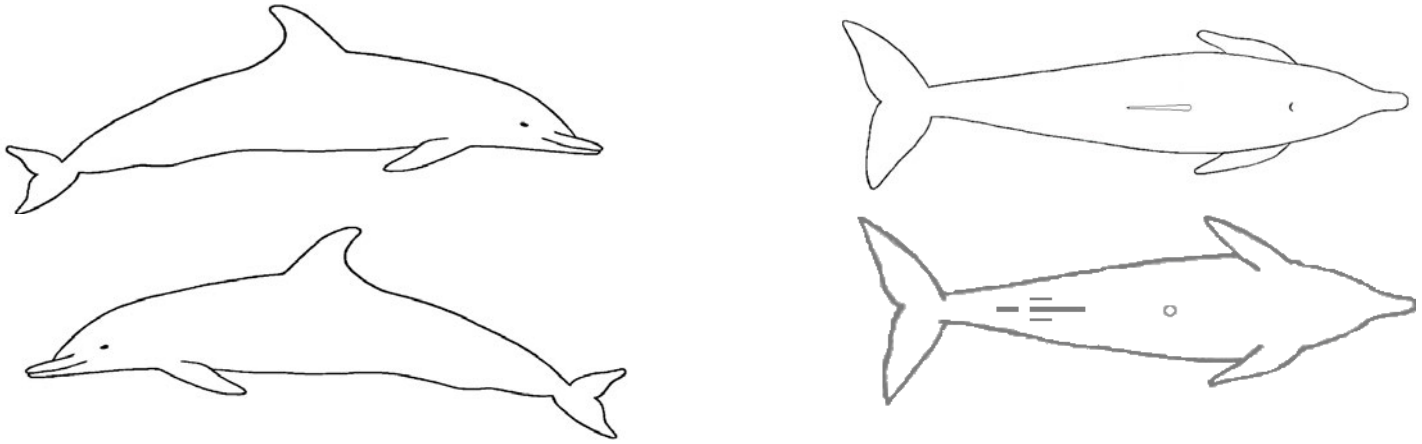
Attitude	BAR QAR Lethargic Non-responsive **TREND:** Improving Stable Declining
Behavior	Calm Vocalizing Tail fluttering Hyperesthetic Thrashing Arching
Body condition	Emaciated (1) Thin (2) Slightly thin (3) Mesomorphic (4) Robust (5)
Post-Nuch. Fat Pad	NE Concave Spongy Firm Convex
MM Color	NE Pink Pale pink White Gray Cyanotic (purple) Injected (bright red)

II. OBJECTIVE:

Rectal Temp: _____°F **Time:** _____ **TREND:** Increasing Stable Decreasing

Neurologic	**Mentation:** Alert Dull Stuporous **First Swimming:** N **Y: Circling:** N Y: (CW CCW) **Listing:** N Y: (to L R) **Nystagmus** (repetitive eye motion)**:** **N** (L R) **Y** (L R / vert OR horiz) **Strabismus** (abnormal eye position): **N** (L R) **Y** (L R / dorsal ventral cranial caudal) **Notes:**
Ophthalmic (Eyes)	**Palpebral Reflex:** **NE:** (R L) **absent:** (R L) **weak:** (R L) **normal:** (R L) **Globe Intact:** **NE**: (R L) **CBD**: (R L) **N**: (R L) **Y**: (R L) **Squinting:** **NE:** (R L) **N**: (R L) **Y**: (R L) **Visual Tracking:** **NE**: (R L) **N**: (R L) **Y**: (R L) **Abnormal Discharge:** **NE**: (R L) **N**: (R L) **Y**: (R L) **Corneal Lesions:** **NE:** (R L) **N**: (R L) **Y**: (R L): Abrasion Laceration Opacity **Periorbital Scavenger Damage:** **NE**: (R L) **N**: (R L) **Y**: (R L) **Notes and other abnorm:** **L** **R**
Oral (mouth, tongue, teeth)	**Dentition** (broken, worn, missing, partially erupted teeth, discoloration): **Ulcers:** NE N Y (describe): **Masses**: NE N Y(describe): **Notes:**

Cardiovascular	**Heart Rate** (bpm): **INTAKE:** _____(min) _____ (max) @ ____:____ **PRE-RELEASE:** _____(min) _____ (max) @ ____:____ **Rhythm:** Split (NSA) OR No Split (NSR) Tachycardia (fast, sustained) Bradycardia (slow, sustained) **Murmur**: NMA Murmur (note systole vs diastole, Grade 1-6): **Notes:**
Respiratory	**Respiratory Rate** (bpm): **INTAKE:** _____ @ ____:____ **PRE-RELEASE:** _____ @ ____:____ **Malodorous Blow:** N Y **Blowhole Seal Intact:** N Y **Blowhole Discharge**: N Y (describe): **Character:** WNL Labored Full Shallow Apneustic Uniform Rapid Dbl breathing (freq occ) Exhale only (freq occ) Chuff (freq occ) BH Leaking (freq occ) **Lung sounds** (note affected lung field and % lung for abnormalities): R: Clear (NBVS) Harsh (crackles, wheezes, increased BVS) Absent L: Clear (NBVS) Harsh (crackles, wheezes, increased BVS) Absent
Gastrointestinal	**Flatulence:** NE N Y **GI Sounds Auscultated:** NE N Y **Vomiting:** N Y **Feces:** NE N Y:(foamy mucoid liquid green yellow brown parasites)
Urogenital	**Sex:** NE M F **Urine:** N Y (USG=1.0_ _ ; clear straw yellow dark yellow orange red brown): **Lactating:** NE NA N Y **Lesions:** NE N Y(describe): **Discharge:** NE N Y (describe):
Musculoskeletal	**Scoliosis:** N Y: ("C" shape opens to: L R / mild moderate marked) **Fractures:** N Y **Wounds:** N Y
Integument	**Rake Marks:** N Y (fresh healed / few many) Location: **Skin sloughing:** N Y (mild mod marked) **Scavenger damage:** N Y (mild mod marked) **Other Lesions:** N Y (describe here and sketch on next page):



III. ASSESSMENT:

MASTER PROBLEM LIST: *denote level of concern: high (H), moderate (M), low (L) for each problem listed*

1. _____ 6. _____
2. _____ 7. _____
3. _____ 8. _____
4. _____ 9. _____
5. _____ 10. _____

OVERALL CONDITION DURING TRANSPORT: □ Stable □ Improving □ Declining

RELEASE CRITERIA: *good=0, fair=1, poor=2, grave=3*

Dependent calves score '6' &, single social cetaceans score "1" for social component

PE____+ Behavior____+ Blood____+ Social____ = ☐ *(0-2=good candidate, 3-5=borderline, 6-12 DNR)*

Other Notes:_____

_____

_____

IV. PLAN:

DIAGNOSTICS:

Blood Draw: Draw Time: _____ Site: DFL VCP DFN IC Method: Vac / Pico / Syr

Ultrasound: □ Blubber Thickness □ Lungs □ Marginal LN □ Heart □ Caudal thorax

☐ NE □ Liver □ Stomach Chambers □ Kidney □ Urinary Bladder □ Repro □ Epaxial MM

Results: □ WNL □ Renal Gas □ Pulmonary Lesions □ Pregnant (1st, 2nd, 3rd trimester, CBD)

Notes: _____

_____

Other DX: □ ECG □ capnograph □ AEP Notes:_____

Sampling: □ blowhole swab □ rectal swab □ skin □ lesion biopsy

TREATMENTS: *(If administering sedation and/or euthanasia, fill out sedation/euthanasia monitoring form)*

IV Fluids: *(10-20 mL/kg IV bolus over 30 min)*

Type: □ LRS □ 0.9% NaCl Site(s): DFL / VCP / DFN

1st bag: Start Time: _____ End Time: _____ Volume: _____ ml

2nd bag (only if indicated): Start Time: _____ End Time: _____Volume: _____ ml

TOTAL VOLUME IV FLUIDS: _____ **ml**

E/Se (2.5 mg/ml Se @ 0.06 mg/kg Se)**:** _____mL Time:_____ Route: IM Inj Site:_____

Drug: _____ Conc:_____mg/ml Volume:_____ml Time: _____

Route: IM IV Other:_____ Inj Site: _____ Indication: _____

Drug: _____ Conc:_____mg/ml Volume:_____ml Time: _____

Route: IM IV Other:_____ Inj Site: _____ Indication: _____

Notes:_____

DISPOSITION:

Tag: □ Not tagged □ ID Tag #: _____ □ Yellow Caisley Other: _____

□ Sat. Tag PTT#: _____ □ SPOT □ SPLASH Pin length: _____mm

□ **Released** Time: _____ □ **Released at stranding site** □ **LAS**

□ **Relocated:** Herring Cove Scusset Beach W Dennis Bch Other: _____

Total # dolphins: _____ Released with: _____

Release Conditions (great=0, 3=bad): _____ _____

Animal Release Score (How well did the animal swim off? well=0, 3=badly): _____

Release Notes: _____

_____

□ **Euthanized** Bottle #: _____ Volume: _____mL Inj time: _____ TOD: _____ □ *fill out sed/euth form*

Overall Euthanasia Score (excellent / good / fair / poor): _____ Staff Init: _____ Vet Init: _____

□ **Died** TOD: _____

Tagging / Disposition Notes & Justification:_____

_____

_____

OVERALL PROGNOSIS: *(0-3 = good, 4-8 = borderline/fair, 9+ = poor)*

Release Criteria _____ **+ Release Conditions** _____ **+ Animal Release Score** _____ **=** _____

Primary examiner: _____ **Signature:** _____ **Att vet if different**_____

IN-HOUSE DOLPHIN REFERENCE RANGES

VETSCAN REFERENCE RANGES (IFAW DATA)

	NA+	K+	tCO2	CK	GLU	CA++	BUN	CRE	AST	TBIL	GGT	ALB	TP	GLOB
Min	143	3.3	25	130	80	8.5	30	0.3	150	0.3	20	3	6	3
Max	149	5	35	400	150	10	50	1.2	500	1.3	50	3.6	7.5	4.5

These are based on the Vetscan results from common dolphins that stranded in 2017, based on my clinical assessment of a range of values for which I would not be concerned. If there are values outside of these ranges, they should be considered as potentially clinically significant. That is not to say that all values within these ranges are normal, but they are acceptable for stranded dolphins in the absence of any clinical signs of disease. SMS 1-24-2018

HM5 REFERENCE RANGES (IFAW DATA)

	WBC	LYM	MON	NEU	EOS	BAS	RBC	HGB	HCT	MCV	MCH	MCHC	RDWc (%)	PLT
Min	3*	0.2*	0	3*	0	0	5	16.7	46	90*	25*	25*	12.3	150*
Max	12*	2*	2*	12*	2*	2*	6.4	19.6	55	110*	35*	35*	14.7	300*

These are based on the HM2 results from Sharp et al. 2014, although the asterisked values were not statistically significant values in that study and are based on current SMS clinical interpretation (2020). In general, neutrophils should be approximately 80% of your WBC count, then lymphocytes, then monocytes in decreasing order. Anemia (low HCT, HGB, RBC) is one of the most significant predictors of poor prognosis. Otherwise, single out of range values can still be considered release candidates.

Overall Poor Prognostic Indicators

Parameter	Poor prognosis range
Hemoglobin	<16.7 g/dL
Hematocrit	<41%
Creatine Kinase	>397 U/L
ALT	>432 U/L
AST	>1059 U/L
LDH	>1197 IU/L
GGT	>138 U/L
BUN	>55 mg/dL
Base excess	<8 mmol/L
Lactate	>4.19 mmol/L
Bicarbonate	<33 mmol/L
Heart rate	>119 beats/minute
BMI	>17.5
length: girth ratio	>2.05

Poor prognostic indicators for stranded short-beaked common dolphins (*Delphinus delphis*) with high specificity for post-release failure (adapted from Sharp et al. 2014 Table 4).

Animals with multiple values within these ranges likely have the poorest prognosis

ALT = alanine aminotransferase, AST = aspartate aminotransferase, LDH = lactate dehydrogenase, GGT = gamma-glutamyl transpeptidase, BUN = blood urea nitrogen, BMI = body mass index (kg/m2).

Bloodwork Interp Quick Ref	
Liver Disease	↑↑ALT, GGT, TBili
Kidney Disease	↑ BUN & Creatinine
Inflamm/Infection	↑ WBC esp Neut, Glob, ↓Alb
Dehydration	↑ Na, K, Cl, Hct, Hgb, TP
Muscle Damage	↑↑ CK, AST, LDH, K, P
Immunosuppression	↓ WBC, Neut, Lym

PHYSICAL EXAM REFERENCE RANGE		CAUSES FOR CONCERN
Responsiveness	BAR, QAR, following movement with eyes	Dull, minimally responsive, not following movement with eyes
Shock Assessment	Palpebral reflex strong and quick (normal), mucous membranes pink or light pink, HR and RR WNL with normal character	Mucous membranes white/gray (pale), purple (cyanotic), or bright red (injected); flatulence, foamy feces, belching, extreme hyperesthesia, unresponsiveness, decreased to absent palpebral reflex, CRT >2 seconds, elevated HR/RR
Neurological	Appropriately responsive, absence of abnormalities	Stuporous or dull, nystagmus (back and form eye movement), strabismus (abnormal eye positioning in any direction), abnormal posture, swimming in unidirectional circles, failed release
Ophthalmic (Eyes)	Intact globe (eye ball), absence of abnormalities	Ruptured globe (be sure to confirm that the globe is actually ruptured and scavenger damage is not just AROUND the eye, hyphema (blood inside the eye), completely opaque corneas or lenses, colored discharge, clenching closed constantly
Oral	Pink or light pink mm, CRT <2 sec, mild-mod teeth wear ok, minimal oral ulcers or other lesions. *NOTE:* if lingual papillae are very prominent in a young animal, it should be considered dependent and released with adult female	Mucous membranes white/gray (pale), purple (cyanotic), or bright red (injected); excessive tooth fratures and wear that correspond to oral abscesses, halitosis (foul smell) and extensive oral ulcers and/or other lesions
Cardiovascular	HR min >60 & max <160, normal sinus arrhythmia (split - faster after breath then slows), no or low grade murmur	**No split, HR max > 160 or min <60 (**but remember HR scales inversely with size, so very large animals will have slower heart rates (pilot whales ~40/min) and young/smaller animals will have faster HR, murmur (grade 3 or greater)
Respiratory	1-12/min, crisp, strong, exhale/inhale, clear crisp sounds on auscultation that are the same in all lung fields, blowhole seal intact	**RR > 12/min or < 1/min**, shallow or rapid breaths, incomplete breaths, frequent chuffing, blowhole leaking, or other abnormal respirations, arching prior to each breath (although common and less concerning in large animals), harsh lung sounds including crackles or rales, or decreased or absent lung sounds, different sounds in different lung fields, blowhole seal not intact and secondary seal (nasal plug that is deeper) also unable to seal
Gastrointestinal	Gut sounds present if auscultated, gastric contractions on US, normal (or no) feces - viscous green-brown	No gut sounds present if auscultated; absent or rapid gastric contractions on US; **foamy, bloody,** or very mucoid feces, very large fecal parasite burden; vomiting (check for pregnancy)
Urogenital	Translucent, pale yellow urine, genital slit WNL, lactating (+/-)	Blood tinged (red) or dark (orange, green, brown) urine, gritty texture or opacity to the urine; significant open lesions around the genital slit, fetal membranes or fetus protruding fully or partially from the genital slit
Musculoskeletal	Body Condition 3 or greater, no scoliosis or major injuries	**Body condition 1-2**, scoliosis, fractures, dislocations, injuries that impact ability to swim, feed, high likelihood of infection

Integumentary (skin)	Stranding-related superficial lacerations are ok, tattoo lesions or other "pox-like" multifocal pinpoint to coalescing lesions that are not open and active and extensively disrupting the skin barrier are ok; mild algal film covering ok if remainder of exam ok; absence of other serious injuries; small singular abscesses or minor superficial infections ok with antibiotics	Sunburn affecting > 50% of the dorsal surface producing bullae or sloughing; other extensive skin sloughing affecting > 50% of body; large open wounds; active, ulcerated or otherwise significant wounds covering >50% of body and likely a contributing cause of stranding

[redacted]

From: [redacted]
Sent: Tuesday, 13 July 2021 9:43 am
To: [redacted]
Subject: RE: Orca calf in Wellington

Thanks [redacted].

At the moment, the priority is finding the pod, however if we get to that point, we would be advocating for getting the carcass to Massey and I have indicated with the Kapiti office that they should have these conversations with iwi. I believe Ian has been in touch with [redacted] throughout the incident so far.

Cheers,
[redacted]

From [redacted]@massey.ac.nz>
Sent: Monday, 12 July 2021 10:49 am
To: [redacted]
Subject: RE: Orca calf in Wellington

Hi [redacted], I'm happy to do a necropsy if desired/required,
[redacted]

From [redacted]
Sent: Monday, 12 July 2021 8:24 AM
To: [redacted]@massey.ac.nz>; Ian Angus <iangus@doc.govt.nz>; [redacted]
Cc: [redacted]@massey.ac.nz>; [redacted]
Subject: RE: Orca calf in Wellington

Morning all,

I agree with what [redacted] has said. I don't know what plans are being made but I would think about asking for [redacted] to come down to ensure a smooth euthanasia once we are at that stage. We also have the budget to assist with necropsy by [redacted]

Cheers,
[redacted]

From: [redacted]@massey.ac.nz>
Sent: Monday, 12 July 2021 6:22 am
To: Ian Angus <iangus@doc.govt.nz>; [redacted]
Cc: [redacted]@projectjonah.org.nz>; [redacted]@massey.ac.nz>
Subject: Orca calf in Wellington
Importance: High

Morena,

I was sad to see on social media this calf never made it out to sea yesterday. Given the clear remnant foetal creases visible in the online images, I don't think this bodes well for this critter given it wont be weaned and its pod may be far away by now ☹ such sad news. With any luck a spotter plane may help if mobilised first thing this morning but that would need to happen quickly now as this calf will not have fed in > 18hrs so dehydration is a serious and imminent concern (don't listen to those who say you can hydrate orally with a hose – the IFAW strandings vets we work with disagree these fluids make any impact to bloody chemistry so at best it quenches thirst).

If the department intends to commit to intervention, I would recommend a vet with marine mammal experience such as [redacted] be connected to get an IV line into the fluke to get saline in asap while efforts are made to relocate the pod. If intervention isn't being considered, I would further support the idea of rapid euthanasia sooner rather than later so we don't have a repeat of the poor welfare outcomes that occurred in Tauranga.

Kia kaha – today I suspect will not be a smooth sailing the department since we all know the complexities orca come with. Good luck folks, please shout out if I can help in any way or if I can connect you to Lydia.

In the sad event this calf doesn't make it today, we would be keen to examine it at Massey (at Palmy is fine – I can travel and it would be great to work with Stu Hunter on this critter). At the very least, I am keen to access blubber for toxicology.

Ngā tauwhirotanga o te wā

[redacted]

[redacted] **PhD**
Professor – Marine Biology
Rutherford Discovery Fellow – Royal Society Te Aparangi

Cetacean Ecology Research Group | School of Natural and Computational Sciences | Massey University
Private Bag 102 904, North Shore, Auckland 0745, New Zealand
Physical Address: Building 5, Gate 4, The Station Crescent, Albany, Auckland, New Zealand

[redacted] http://www.cetaceanecology.org

Cetacean Ecology Research Group
www.cetaceanecology.org

[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 8:25 am
To: [redacted]
Subject: Fw: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi again,

Ah I missed this email in the chain - useful information about drying off time for the dam.

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Wednesday, 14 July 2021 12:24 AM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@seawold.com [redacted]@seawold.com>
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hello [redacted]

It would take approximately 30 days for the cow to completely dry up. In addition, many cetacean species have spontaneously lactated if a calf was introduced. With that being said, the milk is typically, initially (and maybe always) of lower quality and the calf would need to be robust enough to withstand the transition. I look forward to the blood results.

Cheers,

[redacted]

[redacted] DVM, PhD
Vice President of Conservation Research and Animal Health
SeaWorld Parks and Entertainment
Corporate Zoological Operations

7007 SeaWorld Drive
Orlando, FL 21821
[redacted]

From [redacted]
Sent: Tuesday, July 13, 2021 12:32 AM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com

[redacted]@seawold.com>
Subject: RE: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted]

Yes indeed – silly COVID I am sure we would have loved your support on site!

Hopefully not an insensitive question but does any one have any thoughts on how long a female continues to produce milk if she looses a calf? Trying to get an idea on how long we have to find the pod (assuming we can keep the little one medically and nutritionally stable).

Thanks all!

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Tuesday, 13 July 2021 3:47 PM
To: [redacted]
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Happy to help , hard not jumping on a plane ;-)

I've been corresponding with [redacted] frequently and tailoring the plan to help this little one…hope they can sustain him for the pod to come back or to be sighted.

Regards,
[redacted]

> On Jul 12, 2021, at 7:25 PM, [redacted] wrote:
>
> Hello [redacted] and [redacted],
>
> Thank you so very much for the replies (I love the wildlife/veterinary communities so much) – awesome to know a vet has been in touch with you directly already [redacted] Thank you for the support there, so very appreciated of you all taking time to reply and help with getting contacts in the right places.
>
> Depending on how the next few days go I may be back in touch or others may be in touch to lean on your expertise as the situation continues to develop.
>
> Thank you all,
>
> Kindest regards,
>
> [redacted]
>
> ---
>
> **From:** [redacted]@SeaWorld.com>
> **Sent:** Tuesday, 13 July 2021 9:29 AM
> **To:** [redacted]@sdzwa.org>

Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: RE: Stranded orca calf in New Zealand

Thanks [redacted]

Been communicating with zoo vet, [redacted], since last evening.

Regards,
[redacted]

From: [redacted]@sdzwa.org>
Sent: Monday, July 12, 2021 2:25 PM
To: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hello [redacted]
I am responding and including [redacted] and [redacted]. Hopefully they can be of assistance. I am also including [redacted] who can assist with sharing nutritional informational on milk replacements or put in you touch. Good luck.
[redacted]

From: [redacted]@sdzwa.org>
Sent: Monday, July 12, 2021 2:17 PM
To: [redacted]; [redacted]sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>
Subject: RE: Stranded orca calf in New Zealand

Dear [redacted]
So sorry to hear about the stranded orca calf. I have no experience with orcas and have cc:ed 3 folks who may be able to help [redacted] and [redacted]). Both [redacted] and [redacted] and on vacation and may not be monitoring email. I hope [redacted] will be able to help or put you in touch with someone who can.
Best of luck,
[redacted]

[redacted], **DVM, DACZM, DECZM (ZHM)**
Chief Conservation and Wildlife Health Officer

<image001.jpg>

15600 San Pasqual Valley Road
Escondido, CA 92027-7000
[redacted]
sdzwa.org

From [redacted]
Sent: Monday, July 12, 2021 12:19 PM
To: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>
Subject: Stranded orca calf in New Zealand

Kia ora (hello) from New Zealand,

My name is [redacted] and I am a wildlife veterinarian working for the Department of Conservation in New Zealand. I received your contact details via [redacted] as veterinarians who may be able to help provide advice with regards to an orca calf that stranded here just under 48 hours ago. I am on the technical advisory group for the response to this situation and am hoping to provide a strong veterinary voice to the recommendations.

A bit of history on the calf - Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded – report is that it was swept up into a rock pool and stranded there. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependent on the mother. Unfortunately despite extensive searching yesterday both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. From videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night. Last night the calf was kept in the water and the mobility appears to be slowly improving but is still not great.

A Zoo veterinarian attended the site yesterday afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended following advice from Sarah. I have not heard as to what the assessment was or how the procedure went at this stage.

We know the chances of a dependant calf being reunited with a pod are slim but the technical advisory group has been requested to investigate options for supporting the calf to allow time for an attempt to be made.

I was particularly reaching out to you all to seek advice on the what are the **feeding recommendations for an orca calf** if the decision was made to persist with attempts to relocate the pod. Given being located in NZ we have a lot of milk replacers for domestic animals but certainly nothing specific for cetaceans so I am not sure if there is anything in the country that would even work as a milk replacer.

Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

Thank you so much for your time and any thoughts,

Kindest Regards,

[redacted]

[redacted] **BVSc**
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand
http://kakaporecovery.org.nz/

<image002.png>

<image003.png>

<image004.png>

<image005.jpg>

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From: [redacted]
To: [redacted]
Cc: [redacted]
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand
Date: Wednesday, 14 July 2021 5:39:47 pm

Hi [redacted]

The 100% formula should provide all caloric requirements and hydration, so I think you can phase out the electrolyte if the calf is receiving the full amount of formula. A lot is dependent on how the calf is processing the formula, input=output, in fecal consistency(ie. Formula Pooh) and weight gain.

Changes to phase out electrolytes or volume are best done incrementally by 25-50%. Sounds like he should be able to handle more volume, based on the initial tubing, but as formula is thicker it will take more to metabolize the formula. It seems that he should be able to tolerate more volume based on initial tubing volumes.

The formula sent is a species guideline, and adjustments can be made to meet each individual's needs based on environmental differences. Please feel free to share with the local team and make necessary adjustments to ensure adequate hydration, which can be observed with changes in fecal consistently and general behavior. We will often monitor weight gain with neonates that are being fed formula to ensure adequate growth…I know this will be difficult in your scenario, however you could get consistent girth and length measurements to estimate growth rate.

I would probably phase out the steroid with decreasing doses…it is probably no longer needed.

Hope that makes sense? Let me know if I left anything out or you have addition questions,
[redacted]

On Jul 13, 2021, at 10:00 PM, [redacted]@massey.ac.nz> wrote:

Sorry—lastly the blood glucose taken on site this morning was 6.5 mmol/L.

From: [redacted]@massey.ac.nz>
Date: Wednesday, 14 July 2021 at 4:56 PM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@vanaqua.org> [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]@gmail.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

Blood results from today attached!

From: [redacted]@massey.ac.nz>
Date: Wednesday, 14 July 2021 at 4:55 PM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted], [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

Thank you so much for your quick response and advice!

We ran a second biochem on the calf today which I've attached the results of. The biggest changes were a slight increase in PCV suspected to be secondary to dehydration and a decrease in TP. For the most part everything looks ok still. We have extra whole blood and serum saved as well. On the photo, the numbers written in parentheses were from his first blood test on the 12th.

We also started tube feeding formula this morning. We have started with introducing very small amounts of slurried formula so he only received 500 ml at each feeding today (with four total feedings or 1.6 L slurry). The initial feeding was diluted to 50% strength and each subsequent feeding has been increased by 25% strength each time so he is now getting 100% strength feeds (although these are being given with 2.5 liters of vytrate at the same time at the moment).

I've done a rough nutritional calculation for the version of the formula that we are making which gave a calorie content of approximately 5881 cal/4 L (which is one batch of recipe). Meaning he has only received ~2352 calories of feed today. This is obviously well under the recommended amount of 120 kcal/kg/day. We are wondering how quickly we should be increasing the volume of formula fed to safely meet his metabolic requirements. In the orca formula document you sent previously you mentioned not feeding greater than 13.5 L/day. Based on our formula and an estimated weight of ~200 kg he would need 16 L/day to meet his requirements. A related question is whether you have any advice around phasing out vytrate and replacing it with just formula. The formula itself is quite high water content so we were wondering if we should only be relying upon it for hydration.

Our intended feed roster for tomorrow was using 500 ml full strength formula with 2 5 liters of vytrate 4 times during the day. I know

it was recommended that we feed every 2 hours and with a vet on site all day that is something we can start doing to help ramp up his caloric intake. The team on-site is closely monitoring faecal output as well.

In regards to the formula recipe that you sent, we are considering starting to get help making it from some of the on-site vet team we have been collaborating with. Obviously we have diverged from your original recipe based on what is available to us, but we wanted to check to see if you are comfortable with us sharing the recipe for our version of your formula with that team.

For medications, the calf is receiving 5 mg/kg enrofloxacin BID and 0 05 mg/kg dexamethasone SID. We are not administering any other meds at this time.

Apologies for the lengthy email—I hope all that made sense!

Thank you so much once again and we look forward to hearing back!

[redacted]

From: [redacted]@SeaWorld.com>
Date: Wednesday, 14 July 2021 at 4:17 PM
To: [redacted]@massey.ac.nz>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

[redacted]

Actually [redacted] commented that for this guy you could probably start lower on a midazolam dose since it is really just for an anxiolytic, recommend go with 0.1-0.15 mg/kg IM…should be plenty.

[redacted]

On Jul 13, 2021, at 6:02 PM, [redacted]@seaworld.com> wrote:

Hi [redacted]

While transport in stretcher suspended in water transport unit is recommended, transport out-of-water can be done but recognize it will cause more cardiopulmonary stress to the animal. I would look into getting a 2-3" memory foam mattress for additional comfort on the mattress, provide pectoral fin cut-outs as you have done for the mattress.

We and others have transported dolphins for advanced diagnostics (i.e. CT) for up to 4 hrs out-of-water on padded stretchers with "wetting" methods to keep skin moist. We've had adult killer whales out-of-water during procedures for up to 2 hours without significant compromise.
I would have hand sprayers or water pump sprayers (found at hardware store), towels, additional foam padding or pieces of closed-cell foam/foam mattress, waterproof sunscreen (zinc can trap heat at skin surface and lead to sloughing), in case of sun exposure or provide adequate shade during transport.
Monitor respirations, respiratory effort, heart rate (sometimes easier to see or palpate then listen too), vocals or lack thereof. Keep skin moist at all times, check pressure points if on mattress or areas that may rub.
Depending on air temp and wind, he should be able to maintain body temp, however, if you have a cable thermistor for rectal temperature that may be useful to determine if he needs thermal support (emergency space blankets are handy).
Emergency medical kit – standard ER meds, injectable midazolam (can cause respiratory depression, dose 0.5 mg/kg IM), flumazenil 0.02 mg/kg IV/IM, butorphanol (0.1 mg/kg IM, can cause respiratory depression), naltrexone 0.1 mg/kg IM, doxopram
I can send you more specifics on dosage, if you need it…

Others may have additional suggestions, that's what's on the top of my head at moment.

How are the feedings going?

[redacted]

From: [redacted]@massey.ac.nz>
Sent: Tuesday, July 13, 2021 4:27 PM
To: [redacted]
Cc: [redacted]@vanaqua.org>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo com>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo com>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hello everyone,

We completed our morning treatments and got a second blood sample. At the moment we are working on developing plans to attempt a possible relocation with all the parties involved here and have been asked to provide input on the veterinary aspect of welfare of the calf during transport and relocation.

There are a number of aspects of this scenario that are concerning (and certainly something we have no experience with ourselves) so are wondering if you have any advice to give regarding monitoring the health and welfare of this animal during the process (for example time he can safely be kept out of the water and what support is needed ie wet towels, zinc oxide if transported during day?) We can monitor basic vitals such as respiratory rate during this process but are hoping for any additional advice or recommendations.

In terms of a setup for transport we are still waiting on a sling so at the moment what we have is mattresses with areas cut out for his pectoral fins to slot into. He would be transported on this on the back of a boat out to the area of attempted release. There would be designated people to keep him wet as well. This setup would only be used if there was an attempted release prior to the arrival of a sling.

I realize this is quite a difficult attempt to coordinate and we sincerely appreciate any and all input you may have.

[redacted]

On 13/07/2021, at 8:40 PM, [redacted] > wrote:

> Not sure how often you will be getting blood, but can add in a sed rate (erythrocyte sedimentation rate) to have a very crude assessment of inflammation while all other diagnostics are pending. In a pinch, I have used capillary tubes and then kept them undisturbed as vertical as possible for an hour - after which you measure the “drop” in RBC (or the “volume” of plasma). You won’t be able to compare to any reference value, but it can be very helpful at tracking trends over time - an increasing rate of sedimentation is suggestive of worsening inflammatory disease somewhere.
>
> As [redacted] said, keep going! Nice work so far.
>
> [redacted]
>
> Sent from my iPhone

On Jul 13, 2021, at 12:14 AM, [redacted] @vanaqua.org> wrote:

My mistake. 41 was your reference to a normal. Not your corrected number for this animal. Agreed with [redacted] . Not unusual. But a recheck is warranted. It should not be going lower. Going down and a BUN going up with no other obvious cause could be some GI bleeding. Also not unusual but needs addressing.

<VanAqua-300px_aa92c88f-1f67-47e7-95c0-296dd768713a.png>

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

P [redacted]

> On Jul 12, 2021, at 8:40 PM, [redacted] chmitt@seaworld.com> wrote:
>
> H [redacted] ,
>
> Anemia is typical for neonates, not concerned.
>
> I wasn’t impressed with tilt as I think it’s related to him looking at people in the water, because it’s not consistent and his respiration’s appear normal otherwise. His swim behavior appears playful and tolerant of the people in the water, seeing him stall at surface and be redirected.
>
> Regarding formula, yes you can refrigerate and use for duration of 24 hrs.
>
> Keep going, hang in there, it will be worth it.
>
> [redacted]

On Jul 12, 2021, at 8:24 PM, [redacted] [redacted]@wellingtonzoo.com> wrote:

We have a few calf nipples on hand so will try them. He does have a suckle reflex so we are cautiously optimistic about getting feeds into him that way. A few more questions--

Did you have any thoughts about the PCV of 29% or the videos I sent through earlier? It looked to me today that his tilt was less consistent since he was able to right himself so possibly more behavioral as you suggested earlier.

And with the formula that you sent, do you recommend refrigerating and keeping for 24 hours? Our plan for the formula (since we are obviously limited in terms of ingredients) is: 6 cups AnLamb milk replacer, 3000 mg dicalcium phosphate, 1000 mg Taurine, 1100 ml water, 1100 ml 0.9% NaCl injection, 120 ml 50% Dextrose, 200 ml salmon oil with 0.7 kg filleted anchovies and viscera. We are hoping to feed five times/day as you recommended and starting with 500 ml at a feed initially and increasing as described. We will start out with the 50% diluted mixture tomorrow morning and increase the strength by 25% at each feed tomorrow until he is at 100% strength if he tolerates well and continues passing faeces.

I forgot to mention this yesterday but he has been seen to be defecating regularly (5 times noted yesterday).

[redacted] BA DVM
Resident Veterinarian | Animal Care and Science | Wellington Zoo Trust
200 Daniell Street | Newtown | Wellington 6021
E [redacted]@wellingtonzoo.com

From: [redacted]@SeaWorld.com>
Sent: Tuesday, 13 July 2021 3:06 pm
To: [redacted]@vanaqua.org>; [redacted]@wellingtonzoo.com>
Cc: [redacted]@massey.ac.nz>; [redacted]@SeaWorld.com>; [redacted]@gmail.com>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Agree, if you can get a calf nipple (that is what has been used in US and Spain) and see if he has a suckle reflex that will make feeding a lot easier!

People have used calf bottle cut in half, with milk formula in bag attached to nipple, so that milk can be pushed/squeezed with increase intake during nursing bouts.

[redacted]

On Jul 12, 2021, at 7:00 PM, [redacted] [redacted]@vanaqua.org> wrote:

Nothing to shake a stick at yet

<VanAqua-300px_9ae645ef-f355-45be-b66f- | [redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

2816dd0c5fb8.png>

P [redacted]
E [redacted]@vanaqua.org

vanaqua.org

[redacted]

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

> On Jul 12, 2021, at 6:28 PM, [redacted]@wellingtonzoo com> wrote:
>
> Thank you [redacted] we appreciate your input! Will keep that in mind An in house blood smear exam gave a WCC of 4 06x10^9/L (we used a PCV of 41% as a normal in our correction) Of the WBC present: 79% were neutrophils (3 2 x10^9/L), 3% monocytes (0 12 x10^9/L) And 18% lymphocytes (0 73 x10^9/L) There were both anisocytosis and spherocytes noted in the sample as well as a few possible RBC intracytoplasmic inclusions (although these could just have been an artefact) See attached photo
>
> [redacted] BA DVM
> Resident Veterinarian | Animal Care and Science | Wellington Zoo Trust
> 200 Daniell Street | Newtown | Wellington 6021
> E
[redacted]@wellingtonzoo com<mailto:A[redacted]@wellingtonzoo com>
>
> From: [redacted]@vanaqua org>
> Sent: Tuesday, 13 July 2021 12:58 pm
> To: [redacted]@seaworld com>
> Cc [redacted]@massey ac nz>; [redacted]@seaworld com>; [redacted]@wellingtonzoo com>; [redacted]@wellingtonzoo com>
> Subject: Re: Stranded orca calf in New Zealand
>
> We did bottle feed our false killer whale calf but the tubing was more reliable with less salt water intake We did not get our nipple perfect
>
> [cid:image001 png@01D777EA EF0AE440]
>
[redacted], DVM, MSc, DACZM
> Head Veterinarian & Director, Animal Health
>
> P[redacted]
>
> This email and any files transmitted with it are confidential and intended solely for the use of the individual
> or entity to whom they were addressed If you have received this email in error, please notify us immediately
> On Jul 12, 2021, at 5:34 PM, [redacted]
<[redacted]@seaworld com<mailto[redacted]@seaworld com>>
wrote:
>
> Were you able to tube more electrolytes or begin formula supplement?
> Can you share other blood results?
>
> I d plan tubings every 2-3 hrs during day minimum of 5-6 feeds/day…aim to support him 1-2 weeks at least to give time for pod to show up or be located
>
[redacted]
>
> From: [redacted]
<[redacted]@massey ac nz<mailto[redacted]@massey ac nz>>
> Sent: Monday, July 12, 2021 5:13 PM
> To: [redacted]
[redacted]@SeaWorld com[redacted]@SeaWorld com>>

> Cc [redacted]
[redacted]@SeaWorld.com<mailto:[redacted]@SeaWorld.com>>;
[redacted]
<[redacted]@vanaqua.org<mailto:[redacted]@vanaqua.org>>;
[redacted]
<[redacted]@wellingtonzoo.com<mailto:[redacted]@wellingtonzoo.com>>;
[redacted]
[redacted]@gmail.com<mailto:[redacted]@gmail.com>>;
[redacted]
[redacted]@wellingtonzoo.com<[redacted]@wellingtonzoo.com>>
> Subject: [EXTERNAL] Re: Stranded orca calf in New Zealand
>
>
>
> <Orca calf blood smear jpeg>

[redacted]

From: [redacted]@ufl.edu>
Sent: Wednesday, 14 July 2021 11:24 pm
To: [redacted]
Subject: RE: Stranded orca calf in New Zealand

Will be on a Navy ship helping with marine mammal issues for an exercise so out of touch for 5 days. Wish I could be there to help but very good luck to you.
[redacted]

From: [redacted]
Sent: Wednesday, July 14, 2021 5:40 AM
To: [redacted]@ufl.edu>
Subject: RE: Stranded orca calf in New Zealand

[External Email]
Hi [redacted],
Sometimes that view a little removed from the inside can add a lot of perspective. We are definitely very keen to get all the perspective we can on this situation.
[redacted]

From: [redacted]@ufl.edu>
Sent: Tuesday, 13 July 2021 11:59 PM
To: [redacted]
Subject: Re: Stranded orca calf in New Zealand

Hi [redacted],
As an ex SeaWorld vet it is not uncommon to be viewed as an out sider but will help where I can.
[redacted]

From: [redacted]
Date: Tuesday, July 13, 2021 at 7:50 AM
To: "[redacted]@ufl.edu>, [redacted]@SDZWA.org" [redacted]@SDZWA.org>, [redacted]@seaworld.com>, [redacted]@seaworld.com" [redacted]@seaworld.com>, [redacted]@seaworld.com" [redacted]@seaworld.com>, [redacted]@SeaWorld.com" [redacted]@seaworld.com>
Cc: [redacted]@SeaWorld.com>
Subject: RE: Stranded orca calf in New Zealand

[External Email]
Hi [redacted]

Thanks so much again for your response and I have lost track of who is and isn't looped in – thank you all for your interest and support. A lot of messages were fired off in the hopes someone might be willing to respond and you have all been amazing!

I believe [redacted] may have received some videos. I believe it has been sexed as male (though I have not been involved in that side of things). Current suggestions are that it is 4-6 months old – I am imagining closer to 4 moths than 6. It certainly appears to approach and be aware of people – videos of it appearing to respond to touch. Definite vocalising above water, not sure if we have gotten confirmation of in the water vocal though I imagine it will be. Hydrophones have been offered if helpful.

Unfortunately there are no facilities in NZ to enable the longer term raising of a calf this young. “Springer” is being suggested by some people as the model however our understanding within the technical advisory group is that she was much older (2ish yrs?) when she was taken into care and was already self-feeding and her natal pod was well known so was able to be reintegrated.

The Sea World team have been fabulous and provided their formula recipe so the ingredients (or substitutes) for that were being sourced today to start feeding tomorrow.

Asking again in this forum, hopefully not an insensitive question but does any one have an indication as to how long a female will continue to lactate after the loss of a calf? Keen to get thoughts from anyone as to the length of time that might be considered realistic to continue to search for the pod before it becomes a lost cause even if the original pod were to be located an the calf able to be taken to them.

Once again thank you all for your time and the support that is coming through many avenues – we very much appreciate you sharing your expertise with us!

Kindest Regards,

[redacted]

[redacted] **BVSc**
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

From: [redacted]@ufl.edu>
Sent: Tuesday, 13 July 2021 11:25 PM
To: [redacted]@SDZWA.org; [redacted]@seaworld.com; [redacted]@seaworld.com; [redacted]@seaworld.com; [redacted]@seaworld.com>
Cc: [redacted]@SeaWorld.com>
Subject: Re: Stranded orca calf in New Zealand

Hi [redacted],

Based on the photo that is a very young calf and would need formula support as well as antibiotics most likely. The video would be helpful to gauge activity and mental capability. Do you know if male or female? Is it approaching you, aware of you? Vocalizing? I am sure it is challenging for you guys to consider options without the options for raising it. Here it would go to a facility for all that is needed. Odds of replacing it with the pod are hard to imagine but sounds like the only choice though not sure they would take it back. Would consider the mom was possibly inexperienced to have left it behind. Not sure of the state of your approach there in NZ on orphan calves, facilities and options for captivity. Added on [redacted] from SeaWorld for more information and input.
[redacted]

From: [redacted]
Date: Monday, July 12, 2021 at 10:09 PM
To: [redacted]@ufl.edu>, [redacted]@SDZWA.org" [redacted]@SDZWA.org>, [redacted]@seaworld.com>, [redacted]@seaworld.com" [redacted]@seaworld.com>, [redacted]@seaworld.com" [redacted]@seaworld.com>, [redacted]@SeaWorld.com" [redacted]@seaworld.com>
Subject: RE: Stranded orca calf in New Zealand

[External Email]
Hi [redacted]

Thank you so very much for a rapid response and such an excellent resource – so very much appreciated! Definitely a very challenging situation for all involved. I am waiting for an update from the attending veterinarian. I believe bloods were collected yesterday.

As of yesterday afternoon he is being held at a fenced off section of a boat ramp to contain him. There are still people in the water constantly but we are trying to pull back a little from that. I am looking to get a video of the calf without people in the water to get an indication on mobility as currently I am concerned he is not in a state that would allow him to be returned to a pod mobility wise.

Photo below. If I get videos that are better than what is currently available on social media I will send them through.

Kindest regards and many more thanks again.

[redacted]

From: [redacted]@ufl.edu>
Sent: Tuesday, 13 July 2021 1:58 PM
To: [redacted]@SDZWA.org; [redacted]@seaworld.com; [redacted]@seaworld.com; [redacted]@seaworld.com; [redacted]@seaworld.com>
Subject: Re: Stranded orca calf in New Zealand

Adding on some other SeaWorld vets since the returns are challenging. Hi guys see below. There was a killer whale formula we used for an orphaned animal years ago [redacted] may also have it.
[redacted]

From: [redacted]
Date: Monday, July 12, 2021 at 3:14 PM
To: [redacted]@ufl.edu>, [redacted]@SDZWA.org" [redacted]@SDZWA.org>, [redacted]@seaworld.com>
Subject: Stranded orca calf in New Zealand

[External Email]
Kia ora (hello) from New Zealand,

My name is [redacted] and I am a wildlife veterinarian working for the Department of Conservation in New Zealand. I received your contacts from [redacted] as veterinarians who may be able to help provide advice with regards to an orca calf that stranded here just under 48 hours ago. I am on the technical advisory group for the response to this situation and am hoping to provide a strong veterinary voice to the recommendations.

A bit of history on the calf - Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded – report is that it was swept up into a rock pool and stranded there. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependent on the mother. Unfortunately despite extensive searching yesterday both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. From videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night. Last night the calf was kept in the water and the mobility appears to be slowly improving but is still not great.

A Zoo veterinarian attended the site yesterday afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended following advice from [redacted] I have not heard as to what the assessment was or how the procedure went at this stage.

We know the chances of a dependant calf being reunited with a pod are slim but the technical advisory group has been requested to investigate options for supporting the calf to allow time for an attempt to be made.

I was particularly reaching out to you all to seek advice on the what are the **feeding recommendations for an orca calf** if the decision was made to persist with attempts to relocate the pod. Given being located in NZ we have a lot of milk replacers for domestic animals but certainly nothing specific for cetaceans so I am not sure if there is anything in the country that would even work as a milk replacer.

Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

Thank you so much for your time and any thoughts,

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

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Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

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[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 9:32 pm
To: [redacted]
Cc: [redacted]@vanaqua.org; [redacted]

Subject: RE: Stranded orca calf in New Zealand

Hi [redacted]

Thank you so much and thank you again all for your support thus far! [redacted] (senior vet at Wellington Zoo) has looped me in on your direct clinical advice email thread which is fabulous and much appreciated. Very keen for you to continue to liaise directly with the Wellington Zoo team with regards to direct day to day medical care though I would very much appreciate staying in the loop.

My role is to help collate and provide technical advice to the Department of Conservation team with regards to ongoing plans for this calf and to help with interpretation of the veterinary advice so that the decision makers can make decisions based on the best advice available. As such I am keen to start having conversations around medium to longer term health monitoring in an attempt to get some objective measure in place to help assess how this individual is doing.

We are also keen to have input into long term prognosis for return to the wild. As you are no doubt aware there are no facilities in New Zealand that can provide long-term care for a cetacean neonate. We are very concerned about the level of habituation to humans that is already occurring in such a young animal and are interested in any thought on realistic ability to return this individual to the pod (sssuming it can be found). We note that everything we have read indicates that a neonate of this age in any other location would be deemed non-releasable and placed in permanent human care. I am not saying it is impossible that a return to the pod might happen but it feels more unlikely with every day that passes.

I am not sure if this is the right forum for these kinds of conversations or if you would rather focus on providing advice on the medical stabilisation and nutritional support side of things. If the latter is the case have you any suggestions as to the right people we should be talking to about longer term prognosis?

Once again thank you all so very much for your support and help from afar – it is appreciated more than you will ever know as we will not be able to properly express our thanks.

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

From: [redacted]@SeaWorld.com>
Sent: Wednesday, 14 July 2021 5:38 AM
To: [redacted]@wellingtonzoo.com>
Cc: [redacted]@SeaWorld.com>; [redacted]@seaworldabudhabi.com>; [redacted]@SeaWorld.com>; [redacted]@vanaqua.org; [redacted]
Subject: RE: Stranded orca calf in New Zealand

Hi [redacted] and [redacted]

We are interested in helping from afar, but obviously understand the challenges with the situation. One thing that would help, would be to have one spokesperson from NZ, as there appears to be 2 email strings about this calf…so I'm looking to consolidate information about calf coming to us at SeaWorld and [redacted] at Vancouver and [redacted]

Who should be the main contact from NZ?
I will be the main contact for SeaWorld and will share information with my colleagues.

What is the short-term plan and is there a long term contingency plan?
I understand that a more scheduled feeding regimen was to begin, in the past 12 hrs, how is that going?
Do you plan to get another blood sample?

With regards,
[redacted]

[redacted] **DVM** | Sr. Veterinarian
SEA An mal Health and Rescue Hospital
500 SeaWorld Drive | San Diego | CA 92109
[redacted]

From [redacted]
Sent: Tuesday, July 13, 2021 5:01 AM
To: [redacted]@seaworldabudhabi.com>; [redacted]@vanaqua.org; [redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted]

Thank you so very much for your message and the support of the team already. We are all so very appreciative of all the advice and help in ensuring this little calf gets the best possible chance at being stable and in a condition it could be returned if the pod were found.

Time Zones could be a little challenging but if there was a possibility to talk to some or all of you via teams tomorrow that would be very much appreciated and I would be keen to make any meeting work that would suit you all (I will be asleep for the next 8 ish hours but back on line from about 7:30 NZ time tomorrow). We cast a very wide net in the initial messages as we know you are all incredibly busy and weren't sure if people would be able to respond to us – the response has been overwhelming in the level of support which has been incredible heart-warming – that said definitely keen to streamline comms with the most appropriate people.

Let me know if you are indeed available for a talk via teams,

Thank you again so much for the support you have all provided,

Kindest Regards,

[redacted]

From: [redacted]@seaworldabudhabi.com>
Sent: Tuesday, 13 July 2021 6:55 PM
To: [redacted]; [redacted]@vanaqua.org; [redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: RE: Stranded orca calf in New Zealand

Hello [redacted],
Pleasure "e" meeting you and thanks for reaching out! I believe our Drs. [redacted] (SeaWorld) and [redacted] (Vancouver Aquarium) have already been in contact with Dr. [redacted] there and have shared our feeding and nutrition recommendations. I think they are waiting on bloodwork results to help direct further medical recommendations. I have included them on here so they can share with you what they shared with Dr. [redacted] already and also shorten the communication chain. No need for to many cooks in the kitchen 😉 Will be happy to setup a conference or Microsoft teams call if you would like. I can be available any time that works for everybody. I watched some of this on the news, great job on the monumental effort your team has put in thus far. Hopefully we can get this little guy back on track!
Please do not hesitate to reach out for anything, always happy to help.
[redacted]

[redacted]
Animal Health and Welfare Director
Zoological
M [redacted]
D [redacted]
E [redacted]@seaworldabudhabi.com
W www.seaworldabudhabi.com

PO BOX 128717, ABU DHABI, UAE
Operated by Farah Experiences LLC

From: [redacted]
Sent: Monday, July 12, 2021 11:16 PM
To: [redacted]@seaworldabudhabi.com>
Subject: Stranded orca calf in New Zealand

Kia ora (hello) from New Zealand,

My name is [redacted] and I am a wildlife veterinarian working for the Department of Conservation in New Zealand. I received your contact from [redacted] as a veterinarian who may be able to help provide advice with regards to an orca calf that stranded here just under 48 hours ago. I am on the technical advisory group for the response to this situation and am hoping to provide a strong veterinary voice to the recommendations.

A bit of history on the calf - Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded – report is that it was swept up into a rock pool and stranded there. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependent on the mother. Unfortunately despite extensive searching yesterday both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. From videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night. Last night the calf was kept in the water and the mobility appears to be slowly improving but is still not great.

A Zoo veterinarian attended the site yesterday afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended following advice from [redacted] I have not heard as to what the assessment was or how the procedure went at this stage.

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Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

Thank you so much for your time and any thoughts,

Kindest Regards,

Lydia

[redacted] **BVSc**
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

[redacted]

From: [redacted]@massey.ac.nz>
Sent: Wednesday, 14 July 2021 5:01 pm
To: [redacted]
Cc: [redacted]
Subject: Re: Stranded orca calf in New Zealand

Sorry—lastly the blood glucose taken on site this morning was 6.5 mmol/L.

From: [redacted]@massey.ac.nz>
Date: Wednesday, 14 July 2021 at 4:56 PM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

Blood results from today attached! 😊

From: [redacted]@massey.ac.nz>
Date: Wednesday, 14 July 2021 at 4:55 PM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

Thank you so much for your quick response and advice!

We ran a second biochem on the calf today which I've attached the results of. The biggest changes were a slight increase in PCV suspected to be secondary to dehydration and a decrease in TP. For the most part everything looks ok still. We have extra whole blood and serum saved as well. On the photo, the numbers written in parentheses were from his first blood test on the 12th.

We also started tube feeding formula this morning. We have started with introducing very small amounts of slurried formula so he only received 500 ml at each feeding today (with four total feedings or 1.6 L slurry). The initial feeding was diluted to 50% strength and each subsequent feeding has been increased by 25% strength each time so he is now getting 100% strength feeds (although these are being given with 2.5 liters of vytrate at the same time at the moment).

I've done a rough nutritional calculation for the version of the formula that we are making which gave a calorie content of approximately 5881 cal/4 L (which is one batch of recipe). Meaning he has only received ~2352 calories of feed today. This is obviously well under the recommended amount of 120 kcal/kg/day. We are wondering how quickly we should be increasing the volume of formula fed to safely meet his metabolic requirements. In the orca formula document you sent previously you mentioned not feeding greater than 13.5 L/day. Based on our formula and an estimated weight of ~200 kg he would need 16 L/day to meet his requirements. A related question is whether you have any advice around phasing out vytrate and replacing it with just formula. The formula itself is quite high water content so we were wondering if we should only be relying upon it for hydration.

Our intended feed roster for tomorrow was using 500 ml full strength formula with 2.5 liters of vytrate 4 times during the day. I know it was recommended that we feed every 2 hours and with a vet on site all day that is something we can start doing to help ramp up his caloric intake. The team on-site is closely monitoring faecal output as well.

In regards to the formula recipe that you sent, we are considering starting to get help making it from some of the on-site vet team we have been collaborating with. Obviously we have diverged from your original recipe based on what is available to us, but we wanted to check to see if you are comfortable with us sharing the recipe for our version of your formula with that team.

For medications, the calf is receiving 5 mg/kg enrofloxacin BID and 0.05 mg/kg dexamethasone SID. We are not administering any other meds at this time.

Apologies for the lengthy email—I hope all that made sense!

Thank you so much once again and we look forward to hearing back!

[redacted]

From: [redacted]@SeaWorld.com>
Date: Wednesday, 14 July 2021 at 4:17 PM
To: [redacted]@massey.ac.nz>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]>
Subject: Re: Stranded orca calf in New Zealand

[redacted]

Actually [redacted] commented that for this guy you could probably start lower on a midazolam dose since it is really just for an anxiolytic, recommend go with 0.1-0.15 mg/kg IM…should be plenty.

[redacted]

> On Jul 13, 2021, at 6:02 PM, [redacted]@seaworld.com> wrote:
>
> Hi [redacted]
>
> While transport in stretcher suspended in water transport unit is recommended, transport out-of-water can be done but recognize it will cause more cardiopulmonary stress to the animal. I would look into getting a 2-3" memory foam mattress for additional comfort on the mattress, provide pectoral fin cut-outs as you have done for the mattress.
>
> We and others have transported dolphins for advanced diagnostics (i.e. CT) for up to 4 hrs out-of-water on padded stretchers with "wetting" methods to keep skin moist. We've had adult killer whales out-of-water during procedures for up to 2 hours without significant compromise.

I would have hand sprayers or water pump sprayers (found at hardware store), towels, additional foam padding or pieces of closed-cell foam/foam mattress, waterproof sunscreen (zinc can trap heat at skin surface and lead to sloughing), in case of sun exposure or provide adequate shade during transport.
Monitor respirations, respiratory effort, heart rate (sometimes easier to see or palpate then listen too), vocals or lack thereof. Keep skin moist at all times, check pressure points if on mattress or areas that may rub.
Depending on air temp and wind, he should be able to maintain body temp, however, if you have a cable thermistor for rectal temperature that may be useful to determine if he needs thermal support (emergency space blankets are handy).
Emergency medical kit – standard ER meds, injectable midazolam (can cause respiratory depression, dose 0.5 mg/kg IM), flumazenil 0.02 mg/kg IV/IM, butorphanol (0.1 mg/kg IM, can cause respiratory depression), naltrexone 0.1 mg/kg IM, doxopram
I can send you more specifics on dosage, if you need it…

Others may have additional suggestions, that's what's on the top of my head at moment.

How are the feedings going?

[redacted]

From: [redacted]@massey.ac.nz>
Sent: Tuesday, July 13, 2021 4:27 PM
To: [redacted]
Cc: [redacted]@vanaqua.org>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo.com>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hello everyone,

We completed our morning treatments and got a second blood sample. At the moment we are working on developing plans to attempt a possible relocation with all the parties involved here and have been asked to provide input on the veterinary aspect of welfare of the calf during transport and relocation.

There are a number of aspects of this scenario that are concerning (and certainly something we have no experience with ourselves) so are wondering if you have any advice to give regarding monitoring the health and welfare of this animal during the process (for example time he can safely be kept out of the water and what support is needed ie wet towels, zinc oxide if transported during day?) We can monitor basic vitals such as respiratory rate during this process but are hoping for any additional advice or recommendations.

In terms of a setup for transport we are still waiting on a sling so at the moment what we have is mattresses with areas cut out for his pectoral fins to slot into. He would be transported on this on the back of a boat out to the area of attempted release. There would be designated people to keep him wet as well. This setup would only be used if there was an attempted release prior to the arrival of a sling.

I realize this is quite a difficult attempt to coordinate and we sincerely appreciate any and all input you may have.

[redacted]

On 13/07/2021, at 8:40 PM, [redacted] wrote:

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As [redacted] said, keep going! Nice work so far.

[redacted]

Sent from my iPhone

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My mistake. 41 was your reference to a normal. Not your corrected number for this animal. Agreed with [redacted]. Not unusual. But a recheck is warranted. It should not be going lower. Going down and a BUN going up with no other obvious cause could be some GI bleeding. Also not unusual but needs addressing.

<VanAqua-300px_aa92c88f-1f67-47e7-95c0-296dd768713a.png>

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

[redacted]

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Hi [redacted]

Anemia is typical for neonates, not concerned.

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Regarding formula, yes you can refrigerate and use for duration of 24 hrs.

Keep going, hang in there, it will be worth it.

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Did you have any thoughts about the PCV of 29% or the videos I sent through earlier? It looked to me today that his tilt was less consistent since he was able to right himself so possibly more behavioral as you suggested earlier.

And with the formula that you sent, do you recommend refrigerating and keeping for 24 hours? Our plan for the formula (since we are obviously limited in terms of ingredients) is: 6 cups AnLamb milk replacer, 3000 mg dicalcium phosphate, 1000 mg Taurine, 1100 ml water, 1100 ml 0.9% NaCl injection, 120 ml 50% Dextrose, 200 ml salmon oil with 0.7 kg filleted anchovies and viscera. We are hoping to feed five times/day as you recommended and starting with 500 ml at a feed initially and increasing as described. We will start out with the 50% diluted mixture tomorrow morning and increase the strength by 25% at each feed tomorrow until he is at 100% strength if he tolerates well and continues passing faeces.

I forgot to mention this yesterday but he has been seen to be

defecating regularly (5 times noted yesterday).

[redacted] BA DVM
Resident Veterinarian | Animal Care and Science | Wellington Zoo Trust
200 Daniell Street | Newtown | Wellington 6021
E
[redacted]@wellingtonzoo.com

From: [redacted] <[redacted]@SeaWorld.com>
Sent: Tuesday, 13 July 2021 3:06 pm
To: [redacted]@vanaqua.org>; [redacted]@wellingtonzoo.com>
Cc: [redacted]@massey.ac.nz>; [redacted]@SeaWorld.com>; [redacted]>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

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People have used calf bottle cut in half, with milk formula in bag attached to nipple, so that milk can be pushed/squeezed with increase intake during nursing bouts.

[redacted]

On Jul 12, 2021, at 7:00 PM, [redacted]@

vanaqua.org>
wrote:

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<VanAqua-300px_9ae645ef-f355-45be-b66f-2816dd0c5fb8.png>

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal H

P [redacted]
E [redacted]@vanaqua.org

vanaqua.org

[redacted]

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

This email and any files transmitted with it are confidential and intended solely individual or entity to whom they were addressed. If you have received this em notify us immediately.

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>
> [redacted]
BA DVM
> Resident
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Care and Science |
Wellington Zoo Trust
> 200 Daniell Street |
Newtown |
Wellington 6021
> E
[redacted]@w
ellingtonzoo.com<ma
ilto:Ashley.whitehead
@wellingtonzoo.com
>
>
> From: [redacted]
<[redacted]@va
naqua.org>
> Sent: Tuesday, 13
July 2021 12:58 pm
> To: [redacted]
<[redacted]@seaw
orld.com>
> Cc: [redacted]
[redacted]@mas
sey.ac.nz>; [redacted],
[redacted]@seaw
orld.com>; [redacted]
[redacted]@
wellingtonzoo.com>;
[redacted]
<[redacted]
[redacted]@well
ingtonzoo.com>
> Subject: Re:
Stranded orca calf in
New Zealand
>
> We did bottle feed
our false killer whale
calf but the tubing
was more reliable
with less salt water
intake. We did not
get our nipple
perfect.
>
>
[cid:image001.png@0
1D777EA.EF0AE440]
>
> [redacted],
DVM, MSc, DACZM
> Head Veterinarian

& Director, Animal Health
>
> P[redacted]
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> or entity to whom they were addressed. If you have received this email in error, please notify us immediately.
> On Jul 12, 2021, at 5:34 PM, [redacted] @seaworld [redacted] @seaworld.com>> wrote:
>
> Were you able to tube more electrolytes or begin formula supplement?
> Can you share other blood results?
>
> I'd plan tubings every 2-3 hrs during day minimum of 5-6 feeds/day…aim to support him 1-2 weeks at least to give time for pod to show up or be located..
>
>[redacted]
>
> From: [redacted] @massey.ac.nz<mailto:[redacted] @massey.ac.nz>>
> Sent: Monday, July 12, 2021 5:13 PM
> To: [redacted] @SeaWorld.com<mailto:[redacted] @SeaWorld.com>>
> Cc: [redacted] @SeaWorld.com<mailto:[redacted] @SeaWorld.com>>; [redacted]

[redacted]@va
naqua.org<mailto[redacted]
[redacted]vanaqu
a.org>>; [redacted]
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[redacted]wellingtonzoo.c
om>>; [redacted]
[redacted]
[redacted]well
ingtonzoo.com<mailt
o:[redacted]@wel
lingtonzoo.com>>
> Subject:
[EXTERNAL] Re:
Stranded orca calf in
New Zealand
>
>
>
> <Orca calf blood
smear.jpeg>

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 3:27 pm
To: Massey Univ [redacted] @massey.ac.nz)
Cc: [redacted]
Subject: Orca calf - animal welfare assessment

Kia ora [redacted]
Following up on the text I sent you.
I'm working as part of the technical group on the incident with the orca calf at Plimmerton. Ian Angus mentioned that you might have a contact at Massey with particular expertise regarding the assessment of animal welfare, and criteria & guidance to help decision-making on what actions to take in these sort of situations.
Are you able to give me information and/or have a chat about it? Feel free to email or call me.

Kā mihi

[redacted] [redacted]
Technical Advisor Marine | Mātanga Mātai Ahu Moana
Hokitika Office
Phone: [redacted]

www.doc.govt.nz

Department of Conservation
Te Papa Atawhai

From: [redacted]
To: [redacted]
Cc: [redacted]
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand
Date: Thursday, 15 July 2021 2:05:16 pm
Attachments: [redacted]

I agree with [redacted] We will often give nystatin orally TID in combination with ab therapy if an animal will be on treatment for several weeks, if short-term then not indicated

Initially it was thought that he was listing, however from the videos, I saw him list to both sides, roll and appeared to be looking at people on the outside of the circle causing him to tilt to the side…so I did not consider it significant Is he still doing behavior or do are you seeing any other postural abnormalities?

His history of why he stranded was suspect, so we thought it best to cover him empirically…as pneumonia/ bacterial infection, parasite migration, algal toxin, malnutrition and trauma are the most common causes of health compromise that leads to animals stranding His clinical signs and minimum data base diagnostics rule-out many differentials, and it's possible we won't know what caused him to strand

Hope for the best,
[redacted]

On Jul 14, 2021, at 6:25 PM, [redacted]@vanaqua org> wrote:

Hi there,

Yes that sounds good on the meds As for antifungals, yes they may be indicated with long term antibiotic therapy especially when more than one antibiotic has been used and of course the concurrent steroid is also a factor to consider Kinda like in any species But I would not automatically start it for this case You have been pretty conservative with both Ab and steroid use If there is an indication I would not hesitate but I see none for now

Great work with this calf everyone

Best wishes,

[redacted]

<VanAqua-300px_9ae645ef-f355-45be-b66f-2816dd0c5fb8.png>

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

P [redacted]
E [redacted]@vanaqua.org

vanaqua.org

[redacted]

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

On Jul 14, 2021, at 6:16 PM, [redacted]@wellingtonzoo com> wrote:

Thank you[redacted], and thank you everyone so much for your help and support so far, it's been just an incredible help and we're so grateful.

He's had three doses of dex at 0.05mg/kg IM SID, so we'll give him a half dose tomorrow (0.025mg/kg IM) and then stop entirely, if you're happy with that as well?

At this stage we're planning on continuing the enrofloxacin 5mg/kg IM BID for a total of 7 days and then stopping, unless you recommend continuing on with this for longer (or shorter)?

I've had it mentioned to me by one of our biologists that antibiotic use in cetaceans often results in fungal infections, and that some people like to administer antifungals concurrently. I can't find any references to support this, so I was wondering if I could please run this (possibly silly) question past you as well please?

I've just had a quick look over the CBC and blood smear examination result that has come through from the lab and I can't see any abnormalities (will have a closer look soon). The blowhole cytology is also normal and shows no signs of inflammation.

Thanks again for all your support.
Kind regards,
[redacted]

[redacted] BVSc, MVSc (Zoo Animal and Wildlife Health), MANZCVS (Avian Health)
Senior Veterinarian | Animal Care and Science | Wellington Zoo Trust
200 Daniell Street | Newtown | Wellington 6021
Ph [redacted]
E [redacted] wellingtonzoo.com | W www.wellingtonzoo.com |

From: [redacted] @massey.ac.nz>
Sent: 15 July 2021 12:36
To: [redacted] @SeaWorld.com>
Cc: [redacted] @vanaqua.org>; [redacted] @wellingtonzoo.com>; [redacted] [redacted] @SeaWorld.com>; [redacted] @wellingtonzoo com> [redacted] [redacted] @wellingtonzoo com>; [redacted]
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Thank you [redacted]; that all makes sense. Will work on going slowly and see how he does.

From: [redacted] @SeaWorld.com>
Date: Wednesday, 14 July 2021 at 5:39 PM
To: [redacted] @massey.ac.nz>
Cc: [redacted] @vanaqua.org>, [redacted] @wellingtonzoo.com>, [redacted] [redacted] @SeaWorld.com>, [redacted] @wellingtonzoo.com>, [redacted] [redacted] @wellingtonzoo.com>, [redacted] @gmail.com>, [redacted] @doc.govt.nz [redacted] @doc.govt.nz>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hi [redacted]

The 100% formula should provide all caloric requirements and hydration, so I think you can phase out the electrolyte if the calf is receiving the full amount of formula. A lot is dependent on how the calf is processing the formula, input=output, in fecal consistency(ie. Formula Pooh) and weight gain.

Changes to phase out electrolytes or volume are best done incrementally by 25-50%. Sounds like he should be able to handle more volume, based on the initial tubing, but as formula is thicker it will take more to metabolize the formula. It seems that he should be able to tolerate more volume based on initial tubing volumes.

The formula sent is a species guideline, and adjustments can be made to meet each individual's needs based on environmental differences. Please feel free to share with the local team and make necessary adjustments to ensure adequate hydration, which can be observed with changes in fecal consistently and general behavior. We will often monitor weight gain with neonates that are being fed formula to ensure adequate growth…I know this will be difficult in your scenario, however you could get consistent girth and length measurements to estimate growth rate.

I would probably phase out the steroid with decreasing doses…it is probably no longer needed.

Hope that makes sense? Let me know if I left anything out or you have addition questions,
[redacted]

> On Jul 13, 2021, at 10:00 PM, [redacted] @massey.ac.nz> wrote:
>
> Sorry—lastly the blood glucose taken on site this morning was 6.5 mmol/L.
>
> ---
>
> **From** [redacted] @massey ac.nz>
> **Date:** Wednesday, 14 July 2021 at 4:56 PM
> **To:** [redacted] @SeaWorld.com>
> **Cc:** [redacted] @vanaqua.org>, [redacted] [redacted] @wellingtonzoo.com>, [redacted] @SeaWorld com>, [redacted] [redacted] @wellingtonzoo.com>, [redacted] @wellingtonzoo.com>, [redacted] [redacted] @gmail.com>, [redacted]
> **Subject:** Re: Stranded orca calf in New Zealand
>
> Blood results from today attached!
>
> ---
>
> **From** [redacted] @massey ac.nz>
> **Date:** Wednesday, 14 July 2021 at 4:55 PM
> **To:** [redacted] @SeaWorld.com>
> **Cc:** [redacted] @vanaqua.org>, [redacted] <[redacted] @wellingtonzoo.com>, [redacted] @SeaWorld com>, [redacted] [redacted] @wellingtonzoo.com>, [redacted] @wellingtonzoo.com>, [redacted] [redacted]
> **Subject:** Re: Stranded orca calf in New Zealand
>
> Thank you so much for your quick response and advice!

We ran a second biochem on the calf today which I've attached the results of. The biggest changes were a slight increase in PCV suspected to be secondary to dehydration and a decrease in TP. For the most part everything looks ok still. We have extra whole blood and serum saved as well. On the photo, the numbers written in parentheses were from his first blood test on the 12th.

We also started tube feeding formula this morning. We have started with introducing very small amounts of slurried formula so he only received 500 ml at each feeding today (with four total feedings or 1.6 L slurry). The initial feeding was diluted to 50% strength and each subsequent feeding has been increased by 25% strength each time so he is now getting 100% strength feeds (although these are being given with 2.5 liters of vytrate at the same time at the moment).

I've done a rough nutritional calculation for the version of the formula that we are making which gave a calorie content of approximately 5881 cal/4 L (which is one batch of recipe). Meaning he has only received ~2352 calories of feed today. This is obviously well under the recommended amount of 120 kcal/kg/day. We are wondering how quickly we should be increasing the volume of formula fed to safely meet his metabolic requirements. In the orca formula document you sent previously you mentioned not feeding greater than 13.5 L/day. Based on our formula and an estimated weight of ~200 kg he would need 16 L/day to meet his requirements. A related question is whether you have any advice around phasing out vytrate and replacing it with just formula. The formula itself is quite high water content so we were wondering if we should only be relying upon it for hydration.

Our intended feed roster for tomorrow was using 500 ml full strength formula with 2 5 liters of vytrate 4 times during the day. I know it was recommended that we feed every 2 hours and with a vet on site all day that is something we can start doing to help ramp up his caloric intake. The team on-site is closely monitoring faecal output as well.

In regards to the formula recipe that you sent, we are considering starting to get help making it from some of the on-site vet team we have been collaborating with. Obviously we have diverged from your original recipe based on what is available to us, but we wanted to check to see if you are comfortable with us sharing the recipe for our version of your formula with that team.

For medications, the calf is receiving 5 mg/kg enrofloxacin BID and 0 05 mg/kg dexamethasone SID. We are not administering any other meds at this time.

Apologies for the lengthy email—I hope all that made sense!

Thank you so much once again and we look forward to hearing back!

[redacted]

From: [redacted]@SeaWorld.com>
Date: Wednesday, 14 July 2021 at 4:17 PM
To: [redacted]@massey ac nz>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]
Subject: Re: Stranded orca calf in New Zealand

[redacted]

Actually [redacted] commented that for this guy you could probably start lower on a midazolam dose since it is really just for an anxiolytic, recommend go with 0.1-0.15 mg/kg IM…should be plenty.

[redacted]

> On Jul 13, 2021, at 6:02 PM, [redacted]@seaworld.com> wrote:
>
> Hi [redacted],
>
> While transport in stretcher suspended in water transport unit is recommended, transport out-of-water can be done but recognize it will cause more cardiopulmonary stress to the animal. I would look into getting a 2-3" memory foam mattress for additional comfort on the mattress, provide pectoral fin cut-outs as you have done for the mattress.
>
> We and others have transported dolphins for advanced diagnostics (i.e. CT) for up to 4 hrs out-of-water on padded stretchers with "wetting" methods to keep skin moist. We've had adult killer whales out-of-water during procedures for up to 2 hours without significant compromise.
> I would have hand sprayers or water pump sprayers (found at hardware store), towels, additional foam padding or pieces of closed-cell foam/foam mattress, waterproof sunscreen (zinc can trap heat at skin surface and lead to sloughing), in case of sun exposure or provide adequate shade during transport. Monitor respirations, respiratory effort, heart rate (sometimes easier to see or palpate then listen too), vocals or lack thereof. Keep skin moist at all times, check pressure points if on mattress or areas that may rub.

Depending on air temp and wind, he should be able to maintain body temp, however, if you have a cable thermistor for rectal temperature that may be useful to determine if he needs thermal support (emergency space blankets are handy).
Emergency medical kit – standard ER meds, injectable midazolam (can cause respiratory depression, dose 0.5 mg/kg IM), flumazenil 0.02 mg/kg IV/IM, butorphanol (0.1 mg/kg IM, can cause respiratory depression), naltrexone 0.1 mg/kg IM, doxopram
I can send you more specifics on dosage, if you need it…

Others may have additional suggestions, that's what's on the top of my head at moment.

How are the feedings going?

[redacted]

From: [redacted]@massey.ac.nz>
Sent: Tuesday, July 13, 2021 4:27 PM
To: [redacted]
Cc: [redacted]@vanaqua.org>; [redacted]@SeaWorld.com>; [redacted]wellingtonzoo.com>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hello everyone,

We completed our morning treatments and got a second blood sample. At the moment we are working on developing plans to attempt a possible relocation with all the parties involved here and have been asked to provide input on the veterinary aspect of welfare of the calf during transport and relocation.

There are a number of aspects of this scenario that are concerning (and certainly something we have no experience with ourselves) so are wondering if you have any advice to give regarding monitoring the health and welfare of this animal during the process (for example time he can safely be kept out of the water and what support is needed ie wet towels, zinc oxide if transported during day?) We can monitor basic vitals such as respiratory rate during this process but are hoping for any additional advice or recommendations.

In terms of a setup for transport we are still waiting on a sling so at the moment what we have is mattresses with areas cut out for his pectoral fins to slot into. He would be transported on this on the back of a boat out to the area of attempted release. There would be designated people to keep him wet as well. This setup would only be used if there was an attempted release prior to the arrival of a sling.

I realize this is quite a difficult attempt to coordinate and we sincerely appreciate any and all input you may have.

[redacted]

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P [redacted]

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[redacted]

On Jul 12, 2021, at 7:00 PM, [redacted] Haulena <[redacted]@vanaqua.org> [redacted]

Nothing to shake a stick at yet

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Head Veterinarian & Director, Animal Health

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E [redacted]a@vanaqua.org

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[redacted]

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> Subject: Re: Stranded orca calf in New Zealand

>
> We did bottle feed our false killer whale calf but the tubing was more reliable with less salt water intake We did not get our nipple perfect
>
> [cid image001 png@01D777EA EF0AE440]
>
> [redacted], DVM, MSc, DACZM
> Head Veterinarian & Director, Animal Health
>
> P[redacted]
>
> This email and any files transmitted with it are confidential and intended solely for the use of the individual
> or entity to whom they were addressed If you have received this email in error, please notify us immediately
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>
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> Can you share other blood results?
>
> I d plan tubings every 2-3 hrs during day minimum of 5-6 feeds/day…aim to support him 1-2 weeks at least to give time for pod to show up or be located
>
[redacted]
>
> From [redacted]
<A[redacted]@massey ac nz<mailto:[redacted]@massey ac nz>>
> Sent: Monday, July 12, 2021 5:13 PM
> To: [redacted] [redacted]@SeaWorld com<ma[redacted]@SeaWorld com>>
> Cc [redacted] [redacted]@SeaWorld com[redacted]@SeaWorld com>>; [redacted]
<[redacted]@vanaqua org<mailto:[redacted]@vanaqua org>>; [redacted] [redacted]@wellingtonzoo com<mailto:[redacted]@wellingtonzoo com>>; [redacted]
<[redacted] [redacted]
<[redacted]@wellingtonzoo com<m[redacted]@wellingtonzoo com>>
> Subject: [EXTERNAL] Re: Stranded orca calf in New Zealand
>
>
>
> <Orca calf blood smear jpeg>

[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 5:06 pm
To: [redacted]; HUHA Helping You Help Animals; [redacted]
Cc: [redacted]
Subject: RE: rehabilitation and release guidelines

Follow Up Flag: Follow up
Flag Status: Flagged

Hi all-
The medical assessment discussion begins on page 36 of the standards for release linked below. It looks light on specifics, so it would be appreciated if you could read this and coordinate with overseas folks to flesh out any detail required beyond what you're already doing.

It is also worth noting that this calf would be deemed "Non-releasable" under US standards due to its young age. According to their documents, orca are not fully weaned until 2-3 years and 4 m in length, which is a long way away for this animal. Whale Rescue has mentioned weaning as early as 9 months, which might be plausible under some circumstances (i.e. an animal in a facility) but seems optimistic in this case. Any discussion of plans to hold the calf until it's weaned need to be grounded in the reality of how long this would take, in addition to all of the other caveats around behavioural conditioning, costs, etc.

I'm on leave the next two days, but look forward to seeing what progress you've made upon my return. Thanks for your continued efforts everyone, and best of luck.

Cheers,
[redacted]

[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 4:06 pm
To: [redacted]; [redacted]; [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Cc: [redacted] Ian Angus <iangus@doc.govt.nz>
Subject: FW: rehabilitation and release guidelines

Hi all-
Just following up from our conversation this afternoon, below is an email from NOAA colleagues back in 2016. I assume some of them may still be in relevant positions and able to assist if advice is needed. The links in the original email no longer work, but here the relevant documents are attached, with links below.

Standards for release: Final polices and best practices : marine mammal stranding response, rehabilitation, and release : standards for release (noaa.gov)
Standards for rehab facilities: Final polices and best practices : marine mammal stranding response, rehabilitation, and release : standards for rehabilitation facilities (noaa.gov)
Glossary for response, rehabilitation, and release: Glossary for Best Practices for Marine Mammal Response, Rehabilitation, and Release (noaa.gov)

I will have a look through these now and flag anything which seems relevant for health assessment.

Cheers,
[redacted]

[redacted]

From: [redacted]@noaa.gov>
Sent: Saturday, 6 August 2016 5:11 am
To: [redacted]@noaa.gov>; [redacted]@noaa.gov>
Subject: rehabilitation and release guidelines

[redacted]
I want to introduce you to our national response coordinator [redacted] cc'd here. She is another resource contact for you.

Here's the weblink to our release criteria:
http://www.nmfs.noaa.gov/pr/pdfs/health/release_criteria.pdf

Page 41 has the decision tree for cetaceans in text form. The checklist is on page 110.

The Rehabiliation Facilities criteria is here:
http://www.nmfs.noaa.gov/pr/pdfs/health/rehab_standards.pdf

Although we were pretty clear that these are for long term holding facilities and we don't necessarily apply them to temporary situations (pop-up pools). In fact, that's part of the revision of the guidelines we're working on. But there might be something in there that is useful. Cetaceans are Section 1.

We don't have many situations in which rehabilitation occurs in open water pens (net pens) but have had some (A73 is an example). The group in the US that has the most experience with net pens is the National Marine Mammal Foundation. I know that Jeff has contacted them about veterinary care working with Pete. We work very closely with them on veterinary assessments, they have assisted us with live captures, they have assisted us with long transport and release back to the wild. In these types of veterinary consultations it is often critically important to incoming veterinarians to understand their legal status for consulting and connection or request from the national or regional government. It might help things move faster for them if the request for consultation would come from the management team or Jeff and the Department of Conservation. That ensures there are no legal issues or confusion on expectations for the consulting veterinarians. That may have occurred overnight while we slept on the east coast and clarification may have happened. Again good luck and contact us when you need.

[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 4:06 pm
To: [redacted]
Cc: [redacted] Ian Angus
Subject: FW: rehabilitation and release guidelines
Attachments: glossary_of_terms_marine_mammal_response_2009.pdf; noaa_standards for rehab facilities.pdf; noaa_standards for release.pdf

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Best Practices for Marine Mammal Response, Rehabilitation, and Release

Glossary of Terms

Animal Care Supervisor– Responsible for overseeing prescribed treatments, maintaining hospital equipment, and controlling drug supplies. The person should be adequately trained to deal with emergencies until the veterinarian arrives, be able to direct the restraint of the animals, be responsible for administration of post-surgical care, and be skilled in maintaining appropriate medical records. It is important that the animal care supervisor should communicate frequently and directly with the attending veterinarian to ensure that there is a timely transfer of accurate information about medical issues.

Assessment Team – The team of individuals who collectively assess the rehabilitation case and make a release determination recommendation. This team could include the attending veterinarian, lead animal care supervisor, and/or consulting biologist with knowledge of species behavior and life history).

Attending Veterinarian - U.S. licensed veterinarian [i.e., graduated from a veterinary school accredited by the American Veterinary Medical Association Council on Education, or has a certificate by the American Veterinary Graduates Association's Education Commission for Foreign Veterinary Graduates or has received equivalent formal education as determined by NMFS Administrator (adapted from the Animal Welfare Act Regulations 9 CFR Ch. 1)] who has the responsibility to oversee veterinary medical aspects of live animal care and is also responsible for assuring the health of marine mammals released back to the wild following rehabilitation.

Authorized Representative- Individual with signatory authority for the stranding organization. This individual may be the signatory of the stranding agreement (e.g., Executive Director, President, CEO, etc.).

Bite - An injury from an animal that results in a break in the skin (epidermis).

Cohorts- Belonging to same species.

Conspecifics- Belonging to same species.

Diseases of Public Health and Safety Concern- Diseases that have been identified by Federal and State agencies (e.g., Centers for Disease Control and Prevention and state public health agencies) that pose a significant risk to public health.

Diseases of Zoonotic Concern- Diseases that are transmitted from animals to humans.

Ecological Status- A concept to consider when making release determinations. This concept attempts to integrate the medical and behavioral evaluations into an extrapolation of how the animal would likely do in the wild when exposed to typical ecological pressures

Emerging Diseases- Newly recognized serious disease, the cause of which may or may not yet be established, that has the potential to spread within and between populations.

Epidemic (adjective)- Affecting or tending to affect an atypically large number of individuals within a population, community, or region at the same time.

Epizootic (noun)- An outbreak of disease affecting many animals of one kind at the same time (similar to epidemic and term typically used in for animals)

ESA- Endangered Species Act

Ethogram- A catalogue of the discrete behaviors typically employed by a species. These behaviors are sufficiently stereotyped that an observer may record the number of such acts, or the amount of time engaged in the behaviors in a period of time.

FWC – Florida Fish and Wildlife Conservation Commission

FWS (U.S. Fish and Wildlife Service) - The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.

FWS Division of Management Authority (DMA)- The Division of Management Authority implements domestic laws and international treaties to promote long term conservation of global fish and wildlife resources. In response to ever-increasing global pressures of wildlife trade and habitat loss on species worldwide, the office dedicates its efforts to conserving species at risk through trade and implementing policies that have a broad impact on conservation overall.

FWS Field Offices- The program operations of the FWS are performed at various types of field installations within FWS Regional Offices. The FWS Field Offices that are involved with health and stranding of marine mammals under jurisdiction of the FWS are identified in Appendix H.

FWS Letter of Authorization (LOA) - LOAs are issued by the FWS Division of Management to authorize under a "permit" network individuals, facilities, and agencies to rescue, rehabilitate, and release species under their jurisdiction that are in need of assistance. Authorizations and requirements are specific to the species, the organization, and the activity being conducted.

Humane Care- Treatment of an animal in such a way to both minimize pain and suffering and (by providing for proper care and use of the animal) to maximize well being of the individual and the population into which it is to be released.

Human Interaction- Physical signs or evidence (e.g., wounds, marks, gear, etc.) of direct human associated interaction that may or may not be related to the stranding.

Key Personnel – Individuals who represent the stranding organization and serve in key positions such as the authorized representative, primary responder, animal care supervisor, and attending veterinarian.

Letter of Concurrence from the NMFS Regional Administrator (RA) - The official notification from the NMFS regional office that concurs with the release determination recommendation.

Letter of Intent- A letter from a prospective permanent care facility requesting custody of a non-releasable animal. This letter must be sent to the NMFS Office of Protected Resources, Permits, Conservation and Education Division (http://www.nmfs.noaa.gov/pr/permits/mmpa_permits.htm).

MMPA- Marine Mammal Protection Act

MMPA/ESA Permit No. 932-1489-09- A permit issued by the NMFS Office of Protected Resources, Permits, Conservation and Education Division to the Marine Mammal Health and Stranding Response Program (MMHSRP). The permit covers some of the MMHSRP's activities, including emergency response activities for threatened and endangered species, large whale disentanglement activities, health assessment studies, and other research projects.

Marine Mammal Unusual Mortality Event- A stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response.

Necropsy Team Leader- A NMFS approved team leader, responsible for all aspects of the necropsy. The Necropsy Team Leader assigns task during the necropsy and is responsible for the gross report and final necropsy report.

NMFS- National Marine Fisheries Service

NMFS National Stranding Coordinator- Develops national policy and guidance and oversees the national marine mammal stranding program (part of the NMFS Marine Mammal Health and Stranding Response Program)

NMFS Office Director- Office Director for the National Marine Fisheries Service, Office of Protected Resources

NMFS PR1- NMFS Office of Protected Resources, Permits, Conservation and Education Division

NMFS Regional Director- Regional Administrator for the National Marine Fisheries Service Regional Office (regional specific)

NMFS Regional Stranding Coordinator- Coordinates administration of the stranding program within the region.

NMFS Stranding Agreement- The official written agreement between NMFS and Stranding Network Participant as allowed under section 112(c) of the Marine Mammal Protection Act.

Primary Responder – Oversees all aspects of each stranding response and be on-site or supervising when live or dead animals are being examined or handled (i.e., paid staff and unpaid staff). If working with live animals, be in direct contact with the attending veterinarian if necessary.

Panmictic- Referring to unstructured populations (random mating).

Pre-Release Health Screen- Required to be completed prior to release of animals following rehabilitation in accordance with these guidelines

Reasonable Social Group- Refers to in association with conspecifics of similar age, sex, and/or relatedness as would be found in social groups observed in the wild.

Release Determination Recommendation- The official written recommendation for release or non release signed by the attending veterinarian and signatory rehabilitation facility and sent to the NMFS Regional Director.

Release Plan- If release is recommended and NMFS concurs, the release plan will include a timeline, release site, method of transport and tagging/post release monitoring. Conditional releases will require an expanded release plan including a justification and detailed description of the logistics, tagging, location, timing, crowd control, media coordination (if applicable), and post release monitoring. NMFS may require contingency plans, should the release be unsuccessful, including recapture of the animal following a specified time after release.

Reportable Diseases- Diseases that pose a significant concern to public health, agriculture, and marine mammal populations and are required to be reported to NMFS and state agencies.

Responsible Party of Record- This is the official who has the legal authority to make acquisition and disposition decisions on behalf of an organization, institution, or agency that is holding marine mammals in captivity. This person's signature is required on the Letter of Intent to permanently retain or acquire a nonreleasable animal.

Signatory- The individual who signed the official stranding agreement between the stranding organization and NMFS (e.g., Executive Director, President, CEO).

Stranding Network Participant - A nongovernmental entity authorized by an agreement (Stranding Agreement) with NMFS to respond to stranded marine mammals under section 112(c) of the Marine Mammal Protection Act, which provides special exemption from the take prohibition.

Sub Designee- An entity acting under the authority and oversight of the Stranding Network Participant.

Surveillance Program- A method of surveillance that generates a source of information on the animal health status of populations.

Transfer Authorization Letter- The letter issued by NMFS PR1 to the receiving facility which authorizes retention or acquisition of a marine mammal that has been deemed nonreleasable.

USGS – United States Geological Survey

Working Group on Marine Mammal Unusual Mortality Events- An official panel of scientific experts established by the Marine Mammal Protection Act to who advise the NMFS and FWS regarding unusual mortality events.

109(h) Stranding Participant- State or local government official who can respond to a stranded marine mammal for the protection or welfare of the marine mammal and protection of public health and welfare during the course of their official duties. Section 109(h) of the Marine Mammal Protection Act provides special exemption from the take prohibition.

Zoonotic- Diseases caused by infectious agents that can be transmitted between (*or are shared by*) animals and humans.

FINAL

POLICIES AND BEST PRACTICES

MARINE MAMMAL STRANDING RESPONSE, REHABILITATION, AND RELEASE

STANDARDS FOR REHABILITATION FACILITIES

Prepared by
Laurie Gage, D.V.M., Dipl. ACZM
USDA Animal and Plant Health Inspection Service
Animal Care

Edited by
Janet E. Whaley, D.V.M.
NOAA National Marine Fisheries Service
Marine Mammal Health and Stranding Response Program
1315 East-Highway
Silver Spring, Maryland 20910

February 2009

Standards for Rehabilitation Facilities

Table of Contents

Introduction

As part of the National Marine Fisheries Service (NMFS) Stranding Agreements, the Agency will require that all rehabilitation facilities meet the Minimum Standards presented in this document. The goal of this document is to set **MINIMUM** facility, husbandry, and veterinary standards for rehabilitating marine mammals in order to meet the prescribed NMFS Best Practices Marine Mammal Stranding Response, Rehabilitation, and Release - Standards for Release. Likewise some of the standards put forth in this document are based on the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Animal Welfare Act (AWA) regulations which define minimum standards for permanent captive marine mammals. However, there are some differences between the two documents in that these standards were developed for temporary care and all age groups. **RECOMMENDED** Standards are included in some sections, and consist of facility design and operational suggestions for optimizing the rehabilitation success rate. Meeting or exceeding the recommended standards may be considered a goal to strive towards when upgrading existing, or designing new facilities or protocols.

It is the intent of NMFS to provide a reasonable process for facilities to be upgraded to meet the minimum standards set forth in this document. Substandard facilities may be improved using funds that may be available through the John H. Prescott Rescue Assistance Grant Program (Prescott Grant). Likewise Prescott Grant funds may also be used to improve facilities that meet minimum standards with the goal to achieve or exceed the recommended standards.

Health and safety practices are highly stressed in this document. NMFS expects that all personnel and volunteers to be trained to the HIGHEST LEVEL of responsibility they are assigned. Rehabilitation facilities are encouraged to comply with Occupational Safety and Health Administration regulations.

Purpose

The purpose of rehabilitation is to provide humane care for stranded marine mammals and to optimize the success of releasing the animals back to the wild. Defining a successful release encompasses many factors. As mandated by Title IV Section 402 (a) of the Marine Mammal Protection Act, NMFS has developed guidance and criteria for release based on optimizing the chances for survival and minimizing the risk to wild populations *(NMFS/FWS BEST PRACTICES for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*). These facility standards have been developed to achieve the goals set forth by the Standards for Release.

This document is organized by taxa similar to the Standards for Release. While many aspects of rehabilitating cetaceans and pinnipeds that are the same, there are likewise many significant differences. Water quality, pool space and design, and handling debilitated animals are examples of the bigger differences between facility design and equipment required for rehabilitation of these animals. Rehabilitation of cetaceans requires more expensive facilities, as there must be larger, deeper pools available, salt water systems, and more elaborate filtration in closed system situations. While some facilities have adequate equipment and personnel to rehabilitate pinnipeds, they may not meet the standards required for the rehabilitation of cetaceans. Having two sets of guidelines allows NMFS the flexibility of issuing agreements specific to the types of animals that may be rehabilitated at each facility.

1. Standards for Cetacean Rehabilitation Facilities

1.1 Facilities, Housing, and Space

Pools for stranded cetaceans must be appropriate for the basic needs of the animal including keeping the skin moist, to providing buoyancy, and aiding thermoregulation. Debilitated cetaceans often cannot swim and may require assistance when first introduced to a rehabilitation pool. Cetaceans arriving in a debilitated condition may have needs requiring smaller pools than those that are able to swim and dive upon arrival. Choice of pool size may be important and is case specific. Although chances of survival may be improved if animals capable of swimming are given larger space, deeper pools may make it more difficult and stressful to catch an animal for feeding, hydration, and treatment. Likewise with multiple strandings, grouping animals by size, ability to swim, species, and health status may improve overall survival rates. Placing the larger, more robust animals in separate pools or swimming areas away from the smaller, less dominant and/or more debilitated animals may enhance the success of the rehabilitation efforts for the weaker animals. Species of cetaceans known to be social in nature should be housed with other compatible species. Social compatibility should be considered an important part of appropriate housing. Animals should be closely monitored when introduced to a pool and carefully evaluated for social compatibility.

It is up to the attending veterinarian, as defined in Section 1.7, and experienced rehabilitation staff, to decide how to house the animal most appropriately based on their observations and physical examination.

Each animal admitted to a rehabilitation center should be placed in a quarantine holding area and have a full health evaluation performed by the attending veterinarian. Sufficient quarantine time should be allowed for results from tests and cultures to be evaluated before the animal is placed with animals that are apparently disease free. Cetaceans with evidence of infectious disease must be quarantined (See Section 1.4 Quarantine).

During multiple or unusual stranding situations such as hazardous waste spills, catastrophic weather events, toxic algal blooms, or other events leading to unusually high morbidity, rehabilitation center personnel may need to adjust the number of animals that would be normally housed in each pool, bay or ocean pen. The attending veterinarian is responsible for assuring that the number of animals housed in one pool or pen will be appropriate based on the situation. The number of animals housed should be determined not only by the amount of pool space and size of the animals, but also by the number of qualified personnel available on a per animal basis. The recommended number of

personnel to animals less than 250 kg is 3:1 for critical care cetaceans; 2: 1 - 4 once stabilized, and 1:4 when animals are eating regularly and no longer require regular handing. Larger critical care cetaceans will require more personnel per animal.

Unweaned neonate cetaceans shall not be admitted for rehabilitation without prior approval of NMFS. Unweaned cetaceans, once rehabilitated, are frequently not suitable for release or require stringent release criteria to ensure humane treatment and a successful outcome. A rehabilitation facility needs to thoughtfully consider these types of cases when developing overall facility goals and objectives. If the facility aims to rehabilitate neonatal and/or unweaned calves, then they need to discuss and seek concurrence with NMFS options for final disposition since most of these cases will be nonreleasable. These issues need to be researched, outlined and NMFS approved prior to admitting any cases. The plan should include options and criteria for release if appropriate (e.g., release with mother), considerations for permanent care, and euthanasia.

NMFS Regulation, U.S.C. 50 CFR 216.27(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR "is an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive." (See Section 1.13 Viewing).

1.1.1 Space Requirements for Pool, Bay, or Ocean Pens

MINIMUM STANDARD

- All pools or pens must be deep enough for animal(s) to float and submerge and shall be available for all rehabilitating cetaceans. The diameter and depth of the pool for critical care animals is at the discretion of the attending veterinarian.
- Pool depth for non-critical animals (animals able to swim unassisted) must equal one-half the body length or 0.9 meters (3 feet), whichever is greater.
- Pools shall have a minimum horizontal dimension (MHD) of 7.3 meters (24 feet) or two times the actual length of the largest species housed in the pool, whichever is greater.
- Animals housed longer than 6 months must be provided with pools at least 1.5 meters (5 feet) deep and must meet the USDA, APHIS AWA MHD standards unless otherwise directed by the attending veterinarian. This should be documented and justified with a signed veterinary statement in the medical records.

RECOMMENDED

- Pools shall have a depth equal to the body length or 1.8 meters (6 feet), whichever is greater.
- Pools shall have a minimum horizontal dimension of 9.0 meters (30 feet) or two times the average adult length of the largest species in the pool, whichever is greater.

1.1.2 Pool or Pen Design

Pools or pens designed to maximize the ease of handling, and to limit the amount of time the cetacean spends out of water for husbandry or veterinary procedures may help to decrease the stress of handling. Pools designed with a deep and a shallow end work well because the cetaceans may stay in the deep end while the pool level is dropped. The animal requiring treatment may be moved to the shallow end and immediately placed back in the deep end when the treatment has been completed. Pools equipped with a false bottom that can be lifted are ideal because the animal can be caught quickly without dropping the level of the pool water and the animal may be immediately returned to the pool once treatments have been completed. False bottoms in bay or ocean pens will facilitate capture, since there is no convenient way to drop the water level in those situations. Pools equipped with lift-bottoms and/or multi-level pools are recommended, however lift bottoms must be carefully designed when being retrofitted to existing pools.

Scoop-net or trampoline methods may also be used for capture, where a net is placed on the pool or pen bottom under the swimming animal and it is lifted by multiple personnel using tag lines. While this method is an inexpensive alternative to a false floor it may not be suitable for multiple or large animals.

New rehabilitation pools should be designed and constructed to minimize introduction of anthropogenic noise from life-support equipment or other sources. This can be accomplished through sloping of walls, insulation with soil or other materials around the sides of the pool and/or through isolation of noise-generating equipment. Existing pools that do not meet these specifications may be allowed, or a retrofit may be requested if the pools are substandard to the point of becoming an animal welfare issue.

MINIMUM STANDARD

- Any shape pool that meets minimum space standard
- Construction materials
    - Open water pens shall optimally be constructed of plastic or other rigid netting.

- If cotton or nylon netting material is used it must be small enough gage to prevent entanglement.

RECOMMENDED

- Pools with long axes that provide relief from constant turning while swimming
- Pools designed to promote good water circulation and to minimize anthropogenic noise.
- Single depth pool with false bottom that can be lifted

  OR
- Pool with a sloping bottom where the water level may be dropped in the shallow end to facilitate treatment

  OR
- Single or multi-depth pool with an adjoining "med pool' with a false bottom that can be lifted

  OR
- Ability to drop a pool in less than 2 hours and refill it to a "swimming level" in less than 30 minutes

1.1.3 Shelter, Shading, and Lighting

Rehabilitation facilities located where there is inclement weather need to provide shelter to rehabilitating animals that may be exposed to extreme heat or cold. Cetaceans held in rehabilitation facilities may not have normal activity levels and thin animals may be unable to thermoregulate properly. These animals may require shade structures to protect them from direct sunlight and extreme heat, or shelter to protect them from extreme cold.

Animals held in indoor facilities should be provided with appropriate light and dark photoperiods which mimic actual seasonal conditions. Light provided in indoor facilities shall be of sufficient intensity to clearly illuminate the pool.

MINIMUM STANDARD

- Shade structures or shelters must be provided to animals when local climatic conditions could compromise the health of the animal noting that some cetaceans undergoing rehabilitation may be unable to swim, dive, or thermoregulate, thus requiring either shelter from the elements or shade.
- Shade structures, where necessary, shall be large enough to provide shade to at least 50% of the MHD surface area determined for the species held in the pool. MHD is defined as 7.3 meters (24 feet) or two times the actual length of the largest species housed in the pool, whichever is greater.

- Lighting should be appropriate for the species.

RECOMMENDED

- Full spectrum lights or a natural source of lighting for animals housed indoors.
- Removable or adjustable shade structures in pens that are easily cleaned and that provide more natural sunlight to animals that are swimming and diving normally.

1.1.4 Critical Care Animals and Calves

Debilitated and ill cetaceans are often sedentary and tend to float at the surface for long periods of time. Some are unable to swim and dive. Some may require support in order to stay afloat enough to breathe regularly. Young calves may be weak and require assistance. Support may be provided by floatation devices attached to the animal or rehabilitation personnel supporting the animal utilizing a variety of methods. A shallow area that allows the animal to rest on the bottom while keeping its blowhole above the surface may also suffice. This shallow resting shelf must be of sufficient depth for larger animals (over 50 kg) to provide adequate buoyancy to prevent organ-crushing. Small cetaceans may also be supported in a stretcher that is hung within an open aluminum frame while maintaining the water depth at the midline of the animal. These animals must be protected from sun-related skin damage by providing them with shade or covering their exposed skin with an appropriate, non-desiccating sun block that allows proper thermoregulation. Exposed skin may be protected from desiccation with the use of emollients applied to the skin or a water spray.

MINIMUM STANDARD

- Ensure support is available via floatation devices, a shallow resting shelf, sloping beach, suspended stretcher system, or other support for critically ill or neonatal cetaceans that are weak and/or cannot swim normally.
- Monitor animals requiring support.
- Provide sufficient shade.
- Provide a water spray or method for keeping skin moist for cetaceans that cannot swim or dive.
- Control air temperature above the pool to facilitate recovery, protect rehabilitating animals from heat or cold extremes, and prevent discomfort. This may be achieved by heating or cooling the water appropriately for the species and condition of the animal and/or providing shelter from the elements.

1.1.5 Number of Animals Housed in Each Pool/Pen

During multiple or unusual mortality event (UME) strandings the number of cetaceans received by the facility is limited not only by the number and size of the holding pools or pens, but the number of qualified trained rehabilitation staff members available to care for the animals. Due to the intensive 24 hour assistance required for critical care cetaceans, a minimum of two qualified trained staff members are necessary for each and every dependent cetacean on the premises. The maximum number of animals maintained in each pool and onsite at the facility shall be determined by the attending veterinarian and dictated by the number of qualified staff available to care for the animals.

MINIMUM STANDARD

- Provide enough pool space for each animal to swim, dive, and maintain an individual distance of one body length from other animals housed in the same pool.
- Provide 2 qualified trained rehabilitation staff members for every critical care or dependent cetacean weighing less than 250 kg. Larger critical care cetaceans will require more personnel to handle each animal.
- Staff must be available on a 24-hour basis for critical animal care.
- Provide one trained staff member for every 3-4 cetaceans undergoing less critical periods of rehabilitation; during reconditioning or during counter-conditioning if training or desensitization was used for feeding stations, medical procedure desensitization or transport approximations.
- Provide one trained staff member for every five cetaceans that are eating regularly and do not require handling.

RECOMMENDED

- Provide enough pools or pool space to house multiple animals in accordance with the calculated space outlined in the APHIS AWA standards for captive cetaceans.
- Provide three qualified trained rehabilitation staff members for every critical care or dependent cetacean.
- Provide two trained staff members for every 1 – 4 cetaceans undergoing less critical periods of rehabilitation; during reconditioning; or prior to reintroduction.

1.1.6 Housekeeping

MINIMUM STANDARD

- Keep support buildings and grounds as well as areas surrounding rehabilitation pools clean and in good repair.
- Maintain perimeter fences in good repair, and ensure they are an adequate height and construction to keep people, animals, and pests out.
- Ensure primary enclosures housing marine mammals do not have any loose objects, sharp projections, and/or edges which may cause injury or trauma to the marine mammals contained therein.
- Objects introduced as environmental enrichment must be too large to swallow and made of non porous cleanable material that is able to be disinfected. Likewise items such as rub ropes shall be secured to prevent entanglement.
- All drains and overflows must have screened covers.
- Ensure there are no holes or gaps larger than ½ the size of the head diameter of the calf of the smallest species to be housed.

RECOMMENDED

- Coat all pool and haul-out surfaces with a non-porous, non-toxic, non-degradable cleanable material that is able to be disinfected.

1.1.7 Pest Control

MINIMUM STANDARD

- Establish and maintain a safe and effective program for the control of insects, avian and mammalian pests. This should include physical barriers to prevent feral and/or wild animals from contact with the rehabilitating animals.
- Insecticides or other such chemical agents shall not be applied in a primary enclosure housing marine mammals or a food preparation area except as authorized in writing by the attending veterinarian.
- If applied, all appropriate measures must be taken to prevent direct contact with the insecticide/pesticide, whether airborne or waterborne, by the animal.

1.1.8 Security for Facility

Stranded marine mammals often attract public attention and must be protected from excessive commotion and public contact. Ensuring a quiet stress-free environment for rehabilitating animals may improve their chance to recover and survive. Public viewing of marine mammals is discussed in Section 1.13 of this document.

MINIMUM STANDARD

- Locate rehabilitation facilities at sites that have the ability to be secured from the public.
- Prevent direct public contact with the rehabilitating animals but utilizing appropriate fencing, staff and security personnel.

RECOMMENDED

- Maintain 24- hour monitoring when animals are present or maintain a secure perimeter fence with the ability to lock the area off to the public when staff is not present.

1.2 Water Quality

Water quality is an essential part of keeping cetaceans healthy. Sick or debilitated cetaceans should be housed in pools filled with clean, appropriately treated saltwater to facilitate their recovery.

There are four basic types of water systems:

- Pools with filtration systems (closed systems)
- Pools without filtration systems (dump and fill systems)
- Pools with periodic influx of natural seawater (semi-open systems)
- Open water systems (flow-through pools, bay or sea pens)

There are a number of variables which will affect water quality. The number and size of cetaceans utilizing each pool will vary throughout the year at most rehabilitation facilities. During unusual stranding events the number of cetaceans utilizing one pool may increase dramatically, creating a heavier load of waste which must be handled by the filtration system in closed systems and by the amount of water flow-through in semi-open and open systems.

Filtration or life support systems are essential to maintaining clean water for animals held in closed or semi-closed systems. Life support systems have three basic parts; mechanical filters that remove solids, biological filters or baffles to remove or detoxify chemicals in the water, and disinfecting

methods to control or remove pathogens. In addition to maintaining clean water in the animal pools, these systems may be needed to treat waste water, depending on waste water disposal requirements. If a temporary increase in waste production overwhelms part or all of the life support system, a good water quality control program will require alternative options.

The source of water used in closed systems generally is fresh water obtained from municipal sources whereas water in open and semi-open systems comes from a bay or sea source. Municipal fresh water must have salt added to increase the salinity to appropriate levels to maintain cetaceans. Water in closed systems must be regularly filtered through sand and gravel filters to remove particulate matter, and disinfectants such as chlorine or bromine are added at appropriate levels to eliminate pathogens. More elaborate systems utilize ozone to oxidize pathogens in the water. The source should be independent of other rehabilitation and captive animal areas.

Factors that affect water quality are:

- Size of pool or pen
- Efficiency of filtration system or water flow-through rate (tides)
- Water turnover rate
- Number, size and species of animals housed in pool or pen
- Nature and amount of food consumed by animals in pool or pen
- Nature of bottom substrate
- Frequency of cleaning the pool
- Types, amounts, and the frequency with which chemicals are added to the system
- Temperature of the water
- Pathogens in the water
- Biotoxins in open water pens or in pools where the source water comes from the ocean or bay
- Contaminants (oil, pesticides, etc.) in open water pens
- Hazardous waste spills
- Inclement weather
- Sunlight contributing to algae production on pool surfaces, which in turn can support bacteria.

1.2.1 Source and Disposal of Water

The water source for cetaceans housed in closed or semi-closed systems may be municipal water, well water, or water brought into the facility from an adjacent body of water or estuary. The source should be independent of other rehabilitation and captive animal areas.

MINIMUM STANDARD

- Salt water must be readily available to fill pools housing rehabilitating cetaceans unless otherwise directed by the attending veterinarian.
- Fresh water must be available to clean and wash down surrounding areas.
- For pools without adequate filtration systems, drain water from pools daily or as often as necessary to keep the pool water quality within acceptable limits.
- Discharge wastewater in accordance with state or local regulations. Facility managers must seek appropriate authorization to dispose of waste water. Documents of authorization or necessary permits must be kept on site as part of the administrative record and may be requested by NMFS as part of the NMFS Stranding Agreement.
- Chemicals, when necessary, shall be added in appropriate amounts to disinfect the water or adjust the pH, but not added in a manner that could cause harm or discomfort to the animals.
- Have contingency protocols describing how water quality will be maintained during periods of peak animal use.

RECOMMENDED

- Enough salt water must be available to completely fill pools within two hours of draining.
- Maintain a filtration system designed to optimize water quality in each holding pool and decrease water waste.

1.3 Water Quality Testing

It is important to test the water in which the animals live on a regular basis. Coliform bacterial counts are used to monitor the efficiency of the filtration system to eliminate potentially harmful bacteria. Coliform counts should be done at least once per week and more frequently if there are very large or multiple animals utilizing the pool. While coliform numbers may be described as Most Probable Number (MPN) per 100 ml, a more accurate method of measuring coliforms is to determine the total coliform count, or the fecal coliform count.

Temperature of the water is especially important if the animal lacks the ability to thermoregulate. Water may require heating or chilling to aid debilitated animals in their ability to maintain optimal body temperature. Water temperature regulation is not feasible in open water pens, but keeping track of the water temperature in sea pens may aid the staff in making husbandry decisions.

If coliform counts or the water temperature become too high in any system, measures must be taken to correct the problem in a timely manner. A partial-to-total water change may be necessary to correct the problem in a closed or semi-closed system. If the coliform counts are considered too high in sea or bay pens, efforts should be made to circulate clean sea water through the pens using pumps, paddles or other methods of moving water.

Chemicals added to the water may damage eyes and skin, therefore levels must be monitored daily. Emergency chemicals should be on hand such as sodium thiosulfate in case of the accidental hyperchlorination of a system. Salinity may also have an impact on the health of the skin and eyes, as well as the comfort level of the animal, and should be monitored regularly.

1.3.1 Water Quality Tests

MINIMUM STANDARD

- Measure coliform growth weekly.
- Total coliform counts must not exceed 500 per 100 ml or a MPN of 1000 coliform bacteria per 100 ml water. Fecal coliform counts are not to exceed 400 per 100 ml.
- If the above tests yield results that exceed the allowable bacterial count, then two subsequent samples must be taken to repeat the test(s) where the level(s) is/are exceeded. The second sample is to be taken immediately after the initial test result, while the third sample would be taken within 48 hours of the initial test.
- If the averaged value of the three test results still exceeds the allowable bacterial counts, the condition must be corrected immediately or the animals must be moved to a contingency facility.
- Maintain pH between 6.5 and 8.5.
- Maintain salinity between 24 - 35 ppt.
- Maintain the temperature of the water so that it falls within parameters appropriate for the species.
- Measure oxidant levels in systems which require use of a chemical disinfectant and/or ozone in the system (for closed systems).

RECOMMENDED

- Maintain pH between 7.2 and 8.2.
- Total Coliforms with blanks and controls, fecal Coliform, fecal Strep, and yeast count performed at least weekly.

1.3.2 Frequency of Testing in Closed, Semi-Open, or Open Systems

MINIMUM STANDARD

- Measure water temperature, pH, salinity, chemical additives (if applicable) daily in all pools.
- Measure coliform counts weekly; and more frequently at the discretion of the attending veterinarian.

RECOMMENDED

- If ozone systems are used, measure ozone levels regularly in the animal pools. Ozone levels shall not exceed 0.02 mg/liter.
- Test source and discharge water at least once per day or more frequently for "flow through" systems.
- Maintain records for tests with time, level and results – reviewed and signed monthly by the attending veterinarian or the animal care supervisor.

1.3.3 Chemical Additives

Total chlorine = Free chlorine + Combined chlorine.

MINIMUM STANDARD

- Maintain total chlorine below 1.5 ppm, where the combined chlorine shall not exceed 50% of the total chlorine
- All additives must be recorded
- pH may be adjusted chemically – for example – pH may be raised with sodium carbonate, or soda ash; or lowered with HCl or CO2; but not added in a manner that could cause harm or discomfort to the animals.
- Maintain Material Safety Data Sheet (MSDS) information and signage as well as appropriate handling equipment for the addition of chemicals.

1.3.4 Water Circulation

The amount of water turnover through the filtration system in a closed or semi-open system is important to maintain water quality by removing organic waste and particulate matter. Likewise the amount of water movement through an open water pen is also important in the maintenance of water quality. Generally, adequate tidal action will result in the equivalent of two complete water changes per day.

MINIMUM STANDARD

- Maintain sufficient turnover of water through the filtration system in closed or semi-open systems to keep the water quality at or above acceptable limits, with a minimum of two complete water changes per day.
- Ensure methods for moving water (water paddles, pumps, spray devices) are available to aerate and move water in open water pens with insufficient flow of tides or water through the enclosures. These methods should be sufficient to provide the equivalent of two water changes per day.

RECOMMENDED

- A minimum full water turnover rate of every four hours for each pool in closed or semi-open systems.

1.3.5 Salinity

Acceptable salinity levels are dependant on the species and condition of the cetacean and the duration of the stay. Most species of cetaceans require a salinity level greater than 24 ppt in order to maintain healthy skin and eyes. Occasionally the attending veterinarian may chose to house the cetacean in fresh or nearly fresh water for a period not exceeding 3 days. Reasons for maintaining cetaceans in fresh or brackish water should be noted in the veterinary record and signed by the veterinarian. Some species of cetacean are better adapted to live in brackish water and may do well in lower salinity levels than other species.

MINIMUM STANDARD

- Maintain salinity levels over 24 ppt unless a written veterinary plan calls for lower salinity levels, or if the animals are housed in sea pens nearby their resident range.

RECOMMENDED

- Ideal salinity levels should approach natural ocean salinity levels (30 – 33 ppt) but acceptable industry standards suggest maintaining cetaceans in water with salinity levels over 24 ppt.

1.3.6 pH

MINIMUM STANDARD

- Maintain pH in a range between 6.5 to 8.5.

RECOMMENDED

- Maintain pH between 7.2 –8.2.

1.3.7 Water Temperature

Many species of cetaceans are adapted to maintain normal body temperatures when living in a broad range of water temperatures. Healthy *Tursiops* have been housed successfully in water ranging from 50^{o} to 80^{o} F. Atlantic white-sided dolphins fail to thrive in water over 80^{o} F and North Atlantic harbor porpoise do best in 45 to 65^{o} F. Some warmer water species, such as a Vaquita, will require consistent warm water environments. It is therefore important to know if the species being rehabilitated comes from a polar, temperate or tropical climate. It is of equal importance to know the temperature range of water in their primary habitat. Young, underweight, and debilitated animals may also require warmer water than found in their primary habitat.

Cetaceans such as bottlenose dolphins adjust their blubber thickness seasonally in response to water temperature. This must be considered when readying rehabilitated animals for release. Therefore animals should be acclimated to an appropriate seasonal water temperature prior to release.

MINIMUM STANDARD

- Hold water temperatures within the normal seasonal habitat temperature range for the species under rehabilitation unless otherwise authorized by the attending veterinarian in writing.
- Provide methods to heat and maintain warm water environments for species that require it, or for debilitated individuals that are incapable of maintaining appropriate body temperature.
- Monitor the temperature of water being heated or cooled.
- Design water systems to minimize the chance of rehabilitating cetaceans from becoming hyperthermic or hypothermic.

RECOMMENDED

- Monitor blubber thickness ultrasonically.

1.4 Quarantine

Cetaceans brought to a rehabilitation facility have no medical history and may carry diseases communicable to other marine mammals, other animals, or humans. Likewise, these animals are often debilitated and may suffer from a variety of illnesses which may compromise their immune systems making them susceptible to diseases from other animals and/or the rehabilitation environment. Quarantine areas must be available and proper biosecurity protocols must be in place for all incoming animals at rehabilitation facilities.

Direct contact between the general public and cetaceans undergoing rehabilitation should be avoided because of the zoonotic risk from pathogens carried by marine mammals. There have been documented cases of Brucella, Erysipelothrix, and Blastomyces being passed from cetaceans to humans.

Listed on the following website are numerous other potentially zoonotic marine mammal pathogens (see *http://www.vetmed.ucdavis.edu/whc/mmz/*). See also: *2004 UC Davis Wildlife Health Center Report for the Marine Mammal Commission – Assessment of the Risk of Zoonotic Disease Transmission to Marine Mammal Workers and the Public: Survey of Occupational Risks.*

MINIMUM STANDARD

Maintain sufficient quarantine facilities and space for appropriate quarantine of incoming animals or for holding animals with contagious diseases.

1.4.1 Prevention of Animal to Animal Transmission of Diseases

- Quarantine all new animals in a separate dedicated quarantine area and provide pools that can be isolated with the use of dividers, tarps, or physical space from the rest of the animal housing areas.
- Have separate filtration and water flow systems for pools in quarantine/isolation areas.
- Use dedicated protective clothing for personnel.
- Use foot baths, glove baths, and methods to disinfect clothing, wet suits, or exposure suits between handling animals within quarantine area and outside of quarantine area.
- Maintain equipment and tools strictly dedicated to the quarantine areas.

- Provide dividers between pens and pools that prevent washdown or splash from moving from one pool to another.
- Provide sufficient space; ideally greater than 20 feet or 6 meters; or solid barriers between animal enclosures to prevent direct contact – including splashed pool water and airborne disease transmission.
- Ensure sufficient air turnover in indoor facilities to prevent transmission of disease. Air turnover should be enough to prevent build-up of heat or chemical fumes and provide a method of bringing fresh air into the facility. There should be sufficient venting or openings to allow movement of air throughout the facility.
- Implement specific quarantine and sanitation procedures to prevent transmission of disease through fomites (personnel, clothing, equipment).
- Thoroughly clean and disinfect buckets, hoses, scales, transport equipment, and cleaning equipment that is moved between animal areas to prevent transmission of pathogens via fomites.
- Place open water pens so effluent is not near water intake.
- Require evaluation and written veterinary approval before placing animals together after quarantine period has been met.

RECOMMENDED

- Provide separate air handling system in indoor facilities.
- Clean and disinfect quarantine pools between uses.

1.4.2 Prevention of Domestic Animal to Marine Mammal Transmission of Disease

- Ensure appropriate fencing and placement of holding pens prevents direct contact between rehabilitating cetaceans and domestic animals.
- Prohibit personal pets from entering the facility and facility grounds. Pets must stay outside the perimeter fence at all times.
- Place foot baths at the entry and exit of animal areas.
- Require quarantine and sanitation protocols are followed to prevent transmission of disease through fomites such as wet suits and equipment.

1.4.3 Prevention of Wild Animal to Marine Mammal Transmission of Disease

- Ensure perimeter fencing will prevent wildlife from entering the rehabilitation premises.
- Provide appropriate rodent and bird control on the premises. Ensure net pens and lagoon areas have sufficient secondary fencing to keep wildlife from coming in direct contact with the animals housed in the net pens.

1.4.4 Prevention of Marine Mammal to Domestic Animal Transmission of Disease

- Provide appropriate perimeter fencing.
- Require animal personnel to change contaminated clothing and/or disinfect before leaving the rehabilitation premises.
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.

1.4.5 Prevention of Stranded Marine Mammal to Captive Marine Mammal Transmission of Disease

- Train volunteers and staff to follow appropriate quarantine protocols.
- Establish quarantine protocols that take into consideration the changing status of the stranded animal.
- Establish traffic flow so that volunteers or staff working with stranded animals do not inadvertently travel into a collection animal area.
- Establish decontamination protocols before volunteers or staff members exposed to stranded animals may enter a collection animal area.
- Establish separate restrooms, showers, changing rooms, food preparation areas, etc. for staff and volunteers working with rehabilitating vs. collection animals. Food for rehabilitating animals may be prepared in the collection animal kitchen and taken to the rehabilitation animal area, however any bucket, feed implement or other item must be thoroughly disinfected before it may return to the collection animal area.

1.4.6 Methods to Reduce Spread of Disease from Animals Housed in Open Sea/Bay Pen Systems

- Consideration of substrate, water depth and public access when selecting a site for a sea or bay pen.
- Placement of pens in a secluded area where wild animals and marine mammals are unlikely to come into direct contact with the animals housed in the sea/bay pens; nets should be sufficiently rigid to prevent entanglement by mammals or fish.
- Placing a second set of perimeter nets 10 meters from the sea/bay pens to prevent direct contact with wild marine mammals.
- Do not place sea/bay pens within 1000 meters of any major outflow of storm drains or sewage treatment plants and consider the flow direction or current from these major outflows.
- Place the sea/bay pens over 500 meters and downstream from water intake pipes that bring water into facilities that house marine mammals.
- Place pens in an area where there is ample flow-through of tides/currents.
- Ensure the pens are of sufficient size to minimize biomatter build-up. Each cetacean should be housed in a pen that has a minimum depth of half of their body length, and a minimum horizontal dimension of 24 feet or two full body lengths, whichever is greater.
- Avoid overcrowded pens. Animals may fight with each other when housed too closely together. Likewise they must be able to swim and dive normally to maintain optimal muscle condition.
- Have equipment to pump or aerate the water in pens that do not have sufficient tidal action to ensure a minimum of two complete water changes per day.
- Place pens in areas where there is sufficient depth to enhance water circulation and reduce pathogen build-up. Daily coliform testing will determine if pathogen build-up exists.
- Place quarantine pens such that tidal action or underwater currents will not flow through sea pens housing healthy animals.

1.4.7 Evaluation Requirements Before Placing Marine Mammals Together

- Complete blood count (CBC)/Chemistries, appropriate cultures, physical examination before moving animals out of quarantine area.
- Review current NMFS recommendations on diseases of concern (i.e. Morbillivirus) and reportable disease (i.e. Brucella and West Nile virus).

- Consider screening for morbillivirus, herpes virus, Brucella, Leptospira, and Toxoplasma utilizing the most current diagnostic tests available.
- If animals are part of a UME, then screening for diseases must be more thorough and in direct coordination with NMFS and through UME coordinators.
- Have contingency plan for animals that are carriers of or actively infected with reportable disease such as brucellosis, herpes virus, leptospirosis, toxoplasmosis, and morbillivirus.

1.4.8 Zoonotic Considerations

- Restrict public access and direct contact with cetaceans due to zoonosis potential and public health hazard of non-trained individuals interacting with sick and injured marine mammals.
- Train staff and personnel about how to prevent contracting zoonotic diseases (*Occupational and Safety Information for Marine Mammal Workers* http://www.vetmed.ucdavis.edu/whc/mmz/).
- Train staff and personnel working directly with stranded cetaceans how to recognize symptoms of zoonotic disease.
- Provide safety equipment such as protective clothing, eye protection and face masks.
- Provide eye flushing stations as used with hazardous materials (HAZMAT) or normal saline bottles to irrigate the eyes.
- Staff with open wounds shall not enter the pool of animals carrying potentially infectious diseases.
- Persons with disabilities, respiratory conditions, infectious diseases or infectious skin conditions shall not enter pools with rehabilitating cetaceans.
- Train staff the basics of sanitation and properly handling contaminated equipment.

1.4.9 Pre-Release Guidelines

- Pre-release health screens and serologic requirements are directed by the NMFS Regional Stranding Coordinator, in coordination with Marine Mammal Health and Stranding Response Program.

1.5 Sanitation

MINIMUM STANDARD

1.5.1 Primary Enclosure Sanitation

- Remove animal and food waste in areas other than the rehabilitation pool from the rehabilitation enclosure at least daily, and more often when necessary to prevent contamination of the marine mammals contained therein and to minimize disease hazards.
- Remove particulate animal and food waste from rehabilitation/exercise pools at least once daily, but as often as necessary to maintain water quality and to prevent increased health hazards to the marine mammals that use the pools.
- Remove trash and debris from pools as soon as it is noticed, to preclude ingestion or other harm to the animals.
- Clean the walls and bottom surfaces of the rehabilitation/exercise pools as often as necessary to maintain proper water quality.
- Prevent animals from coming in direct contact with disinfectants or aerosolized disinfectants from spray or cleaning hoses.

RECOMMENDED

- Empty and allow pools to dry once each year but dry and hyperchlorine pool bottoms and walls after each use by sick cetaceans.

1.5.2 Sanitation of Food Preparation Areas and Food Receptacles

- Use separate food preparation areas and supplies for rehabilitation vs. collection animals.
- Clean food containers such as buckets, tubs, and tanks, as well as utensils, such as knives and cutting boards, or any other equipment which has been used for holding, thawing or preparing food for marine mammals after each feeding with detergent and hot water and sanitize with an appropriate disinfectant approved for use in food areas at least once a day.
- Clean kitchens and other food handling areas where animal food is prepared after every use, and sanitize at least once weekly using standard accepted sanitation practices.
- Store substances such as cleaning and sanitizing agents, pesticides and other potentially toxic agents in properly labeled containers away from food preparation areas.
- Post MSDS “right to know” documents for staff utilizing cleaning and animal treatment chemicals and drugs.

1.6 Food, Handling, and Preparation

During rehabilitation food for marine mammals shall be wholesome, palatable, free from contamination, and of sufficient quantity and nutritive value to allow the recovery of the animals to a state of good health. Live fish may be fed during rehabilitation but preferences should be given to native prey species. Live fish may contain parasites which could infect compromised animals. Feeding regimens should simulate natural patterns in terms of frequency and quantity to the extent possible while following a prescribed course of medical treatment. Most cetaceans feed repeatedly during a given day.

1.6.1 Diets and Food Preparation

MINIMUM STANDARD

- Prepare the diets with consideration for age, species, condition, and size of marine mammals being fed.
- Feed cetaceans a minimum of three times a day, except as directed by a qualified veterinarian or when following professionally accepted practices.
- Diets reviewed by a nutritionist, attending veterinarian, or the animal care supervisor.
- Train staff to recognize good and bad fish quality.
- Feeding live fish may be required for release determination. See *NMFS /FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release* for more information regarding feeding live fish.
- Food receptacles should be cleaned and sanitized after each use. Food preparation and handling should be conducted so as to minimize bacterial or chemical contamination and to ensure the wholesomeness and nutritive value of the food.

RECOMMENDED

- Feeding patterns should simulate natural patterns in terms of frequency and quantity which may require food to be offered 5 – 10 times daily.

1.6.2 Food Storage and Thawing

MINIMUM STANDARD

- Frozen fish or other frozen food shall be stored in freezers which are maintained at a maximum temperature of 0º F (-18ºC).

- The length of time food is stored and the method of storage, as well as the thawing of frozen food should be conducted in a manner which will minimize contamination and which will assure that the food retains optimal nutritive value and wholesome quality until the time of feeding.
- Freezers should only contain fish for animal consumption. Human food or specimens should not be placed in the fish freezer.
- Experienced staff should inspect fish upon arrival to ensure there are no signs of previous thawing and re-freezing, and check temperature monitoring devices in the transport container. The fish shipment should be refused or the fish discarded if temperature fluctuations occurred during transport.
- Freezers shall be of sufficient size to allow for proper stock rotation.
- All foods shall be fed to the marine mammals within 24 hours following the removal of such foods from the freezers for thawing.
- If the food has been thawed under refrigeration it must be fed to marine mammals within 12 hours of complete thawing.
- When fish is thawed in standing or running water, the coldest available running water must be used to prevent excess bacterial growth.
- To ensure optimal quality of the fish, and to prevent bacterial overgrowth, do not allow fish to reach room temperature or sit in direct sunlight.
- The thawed fish shall be kept iced or refrigerated until a reasonable time before feeding. This time will vary with ambient temperature.
- Prepared formula should be fed immediately or refrigerated and fed to the marine mammals within 24 hours of preparation. Formula, once heated to an appropriate temperature for a feed, shall be discarded if it is not consumed within one hour.

RECOMMENDED

- Calculate kilocalories of each type of fish or food items fed to each animal daily.
- Conduct food analysis for protein, fat and water content of each lot of fish used.
- Culture the slime layer from the fish lot prior to thawing for *Erysipelothrix.*

1.6.3 Supplements

MINIMUM STANDARD

- Each animal shall receive appropriate vitamin supplementation which is sufficient and approved in writing by the attending veterinarian.

1.6.4 Feeding

MINIMUM STANDARD

- Food, when given to each marine mammal individually or in groups, must be given by personnel who have the necessary training and knowledge to assure that each marine mammal receives and eats an adequate quantity of food to maximize its recovery or maintain good health. Such personnel is required to recognize deviations in each animal being rehabilitated such that intake can be adjusted and/or supplemented accordingly.

1.6.5 Public Feeding

MINIMUM STANDARD

- Public feeding of animals that are being rehabilitated is **strictly** prohibited.
- Feeding must be conducted only by qualified, trained personnel.

1.6.6 Feed Records

MINIMUM STANDARD

- Maintain feed records on each individual animal noting the actual (not an estimate) individual daily consumption for each animal by specific food type.
- If non-critical animals are housed in groups and are broadcast-fed, then daily individual food consumption estimates are acceptable
- Weigh food before and after each feeding and the record the amount consumed.
- Obtain body weight or girth measurements at least weekly from debilitated easily-handled animals. Girth measurements are taken at the level of the axilla and the anterior insertion of the dorsal fin. Girth measurements are generally less stressful to obtain than weighing the animal.
- Girth measurements or body weight should be obtained as often as practical in the later stages of rehabilitation without causing undue stress to the animal.

1.7 Veterinary Medical Care

All rehabilitation facilities shall have an attending veterinarian. The attending veterinarian is critically involved in making decisions regarding medical care as well as housing and husbandry of resident and newly admitted patients.

1.7.1 Veterinary Experience

MINIMUM STANDARD

The attending veterinarian shall:

- Assume responsibility for diagnosis, treatment, and medical clearance for release or transport of marine mammals in rehabilitation (50 CFR 216.27).
- Ability to provide a schedule of veterinary care that includes a review of husbandry records, visual and physical examinations of all the marine mammals in rehabilitation, and a periodic visual inspection of the facilities and records.
- Be available to examine animals on a regular schedule and emergency basis; daily if necessary.
- Be available to answer veterinary questions on a 24 hour basis.
- Have marine mammal experience or be in regular consultation with a veterinarian who has marine mammal experience and have access to a list of expert veterinarians to contact for assistance.
- Have an active veterinary license in the United States (means a person who has graduated from a veterinary school accredited by the American Veterinary Medical Association Council on Education, or has a certificate issued by the American Veterinary Graduates Association's Education Commission for Foreign Veterinary Graduates), or has received equivalent formal education as determined by NMFS Administrator (adapted from the Animal Welfare Act Regulations 9 CFR Ch. 1).
- Have the skills to be able to draw blood from, and give injections to the species most commonly encountered at the rehabilitation center.
- Be available to examine animals immediately upon admittance to a facility.
- Be available to assess animals during a mass stranding directly or indirectly through trained and qualified primary responders.
- Have contingency plan for veterinary backup.
- Have the appropriate registrations and licenses (e.g., registered with the Drug Enforcement Administration for handling controlled substances) to obtain the necessary medications for the animals housed at that rehabilitation facility.
- Be able to conduct a full post-mortem examination on all species of cetaceans treated at the facility.
- Be knowledgeable and able to perform cetacean euthanasia.
- Be knowledgeable about species-specific pharmacology.

- Must certify in writing that animals are fit for transport.
- Ability to write and submit timely disposition recommendations for marine mammals in rehabilitation.
- Be knowledgeable of marine mammal zoonotic diseases.

RECOMMENDED

All of the above plus:

- Membership in the International Association for Aquatic Animal Medicine.
- Have access to a current version of the CRC "Handbook of Marine Mammal Medicine"
- Complete a course that offers basic medical training with marine mammals such as Seavet, Aquavet, or MARVET.
- Have a minimum of one year of clinical veterinary experience post graduation.
- Have at least one year clinical experience working with the marine mammal type(s) most frequently admitted to the rehabilitation facility
- Be full time employees or contracted veterinarian experienced in cetacean medicine at facilities managing an average of 5 live cetacean cases per year.

1.7.2 Veterinary Program

MINIMUM STANDARD

- Veterinary care for the animals must conform with any State Veterinary Practice Act or other laws governing veterinary medicine which applies to the state in which the facility is located.
- Standard operating procedures should be reviewed and initialed by the attending veterinarian or the animal care supervisor annually and/or whenever the document is changed or updated. This document may be reviewed by NMFS as part of the NMFS Stranding Agreement or as part of inspections.
- Staff caring for animals should be sufficiently trained to assist with veterinary procedures under the direction of the veterinarian and the rehabilitation facility should maintain at least one **Animal Care Supervisor** who is responsible for overseeing prescribed treatments, maintaining hospital equipment, and controlling drug supplies. The person should be adequately trained to deal with emergencies until the veterinarian arrives, be able to direct the restraint of the animals, be responsible for administration of post-surgical care, and be skilled in maintaining appropriate medical records. It is important that the animal care supervisor should communicate frequently

and directly with the attending veterinarian to ensure that there is a timely transfer of accurate information about medical issues.

- Veterinary decisions shall be based on "best practices" (i.e., based on informed opinions and expertise of veterinarians practicing marine mammal medicine).
- A schedule of veterinary care which includes a review of husbandry records, visual and physical examinations of the animals, and a visual inspection of the facilities should be implemented.
- A health and safety plan for the staff shall be written and accessible at all times. It shall be reviewed by the attending veterinarian or the animal care supervisor annually or as prescribed by the NMFS Stranding Agreement. Also, it may be beneficial to consult with an occupational health medical professional when developing these plans. All animal care staff will be familiar with the plan. The plan shall include protocols for managing bite wounds.

The following reports may be requested annually by NMFS as required under the NMFS Stranding Agreement or as a part of inspections:

- Standard Operating Procedure (SOP) reviews
- Health and Safety Plan reviews
- Animal acquisitions and dispositions
- National Oceanic and Atmospheric Administration (NOAA) Form 89864, Office of Management and Budget (OMB) #0648-0178 (Level A data)
- NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report)
- Case summaries for any rehabilitation performed at a facility, including narrative descriptions of the cases as well as spreadsheets of treatments, blood values, etc.

1.8 Laboratory Tests and Frequency of Testing

Specific requirements for tests will be issued by the NMFS stranding coordinator (or UME Onsite Coordinator) in each region as outlined in the Marine Mammal Health and Stranding Response Program for release determinations, surveillance programs and UME investigations. Routine diagnostic sampling and testing protocols will be determined by the attending veterinarian. NMFS must be provided adequate time and information including a veterinary certificate of health before an animal is released as directed in 50 CFR 216.27 (see *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*).

1.8.1 Laboratory Testing

MINIMUM STANDARD

- CBC/Serum Chemistry- For most cases, all animals shall have a minimum of two blood samples drawn for CBC with differential and serum chemistry; upon admission and prior to release (see *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*). If duration of rehabilitation is shorter than a week, one blood workup may suffice and is at the attending veterinarian's discretion.
- Fecal analysis for parasites - Fecal tests for parasites shall be run upon admission of each animal at the discretion of the attending veterinarian.
- Serology as necessary for release determination based on direction of the NMFS stranding coordinator and the Marine Mammal Health and Stranding Program and for additional clinical diagnosis as deemed appropriate by the attending veterinarian.
- The administration of drugs with potential adverse side-effects may require additional testing. For example, the use of ototoxic antibiotics may require subsequent testing of hearing abilities of the animal prior to consideration for release.
- The attending veterinarian or a trained staff member shall perform a necropsy on every animal that dies within 24 hours of death if feasible. If necropsy is to be performed at a later date (ideally no longer than 72 hours postmortem), the carcass should be stored appropriately to delay tissue decomposition.
- Carcass disposal shall be handled in a manner consistent with local and state regulations.
- Perform histopathology on select tissues from each animal that dies at the discretion of the attending veterinarian. A complete set of all major tissues should be evaluated if the animal dies of an apparent infectious disease process.
- Culture and other diagnostic sampling shall be conducted as directed by the attending veterinarian to determine the cause of stranding or death.
- Contact NMFS for additional laboratory test requirements in all cases of unusual mortality outbreaks or disease outbreaks. More complete testing may be required for diseases of concern.
- For cases involving release decisions, unusual mortality investigations, or surveillance programs, serologic assays may only go to labs that have validated tests approved by NMFS, especially for release decisions or determinations. Guidance will be provided by the NMFS Stranding Coordinators or UME Onsite Coordinator.

- Notify the NMFS Stranding Coordinator of learning of any diseases of concern (e.g., emerging, reportable, and/or zoonotic diseases) that are detected and/or confirmed that could be a potential hazard for public health or animal health (NMFS will provide guidance on reportable diseases as it becomes available).
- NMFS must be provided adequate time and information (including veterinary certificate of health) before the animal is released in all cases as directed in 50 CFR 216.27 (see NMFS Standards for Release). This information is required under 50 CFR 216.27(a) and must be submitted 15 days prior to release unless advanced notice is waived by the NMFS Regional Administrator. Guidance on the waivers is provided in the *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release.*

RECOMMENDED

- Complete necropsy performed by the attending veterinarian or a pathologist within 24 hours of death.
- Full histopathology done on tissues from each animal that dies of apparent infectious disease.
- Bank 1cc of serum per blood draw in –80° F freezer.
- Bank heparinized plasma (green top) tube in –80 ° F one per animal.
- Reproductive status shall be evaluated upon admission and prior to release through analysis of serum progesterone and estrogen levels in females, and testosterone in males. Elevated hormone values in females upon admission will require re-sampling within the first two weeks to assess pregnancy. Monitoring by means of monthly blood sample collection and analysis through the course of rehabilitation is strongly advised. If possible, sampling will be done in conjunction with ultrasonic examination of reproductive tracts.

1.9 Record Keeping and Data Collection

Record keeping is an essential part of the rehabilitation process. Not only do accurate and complete medical records for each stranded cetacean allow the staff to provide consistent and optimal care for each animal, but retrospective records help scientists and veterinarians to make better evaluations on how to treat individuals.

1.9.1 Record Keeping

MINIMUM STANDARD

- Record and report the "Marine Mammal Stranding Report - Level "A".

- Complete the require NMFS Marine Mammal Rehabilitation Disposition Report NOAA 89-878, OMB #0648-0178.as in accordance with the NMFS Stranding Agreement
- Maintain and update individual medical records daily on each animal at the rehabilitation center.
- Individually identify each animal with unique field number.
- Keep an accurate description of the animal, including identification/tag number, date and location of stranding, sex, weight, and length at stranding.
- Subjective, objective, assessment and plan (SOAP) based records are preferred.
- Include food intake and medication administered to each animal in the daily records.
- Weight
    a. Recorded weekly for underweight cetacean calves or as authorized in writing by the attending veterinarian.
    b. Taken as often as possible for underweight animals without causing undue stress to the animal.
    c. Recorded on admission and prior to release for larger cetaceans.
- Measure body weight, girths (axilla and anterior insertion of the dorsal fin) and standard straight-line and length upon admission, and within one week of release/placement.
- Measure blubber thickness (ultrasonically) at standard sites upon admission, and monitor monthly throughout the course of rehabilitation, with a goal of matching blubber to seasonal water temperatures.
- Weigh the animal as practical, keeping in mind that obtaining the weight of the animal may be stressful.
- Record all treatments, blood work, test and results and daily observations in the medical records.
- Maintain individual medical records for each animal. Medical records remain on site where the animal is housed and are available for NMFS on site review upon request as stated in the NMFS Stranding Agreement.
- Maintain medical records in an accessible format on site for a minimum of 15 years.
- Maintain up to date water quality records for a minimum of two years.
- Maintain life support system maintenance records.
- Maintain records of water quality additives.

RECOMMENDED

- Full set of standard morphometrics prior to release.
- Photographic documentation, identifying marks, lesions.

- Caloric value of daily food intake calculated and recorded for each animal each day
- Daily weight of calves or emaciated animals at the discretion of the attending veterinarian.
- Maintain food acquisition and analysis records.
- Maintain "paper copy" archive of required NMFS records.

1.9.2 Data Collection

MINIMUM STANDARD

- Written documentation of the medical history, food and observation records must be kept.
- NMFS Required Forms to be completed in writing or submitted electronically in the NMFS National Marine Mammal Stranding Database as prescribed in the NMFS Stranding Agreement:
  a. Marine Mammal Stranding Report – Level A (NOAA 89-864, OMB #0648-0178)
  b. Marine Mammal Rehabilitation Disposition Report (NOAA 89-878, OMB #0648-0178)

RECOMMENDED

- Computerized documentation with hard copies.
- Ability to network with other institutions.
- Maintain real-time accessible compiled comparative data.

1.10 Euthanasia Protocols

MINIMUM STANDARD

- Each institution must have a written euthanasia protocol signed by the attending veterinarian.
- Persons administering the euthanasia must be knowledgeable and trained to perform the procedure.
- Maintain a list of individuals authorized to perform euthanasia signed by the veterinarian.
- Euthanasia shall be performed in a way to minimize distress in the animal.
- Refer to resources such as the American Veterinary Medical Association Panel Report on Euthanasia, the CRC Press Handbook of Marine Mammal Medicine and American Association for Zoo Veterinarians Guidelines for Euthanasia of Nondomestic Animals.
- Appropriate drugs for euthanasia in appropriate amounts for the largest species admitted to the facility shall be maintained in stock on site in an appropriate lockbox or under the control of a licensed veterinarian with a current Drug Enforcement Administration (DEA) license.
- Drugs for euthanasia shall be kept with an accurate inventory system in place.

- DEA laws and regulations and any applicable State Veterinary Practice Acts must be followed when using controlled drugs.
- NMFS may request this information (protocols and DEA number) as part of the NMFS Stranding Agreement.

1.11 Health and Safety Plans for Personnel

There shall be a health and safety plan on site at each rehabilitation facility that identifies all health and safety issues that may be factors when working closely with wild marine mammals. The plan should identify all potential zoonotic diseases as well as including safety plans for the direct handling of all species and sizes of cetaceans seen at that facility. Rehabilitation facilities are encouraged to comply with Occupational Safety and Health Administration regulations.

MINIMUM STANDARD

- Identify all potential zoonotic diseases in a written document available to all personnel.
- Include safety plans for the direct handling of all species and sizes of cetaceans seen at that facility.
- Include safety plan for dealing with handling any untreated discharge water.

1.12 Contingency Plans

Contingency plans shall be in place at each facility and may be required by NMFS as part of the NMFS Stranding Agreement. NMFS may require approved variances or waivers prior to planned projects such as construction, and NMFS may not allow rehabilitation efforts to occur under some circumstances. These plans should addresses in detail the operation of the facility and care of the animals under the following conditions:

- Inclement weather plan, including a hurricane/big storm plans where appropriate.
- Construction in the vicinity of the animal rehabilitation pools recognizing the potential and documented adverse impacts of construction on cetaceans, and including specific reference to how noise, dust, debris, and construction worker access will be controlled, how and how frequently animal health will be monitored, and specific criteria for when construction shall be halted or the animals will be moved to another site out of the construction area if the animals appear to be adversely impacted.
- Power outages, including plans of how to maintain frozen fish stores and life support systems.

- Water shortages.
- "Acts of God" plan which may include floods, earthquakes, hurricanes or other unpredictable problems known to occur on occasion in the region where the facility is located.

1.13 Viewing

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR is "an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive". Only remote public viewing or distance viewing should be allowed and only when there is no possible impact of the public viewing on the animals being rehabilitated. There is a regulatory requirement for a variance or waiver by NMFS for facilities planning to offer public viewing of any marine mammal undergoing rehabilitation.

1.14 Training and Deconditioning Behaviors

Basic behavioral conditioning of wild cetaceans for husbandry and medical procedure may be warranted during rehabilitation as long as every effort is made to limit reinforced contact with humans. Such conditioning may reduce stress for the animal during exams and acquisition of biological samples. Conditioning may assist with appetite assessment and ensuring that each animal in a group receives the appropriate amount and type of diet and medications.

In some cases, extensive contact with humans, including training, may benefit resolution of the medical case by providing mental stimulation and behavioral enrichment, and may facilitate medical procedures. The relative costs and benefits of training should be evaluated by the attending veterinarian and animal care supervisor and the likelihood of contact with humans following release should be considered. Seeking advice from a qualified cetacean behaviorist (with at least 3 years of experience) may be beneficial.

Behavioral conditioning of cetaceans must be done for the shortest time necessary to achieve rehabilitation goals and is to be eliminated prior to release such that association of food rewards with humans is diminished. If an animal has become accustomed to hand-feeding or boat-following, the animal may approach humans after release. Therefore, these behaviors should be deconditioned or counter-conditioned before the animals can be considered for release. Most behaviors will extinguish through lack of reinforcement, but some may require more concentrated efforts.

Training for research that is above and beyond the scope of normal rehabilitation practices can be approved on a case-by case basis under a NMFS scientific research permit. An exception can be made if the attending veterinarian, facility, and NMFS officials all agree that the research will not be detrimental to the animals' health and welfare and will not impede their ability to be successfully released back to the wild.

2. Standards for Pinniped Rehabilitation Facilities

2.1 Facilities, Housing, and Space

Pools for stranded pinnipeds must be appropriate for the basic needs of the animal including buoyancy and thermoregulation. Debilitated pinnipeds often cannot swim and will avoid water if offered, preferring a haul-out space to a pool. Pinnipeds arriving in a debilitated condition have different needs and may not require pools initially. If no pool is provided to the animal, means of keeping it wet and protected from direct sunlight is essential. The upper critical temperature of California sea lions is lower than most land-dwelling mammals at 24°C (75°F) and with limited thermoregulatory ability, they have special habitat needs in captivity. While dry sea lion coats absorb about 74% and wet California sea lion coats absorb almost 92% of all types of shortwave radiation respectively, a California sea lion with a wet coat exposed to direct sunlight could easily overheat on a hot day if there were no other method to cool the animal. (Langman *et al.*, 1996).

Social compatibility should be considered as a part of appropriate housing. Pinnipeds known to be social should be housed with compatible species whenever possible. Placing larger, more robust animals in separate pens, away from the smaller, weaker, or less dominant animals may enhance the success of the rehabilitation efforts for the weaker animals.

It is up to the attending veterinarian and experienced rehabilitation staff, to decide how to house the animal most appropriately based on their experience, observations, and physical examination.

Each animal admitted to a rehabilitation center should be placed in a quarantine holding area and have a full health evaluation performed by the attending veterinarian, Sufficient quarantine time should be allowed for results from tests and cultures to be evaluated before the animal is placed with animals that are apparently disease free. Pinnipeds with evidence of infectious disease must be held in separate areas from other rehabilitating animals to prevent transmission of disease. There should be sufficient isolation areas to accommodate incoming animals with evidence of disease utilizing methods to control aerosol and water-borne exposure to other on-site animals. (See Section 2.4 Quarantine).

During multiple or unusual stranding situations such as hazardous waste spills, catastrophic weather events, toxic algal blooms, or other events leading to unusually high morbidity or mortality, rehabilitation centers may need to adjust the number of animals that would be normally housed in each pen, pool, or bay or ocean pen. The attending veterinarian will be responsible for assuring that

numbers of animals housed in one pool or pen will be appropriate based on the situation. The number of qualified animal care personnel available to care for the animals could be a limiting factor on how many animals may be housed at each facility.

Care should be taken when hand rearing neonatal otariids, as some species frequently imprint on their caregivers rendering them unsuitable for release. A plan for placing animals in a permanent captive environment should be in place in advance for pinniped pups that are ultimately deemed unreleasable.

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR is "an activity that provides opportunity for the public to view living marine mammals at a facility holding marine mammals captive" (See Section 2.13 Viewing).

2.1.1 Pool Requirements

MINIMUM STANDARD

- Pools shall be available for all pinnipeds under rehabilitation. Critical care animals may be temporarily held without water access at the discretion of the attending veterinarian.
- Critically ill animals or young pups are to be housed appropriately, with the pool size and depth as well as the dry resting area determined by the discretion of the attending veterinarian.
- Pools shall be deep enough for each animal to completely submerge, and shall be at least 0.76 meters or 2.5 feet deep. An exception to this would be temporary pools for young pups or debilitated animals.
- Pools shall be large enough in diameter to allow each animal housed therein to swim.

RECOMMENDED

- Pools shall have a MHD of 1 meter or 1.5 x the length of the largest animal utilizing the pool, whichever is larger.
- The minimum surface area of the pool for non-critical animals shall be at least equal to the dry resting area required by USDA, APHIS AWA standards, but using the actual length of the largest animal in the enclosure instead of the average adult length.
- The pool shall be at least 0.91 meters deep or one-half the actual length of the longest species contained therein, whichever is greater.

- If adult pinnipeds are commonly rehabilitated, facilities should be designed to accommodate the average number of adult-sized animals that strand each year, and have at least one pool and haul-out area that meet USDA APHIS AWA standards.

2.1.2 Dry Resting Area

MINIMUM STANDARD

- One non-critical animal; area of dry resting area = 1.2 x (length of the animal)^2.
- Two non-critical animals; area of dry resting area = 1.5 x (length of the longest animal)^2.
- Three or more animals in the same enclosure require the minimum space for two animals and, in addition, enough space for the animals to lay separately with at least one body length from one another, to turn around completely, and to move at least two body lengths in one direction.
- The facility must have a plan to manage adult males.
- Animals may be temporarily housed in smaller areas at the discretion of the veterinarian. The attending veterinarian should determine the minimum space which will be most appropriate for the age or medical condition of the animal.
- Critical care animals and young pups may be temporarily supplied smaller pools and less dry resting area.

RECOMMENDED

- One to two animals: 2 x (length of longest animal)^2
- Three or more animals in the same enclosure: (length of each animal)^2 x number of animals in enclosure = number of square feet of required dry resting area (DRA).

2.1.3 Pool or Pen Design

New rehabilitation pools should be designed and constructed to minimize introduction of anthropogenic noise from life-support equipment or other sources. This can be accomplished through sloping of walls, insulation with soil or other materials around the sides of the pool and/or through isolation of noise-generating equipment. A special exception may be granted by NMFS if existing pools do not meet these specifications and a retrofit is not feasible as long as animal welfare is maintained.

MINIMUM STANDARD

- Pools or pens shall be designed for ease of cleaning and handling the animals.

- Open water pens shall optimally be constructed of plastic or other rigid netting.
- If cotton or nylon netting material is used it must be small enough gage to prevent entanglement.

RECOMMENDED

- Pools designed to promote good water circulation and to minimize anthropogenic noise.
- Ability to drop a pool in less than 2 hours and refill it to a "swimming level" in less than 30 minutes or a false bottom or other method utilized for ease of capturing and treating pinnipeds.

2.1.4 Length of Stay and How it Affects Space

Facilities which handle adult animals that are kept for periods longer than six months but less than one year should meet USDA APHIS AWA standards. However the actual length of each animal may be used for each DRA calculation rather than the adult length. After one year, holding space must meet APHIS standards.

2.1.5 Shelter, Shading, and Lighting

Animals housed at rehabilitation facilities must be provided with shelter to provide refuge from extreme heat or cold. Pinnipeds held in rehabilitation facilities may not have normal activity levels and thin animals may be unable to thermoregulate properly. These animals may require shade structures to protect them from direct sunlight and extreme heat, or shelter to protect them from cold temperatures or inclement weather. Animals held in indoor facilities should be provided with appropriate light and dark photoperiods which mimic actual seasonal conditions. At the discretion of the attending veterinarian an exception to refuge from extreme cold during the pre-release conditioning phase may be made. Pinnipeds should be protected at all times from extreme heat.

MINIMUM STANDARD

- Provide shade structures or shelters to animals to aid thermoregulation when local climatic conditions could compromise the health of the animal.
- Provide shade and/or water spray to all pinnipeds that cannot swim and are housed in areas where ambient air temperatures reach > 80° F (26.6° C).
- Lighting in indoor facilities shall be appropriate for the species and shall clearly illuminate the DRA and pool during daylight hours.

RECOMMENDED

- All of the above and a source of natural or full spectrum light for animals housed indoors.
- Removable or adjustable shade structures that may be sanitized regularly in pens to provide more natural sunlight to animals that are swimming and diving normally.

2.1.6 Air Temperature

MINIMUM STANDARD

- Attention to ambient air temperature and humidity should be considered to facilitate recovery, protect rehabilitating animals from extremes of heat or cold, and to prevent discomfort.
- Method to raise or lower air temperature, as appropriate to maintain proper body temperature should be available. Access to full shade, constant water sprays and fans may be used for animals that have no access to pools during times when the ambient temperature exceeds 85°F (29.4°C). Likewise radiant heating devices or waterproof heating pads may be utilized when ambient temperatures fall below the comfort level of the animal, which will be determined by the species, age, medical condition, and body condition of the animal.
- Animals should be able to move away from point source heaters. If animals are too debilitated to move, temperature of heaters can not exceed the safe range of 60-80^{o}F at skin surface or animals must be monitored every 2 hours.
- Large fans or "swamp coolers" available to move air across animals with no access to pools when ambient temperatures reach over 85°F (29.4°C).

RECOMMENDED

- Provide temperature-controlled shelter or holding space for critical care animals or pups.
- Monitor temperature of additional heaters such as heating pads infrared heaters and heat lamps.

2.1.7 HOUSING FOR CRITICAL CARE ANIMALS

Debilitated and ill pinnipeds are often sedentary and haul out or float at the surface of a pool for long periods of time. Young pups may be weak and require assistance moving in and out of pools. A shallow area that allows the animal to rest on the bottom with gradually sloping sides or a ramp equipped with a gripping surface to allow ease in entering and exiting the pool are considered optimal.

MINIMUM STANDARD

- Individual dry haul out space or individual enclosures shall be large enough to accommodate the most common species of pinnipeds rehabilitated routinely at the facility.
- Housing for critically ill animals that will provide shelter from the extremes of heat or cold, and will provide heat as appropriate for animals held in cold climates.
- Access to shallow water and/or water spray for all pinnipeds as advised by the attending veterinarian.
- Barriers sufficient to isolate incoming animals until the attending veterinarian determines them to be free from contagious disease (See Section 2.4 Quarantine).

RECOMMENDED

All of the above minimum standards, plus:

- Individual enclosures for each critical care animal where the dry resting area = (length of the animal)^2.
- Housing which provides optimal temperature control for critically ill animals (heating and/or air conditioning).

2.1.7 Housing of Pups

Pups of all species have special housing and management needs and require careful monitoring when introducing them to pools. Premature pups may require more time than full-term pups before introducing them to water.

MINIMUM STANDARD

Phocids less than 1 week old:

- Individual housing with fully supervised access to shallow water (< 0.5 meters deep) pools. Full supervision may stop when animals demonstrate ability to swim and haul out.

Otariids less than 3 weeks old:

- Individual housing or housing with similarly sized pups with fully supervised access to shallow water pools (<0.5 meters deep) Full supervision may stop when animals demonstrate ability to swim and haul out.

- Access to raised platforms in dry resting areas for pups of all ages at the discretion of the veterinarian. Critical or debilitated pups should not be required to lay on concrete or other hard/cold surfaces. Platforms must be low enough for easy access yet high enough to allow the floor to dry under platform. Platforms should be made of material with a sealed cleanable surface and designed to allow for waste to pass through.

RECOMMENDED

- All of the above and with pools designed with a gently sloping side/beach area with "gripping surface" to allow pups to easily haul out without assistance.

2.1.8 Housing of Older Pups

Full term phocids greater than 1 week old and otariids greater than three weeks old

MINIMUM STANDARD

- House pups with similar conspecific age group.
- House pups as individuals or groups with frequent or constant access to deeper water (> 0.5 meters deep).
- Provide a platform or shallow shelf in each pool that allows pups to easily haul out on their own.
- Provide platforms in dry resting areas allowing critical or debilitated pups an alternative to laying on concrete or other hard/cold surfaces (as above).

RECOMMENDED

- Provide a pool designed with a gently sloping side leading to a level beach area that allows pups to easily haul out.

2.1.9 Number of Animals Housed in Each Pen/Pool

During UME strandings, the number of pinnipeds received by the facility is limited not only by the number and size of the holding pools or pens, but the number of qualified trained rehabilitation staff members available to care for the animals. The maximum number of animals maintained in each pool and onsite at the facility shall be determined by the attending veterinarian and dictated by the number of qualified staff available to care for the animals.

MINIMUM STANDARD

- Provide a minimum of three qualified trained rehabilitation staff members on site for the first 25 pinnipeds housed at the facility, and two more trained rehabilitation staff members for every additional 25 pinnipeds. More staff will be required when animals are housed simultaneously in quarantine holding and recovering animal holding areas. Dependant pups are more labor intensive and require more staffing. Staff must be available on a 24-hour basis for critical animal care.

2.1.10 Housekeeping

MINIMUM STANDARD

- Keep support buildings and grounds as well as areas surrounding rehabilitation pools clean and in good repair.
- Maintain perimeter fences in good repair, and ensure they are an adequate height and construction to keep people and animals and pests out.
- Ensure primary enclosures housing marine mammals do not have any loose objects, sharp projections, and/or edges which may cause injury or trauma to the marine mammals contained therein.
- No holes or gaps larger than ½ the size of the head diameter of the pup of the smallest species to be housed.
- All drains and overflows must have screened covers.
- Objects introduced as environmental enrichment must be too large to swallow and made of non porous cleanable material.

RECOMMENDED

- Coat all pool and haul-out surfaces with a non-porous, non-toxic, non-degradable cleanable material that is able to be disinfected.

2.1.11 Pest Control

MINIMUM STANDARD

- Establish and maintain a safe and effective program for the control of insects, avian and mammalian pests. This should include physical barriers to help to prevent feral and/or wild animals from contact with the rehabilitating animals.

- Insecticides or other such chemical agents shall not be applied in a primary enclosure housing marine mammals or a food preparation area except as authorized in writing by the attending veterinarian.
- If applied, all appropriate measures must be taken to prevent direct contact with the insecticide/pesticide, whether airborne or waterborne, by the animal.

2.1.12 Security for Facility

Stranded marine mammals often attract public attention and must be protected from excessive commotion and public contact. Ensuring a quiet stress-free environment for rehabilitating animals may improve their chance to recover and survive. Public viewing of marine mammals is discussed in Section 2.13 of this document.

MINIMUM STANDARD

- Locate rehabilitation facilities at sites that are able to be secured from the public.
- Prevent direct public contact with the rehabilitating animals by utilizing appropriate fencing, staff and security personnel.

RECOMMENDED

- Maintain 24- hour monitoring when animals are present or maintain a secure perimeter fence with the ability to lock the area off to the public when staff is not present.

2.2 Water Quality

There are four basic types of water systems:

- Pools with filtration systems (closed systems)
- Pools without filtration systems (dump and fill systems)
- Pools with periodic influx of natural seawater (semi-open systems)
- Open water systems (Bay or sea pens).

There are a number of variables which will affect water quality. The number and size of pinnipeds utilizing each pool will vary throughout the year at most rehabilitation institutions. During the busy season or during unusual stranding events, the number of pinnipeds utilizing one pool may increase dramatically creating a heavier load of waste which must be handled by the filtration system in closed systems and by the amount of water flow-through in semi-open and open systems. A life support

system is used as one tool in a program of water quality maintenance to provide safe and clean water to the animals.

Filtration or life support systems are essential to maintaining clean water for animals held in closed or semi-closed systems. Life support systems have three basic parts; mechanical filters that remove solids, biological filters or baffles to remove or detoxify chemicals in the water, and disinfecting methods to control or remove pathogens. In addition to maintaining clean water in the animal pools, these systems may be needed to treat waste water, depending on waste water disposal requirements. If a temporary increase in waste production overwhelms part or all of the life support system, a good water quality control program will require alternative options.

Water used in closed systems generally is fresh water obtained from municipal sources, whereas water in open and semi-open systems comes from a bay or sea source. Water in closed systems must be regularly filtered through sand and gravel filters to remove particulate matter, and disinfectants such as chlorine or bromine may be added to eliminate pathogens. More elaborate systems utilize ozone to oxidize pathogens in the water. The source should be independent of other rehabilitation and captive animal areas.

Factors that affect water quality are:

- Size of pool or pen
- Efficiency of filtration system or water flow-through rate (tides)
- Water turnover rate
- Number, size and species of animals housed in pool or pen
- Type and amount of food consumed by animals in pool or pen
- Nature of bottom substrate
- Frequency of cleaning the pool
- Types, amounts, method and the frequency with which chemicals are added to the system
- Temperature of the water
- Pathogens in the water
- Biotoxins in open water pens or in pools where the source water comes from the ocean or bay
- Contaminants (oil, pesticides, etc.) in open water pens
- Hazardous waste spills
- Inclement weather
- Sunlight contributing to algae production on pool surfaces, which in turn can support bacteria.

2.2.1 Water Source and Disposal

The water source for pinnipeds housed in closed or semi-closed systems may be municipal water, well water, or water brought into the facility from an adjacent body of water or estuary. The source should be independent of other rehabilitation and captive animal areas.

MINIMUM STANDARD

- Fresh or salt water must be readily available to fill pools, and fresh water to clean and wash down holding pens daily.
- Drain water as often as necessary to keep the pool water quality within acceptable limits.
- Discharge waste water in accordance with state or local regulations. Facility managers must seek appropriate authorization to dispose of waste water. Documents of authorization or necessary permits must be kept on site as part of the administrative record and may be requested by NMFS as part of the NMFS Stranding Agreement.
- Chemicals, when necessary, shall be added in appropriate amounts to disinfect the water or adjust the pH, but not added in a manner that could cause harm or discomfort to the animals.
- Have contingency protocols describing how water quality will be maintained during periods of peak animal use.
- Water will be clear enough to see animals and bottom of pool and free from obvious solid waste and noxious odors.

RECOMMENDED

- Fresh or ideally salt water must be available to fill pools within two hours of draining.
- Maintain a filtration system designed to optimize water quality in each holding pool and decrease water waste.
- Ability to dechlorinate fresh water for species which require this (i.e., fur seals).
- Protocols in place for maintenance of water quality throughout the year.
- Testing of source and discharge water.

2.3 Water Quality Testing

It is important to test the water in which the animals live on a regular basis. Coliform bacterial counts are used to monitor the efficiency of the filtration system to eliminate potentially harmful bacteria. Coliform counts should be done at least once per week and more frequently if there are very large or multiple animals utilizing the pool. While coliform numbers may be described as Most Probable

Number (MPN) per 100 ml, a more accurate method of measuring coliforms is to determine the total coliform count, or the fecal coliform count.

Temperature of the water is especially important if the animal lacks the ability to thermoregulate. Water may require heating or chilling to aid debilitated animals in their ability to maintain optimal body temperature, although debilitated pinnipeds are likely to haul out, in such case the water temperature becomes less important. Water temperature regulation is not feasible in open water pens, but keeping track of the water temperature in sea pens may aid the staff in making husbandry decisions. If coliform numbers or the water temperature becomes too high in any system, measures must be taken to correct the problem in a timely manner. A partial-to-total water change may be necessary to correct the problem in a closed or semi-closed system. If the coliform counts are considered too high in sea or bay pens, efforts should be made to circulate clean sea water through the pens using pumps, paddles or other methods of moving water.

Chemicals added to the water may damage eyes and skin and must be monitored daily. Salinity, when utilized for rehabilitating pinnipeds, may also have an impact on the health of the skin and eyes, as well as the comfort level of the animal, and should be monitored regularly. Emergency chemicals should be on hand such as sodium thiosulfate in case of the accidental hyperchlorination of a system.

2.3.1 Water Quality Tests

MINIMUM STANDARD

- Measure coliform growth weekly, unless pools are dumped and filled daily.
- Total coliform counts must not exceed 500 per 100 ml or a MPN of 1000 coliform bacteria per 100 ml water. Fecal coliform counts are not to exceed 400 per 100 ml.
- If the above tests yield results that exceed the allowable bacterial count, then two subsequent samples must be taken to repeat the test(s) where the level(s) is/are exceeded. The second sample is to be taken immediately after the initial test result, while the third sample would be taken within 48 hours of the initial test.
- If the averaged value of the three test results still exceeds the allowable bacterial counts, the condition must be corrected immediately or the animals moved to a contingency facility.
- Maintain pH between 6.5 and 8.5.
- Maintain the temperature of the water so that it falls within parameters appropriate for the species, generally between 50-80^{o}F.

- Measure oxidant levels in systems which require use of a chemical disinfectant and/or ozone in the system (for closed systems).

RECOMMENDED

- Maintain pH between 7.2 to 8.2.
- Total Coliforms with blanks and controls, fecal Coliform, fecal Strep, and yeast count performed weekly or as needed.

2.3.2 Frequency of Testing in Closed, Semi-open, or Open Systems

MINIMUM STANDARD

- Measure water temperature, pH, salinity (if applicable), chemical additives (if applicable) daily in all pools.
- Measure coliform counts weekly; and more frequently at the discretion of the attending veterinarian.

RECOMMENDED

- If ozone systems are used, measure ozone levels regularly in the animal pools. Ozone levels shall not exceed 0.02 mg/liter.
- Test source and discharge water at least once per day (more frequently for "flow through" systems).
- Maintain records for tests with time, level and results – reviewed and signed monthly by the attending veterinarian or animal care supervisor.

2.3.3 Chemical Additives

Total chlorine = Free chlorine + combined chlorine.

MINIMUM STANDARD

- Maintain total chlorine below 1.5 ppm, where the combined chlorine shall not exceed 50% of the total chlorine.
- All additives must be recorded.
- pH may be adjusted chemically – for example – pH may be raised with sodium carbonate, or soda ash; or lowered with HCl or CO2; but not added in a manner that could cause harm or discomfort to the animals.

- Maintain MSDS information and signage as well as appropriate handling equipment for the addition of chemicals.

2.3.4 Water Circulation

The amount of water turnover through the filtration system in a closed or semi-open system is important to maintain water quality by removing organic waste and particulate matter. Likewise the amount of water movement through an open water pen is also important in the maintenance of water quality. Generally, adequate tidal action will result in the equivalent of two complete water changes per day.

MINIMUM STANDARD

- Maintain sufficient turnover of water through the filtration system in closed or semi-open systems to keep the water quality at or above acceptable limits, with a minimum of two complete water changes per day.
- Ensure methods for moving water (water paddles, pumps, spray devices) are available to aerate and move water in open water pens with insufficient flow of tides or water through the enclosures. These methods should be sufficient to provide the equivalent of two water changes per day.

RECOMMENDED

- A minimum full water turnover rate of every four hours for each pool in closed or semi-open systems.

2.3.5 Salinity

Pinnipeds under rehabilitation may be housed in fresh water. However salinity may play a part in eye health, may enhance wound healing, or may be desirable in some other instances. In some cases animals will drink fresh water which may aid in rehydration. Placing animals in water of appropriate salinity shall be left to the discretion of the animal care supervisor and staff in consultation with the attending veterinarian.

2.3.6 pH

MINIMUM STANDARD

- pH shall be held in a range between 6.5 to 8.5.

RECOMMENDED

- Maintain pH between 7.2 to 8.2.

2.3.7 Water Temperature

MINIMUM STANDARD

- Hold water temperatures within the normal habitat temperature range for the species under rehabilitation or as authorized in writing by the attending veterinarian.
- Provide methods to heat and maintain warm water environments for species that require it, or for debilitated or critically ill individuals that are incapable of maintaining appropriate body temperature.
- Monitor temperature of water being heated or cooled.

2.4 Quarantine

Pinnipeds brought to a rehabilitation facility have no medical history and may carry diseases communicable to other marine mammals, other animals, or humans. Likewise, these animals are often debilitated and may suffer from a variety of illnesses which may compromise their immune systems making them susceptible to diseases from other animals. Quarantine areas must be available and proper biosecurity protocols must be in place for all incoming animals at rehabilitation facilities.

Direct contact between the general public and pinnipeds undergoing rehabilitation should be avoided because of the zoonotic risk of some organisms carried by marine mammals. There have been documented cases of Brucella, Leptospira, Mycoplasma (Seal Finger), San Miguel Sea Lion Virus, Influenza A, and Sealpox, being passed from pinnipeds to humans.

Listed on the following website are numerous other potentially zoonotic marine mammal pathogens (see *http://www.vetmed.ucdavis.edu/whc/mmz/*). See also: *2004 UC Davis Wildlife Health Center Report for the Marine Mammal Commission – Assessment of the Risk of Zoonotic Disease Transmission to Marine Mammal Workers and the Public: Survey of Occupational Risks.*

2.4.1 Prevention of Animal to Animal Transmission of Diseases

MINIMUM STANDARD

- Quarantine all new animals in a separate dedicated quarantine area and provide pens/pools that can be isolated with the use of dividers, tarps, or physical space from the rest of the animal housing areas. Animals that are admitted in groups may be quarantined together.
- Provide dividers between pens and pools that prevent washdown or splash from moving from one pool or pen to another.
- Use dedicated protective clothing for personnel- including gloves, eye shields, safety glasses, and/or eye wash stations.
- Use foot baths, glove baths, and methods to disinfect clothing between handling animals within quarantine area and outside of quarantine area.
- Maintain equipment and tools strictly dedicated to the quarantine area or thoroughly disinfect.
- Provide sufficient space or solid-surfaced barriers between animal enclosures to prevent direct contact between animals.
- Provide sufficient air turnover in indoor facilities to prevent transmission of disease. Air turnover should be enough to prevent build-up of heat and provide a method of bringing fresh air into the facility. There should be sufficient venting or openings to allow movement of air throughout the facility.
- Implement specific quarantine and sanitation procedures to prevent transmission of disease through fomites (e.g., clothing, equipment):
    - Thoroughly clean and disinfect buckets, hoses, scales, transport equipment, and cleaning equipment that is moved between animal areas to prevent transmission of pathogens via fomites.
- Place open water pens so effluent is not near water intake.
- Require evaluation and written veterinary approval before placing animals together after quarantine period has been met.

RECOMMENDED

- Provide separate air handling system in indoor facilities.
- Separate entries to quarantine areas with no crossover with the rest of the facility.
- Clean and disinfect quarantine areas between uses.

2.4.2 Prevention of Domestic Animal to Marine Mammal Transmission of Disease

- Ensure appropriate fencing and placement of holding pens to prevent direct contact between rehabilitating pinnipeds and domestic animals.
- Prohibit personal pets within outermost perimeter of facility.
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.
- Use dedicated carriers for pinnipeds – carriers should not be used for other mammals or birds unless they are thoroughly scrubbed and disinfected between uses.

2.4.3 Prevention of Wild Animal to Marine Mammal Transmission of Disease

- Ensure perimeter fencing will deter wildlife from entering the rehabilitation premises.
- Provide rodent control on the premises.
- Ensure net pens and lagoon areas have sufficient secondary fencing to keep wild mammals from coming in direct contact with the animals housed in the net pens.

2.4.4 Prevention of Marine Mammal to Domestic Animal Transmission of Disease

- Provide appropriate perimeter fencing.
- Require animal personnel to change contaminated clothing and/or disinfect before leaving the rehabilitation premises.
- Require that specific quarantine and sanitation procedures are taken to prevent transmission of disease through fomites such as clothing and equipment.
- Follow appropriate release guidelines.

2.4.5 Prevention of Stranded Marine Mammal to Captive Marine Mammal Transmission of Disease

- Train volunteers and staff to follow appropriate quarantine protocols.
- Establish quarantine protocols that take into consideration the changing status of the stranded animal.
- Establish traffic flow so that volunteers or staff working with stranded animals do not inadvertently travel into a collection animal area.

- Establish decontamination protocols before volunteers or staff members exposed to stranded animals may enter a collection animal area.
- Establish separate restrooms, showers, changing rooms, food preparation areas, etc. for staff and volunteers working with rehabilitating vs. collection animals. Food for rehabilitating animals may be prepared in the collection animal kitchen and taken to the rehabilitation animal area, however any bucket, feed implement or other item must be thoroughly disinfected before it may return to the collection animal area.

2.4.6 Methods to Reduce Spread of Disease from Animals Housed in Open Sea/Bay Pen Systems

- Place pens in a secluded area where wild animals and marine mammals are unlikely to come into direct contact with the animals housed in the sea/bay pens.
- Place a second set of perimeter nets 30 feet from the sea/bay pens to prevent direct contact with wild marine mammals. Nets should be sufficiently rigid to prevent entanglement by mammals or fish.
- Do not place sea/bay pens within 1000 meters any major outflow sewage treatment plants and consider the flow direction or current from these major outflows.
- Place the sea/bay pens 500 meters and downstream from water intake pipes that bring water into facilities that house marine mammals.
- Place pens in an area where there is ample flow-through of tides/currents.
- Ensure the pens are of sufficient size to minimize biomatter build-up. Each pinniped should be housed in a pen that has a minimum depth of half of their body length, and a minimum horizontal dimension of two full body lengths.
- Avoid overcrowded pens. Animals may fight with each other when housed too closely together.
- Have equipment to pump or aerate the water in pens that do not have sufficient tidal action to ensure a minimum of two complete water changes per day.
- Place pens in areas where there is sufficient depth to enhance water circulation and reduce pathogen build-up. Weekly coliform testing will determine if pathogen build-up exists. Water circulation may be enhanced using water paddles.
- Place quarantine pens such that tidal action or underwater currents will not flow from quarantine pens through sea pens housing healthy animals.

2.4.7 Evaluation Requirements before Placing Marine Mammals Together

- CBC/Chemistries, appropriate cultures, physical examination before moving animals out of quarantine area and at the discretion of the attending veterinarian.
- Review current NMFS recommendations on diseases of concern and reportable disease such as morbillivirus.
- Consider screening for morbillivirus, herpes virus, brucellosis, leptospirosis, and toxoplasmosis utilizing the most current diagnostic tests available and at the discretion of the attending veterinarian.
- If animals are part of a UME, then screening for diseases must be more thorough and in direct coordination with NMFS and the UME On-site Coordinators.
- Have contingency plan for animals that are actively infected with or carriers of a reportable disease such as brucellosis, leptospirosis, toxoplasmosis, herpes virus, and morbillivirus.

2.4.8 Zoonotic Considerations

- Restrict public access and direct contact with pinnipeds due to zoonosis potential and public health hazard of untrained individuals interacting with sick and injured marine mammals.
- Train staff and personnel about how to prevent contracting zoonotic diseases (*Occupational and Safety Information for Marine Mammal Workers* http://www.vetmed.ucdavis.edu/whc/mmz/).
- Train staff and personnel working directly with stranded pinnipeds how to recognize symptoms of zoonotic disease.
- Train staff the basics of sanitation and properly handling contaminated equipment.
- Provide appropriate safety equipment, as reasonable, such as protective clothing, eye protection and face masks to all staff who may be exposed to zoonotic diseases.
- Provide eye flushing stations as used with HAZMAT or normal saline bottles to irrigate the eyes.
- Staff with open wounds shall not handle animals carrying potentially infectious diseases without appropriate precautions to protect their wound(s).

2.4.9 Pre-Release Guidelines

- Pre-release health screens and serologic requirements are determined by the NMFS Regional Stranding Coordinator and the Marine Mammal Health and Stranding Response Program (see *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*).

2.5 Sanitation

2.5.1 Primary Enclosure Sanitation

MINIMUM STANDARD

- Remove animal and food waste in areas other than the rehabilitation pool from the rehabilitation enclosure at least daily, and more often when necessary to prevent contamination of the marine mammals contained therein and to minimize disease hazards.
- Remove particulate animal and food waste, trash, or debris that enter rehabilitation/exercise pens or pools at least once daily, but as often as necessary to maintain water quality and to prevent increased health hazards to the marine mammals that use the pools.
- Remove trash and debris from pools as soon as it is noticed, to preclude ingestion or other harm to the animals.
- Clean the walls and bottom surfaces of the rehabilitation/exercise pens and pools as often as necessary to maintain a clean environment and proper water quality.
- Ensure appropriate disinfectants mixed to recommended dilutions are utilized to clean pens, equipment, utensils, and feed receptacles and to place in foot baths. These disinfectants should have both bacteriocidal and virocidal qualities.
- Rotate disinfectants on a regular basis to prevent bacterial resistance.
- Prevent animals from coming in direct contact with disinfectants or aerosol from spray or cleaning hoses (i.e., water splashed from floor).

RECOMMENDED

- Empty and allow pools to dry once each year but dry and hyperchlorinate pool bottoms and walls and haul-out areas after each use by sick pinnipeds.

2.5.2 Sanitation of Food Preparation Areas and Food Receptacles

- Use separate food preparation areas and supplies for rehabilitation vs. collection animals.
- Clean food containers such as buckets, tubs, and tanks, as well as utensils, such as knives and cutting boards, or any other equipment which has been used for holding, thawing or preparing food for marine mammals after each feeding, and sanitize at least once a day. Equipment should be cleaned with detergent and hot water, sanitized and dried before reuse.
- Clean kitchens and other food handling areas where animal food is prepared after every use, and sanitize at least once weekly using standard accepted sanitation practices.

- Store substances such as cleaning and sanitizing agents, pesticides and other potentially toxic agents in properly labeled containers away from food preparation areas.
- Post MSDS "right to know" documents for staff utilizing cleaning and animal treatment chemicals and drugs.

2.6 Food, Handling, and Preparation

During rehabilitation food for marine mammals shall be wholesome, palatable, free from contamination, and of sufficient quantity and nutritive value to allow the recovery of the animals to a state of good health. Live fish may be fed during rehabilitation but preferences should be given to native prey species. Live fish may contain parasites which could infect compromised animals. Feeding regimens should be tailored to enhance weight gain for underweight animals or growing pups, and should simulate natural patterns in terms of frequency and quantity to the extent possible while following a prescribed course of medical treatment. Most pinnipeds feed several times during a given day

2.6.1 Diets and Food Preparation

MINIMUM STANDARD

- Prepare the diets with consideration for age, species, condition, and size of marine mammals being fed.
- Feed pinnipeds a minimum of twice a day, except as directed by a qualified veterinarian or when following professionally accepted practices.
- Diets reviewed by a nutritionist, attending veterinarian, or the animal care supervisor.
- Train staff to recognize good and bad fish quality.
- Feeding live fish may be required for release determination. See *NMFS /FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release* for more information regarding feeding live fish.
- Food receptacles should be cleaned and sanitized after each use. Food preparation and handling should be conducted so as to minimize bacterial or chemical contamination and to ensure the wholesomeness and nutritive value of the food.

2.6.2 Food Storage and Thawing

- Frozen fish or other frozen food shall be stored in freezers which are maintained at a maximum temperature of 0^{o} F (-18^{o} C).

- The length of time food is stored and the method of storage, as well as the thawing of frozen food should be conducted in a manner which will minimize contamination and which will assure that the food retains optimal nutritive value and wholesome quality until the time of feeding.
- Freezers should only contain fish for animal consumption. Human food or specimens should not be placed in the fish freezer.
- Experienced staff should inspect fish upon arrival to ensure there are no signs of previous thawing and re-freezing, and check temperature monitoring devices in the transport container. The fish shipment should be refused, or fish should be discarded if temperature fluctuations occurred during transport.
- Freezers shall be of sufficient size to allow for proper stock rotation.
- All foods shall be fed to the marine mammals within 24 hours following the removal of such foods from the freezers for thawing.
- If the food has been thawed under refrigeration it must be fed to marine mammals within 12 hours of complete thawing.
- When fish is thawed in standing or running water, the coldest available running water must be used to prevent excess bacterial growth.
- To ensure optimal quality of the fish, and to prevent bacterial overgrowth, do not allow fish to reach room temperature or sit in direct sunlight.
- The thawed fish shall be kept iced or refrigerated until a reasonable time before feeding. This time will vary with ambient temperature.
- Prepared formula should be fed immediately or refrigerated and fed to the marine mammals within 24 hours of preparation. Formula, once heated to an appropriate temperature for a feed, shall be discarded if it is not consumed within one hour.

RECOMMENDED

- Calculate kilocalories of each type of fish or food items fed to each animal daily.
- Conduct food analysis for protein, fat and water content of each lot of fish used. Analysis from fish supplier may be used, and a copy should be maintained on site.
- Calculate composition of each diet routinely used.

2.6.3 Supplements

MINIMUM STANDARD

- Each animal shall receive appropriate vitamin supplementation which is sufficient and approved in writing by the attending veterinarian.
- Salt supplements shall be given to pinnipeds housed in fresh water as necessary and as approved by the attending veterinarian.

2.6.4 Feeding

Food, when given to each marine mammal individually or in groups, must be given by an employee or trained personnel who has the necessary training and knowledge to assure that each marine mammal receives an adequate quantity of food to maximize its recovery or maintain good health. Such personnel are required to recognize deviations in each animal being rehabilitated such that food intake can be adjusted accordingly.

2.6.5 Public Feeding

MINIMUM STANDARD

- Public feeding is not allowed for animals that are being rehabilitated.
- Feeding must be conducted only by qualified, trained rehabilitation staff members.

2.6.6 Feed Records

MINIMUM STANDARD

- Maintain feed records for each individual animal noting the individual (not an estimate) daily consumption by specific food type.
- If animals are fed in groups then group feed records shall be maintained and together with daily husbandry notes and weekly weight records ensure evidence of sufficient feed intake.
- Weigh food before and after each feeding individuals and groups and the record the amount consumed.
- Weigh the animal as practical, keeping in mind that obtaining the weight of the animal may stressful.
- If weighing the animal is not an option, obtain the girth measurement at the level of the axilla if possible.

2.7 Veterinary Medical Care

All rehabilitation facilities shall have an attending veterinarian. The attending veterinarian is critically involved in making decisions regarding medical care as well as housing and husbandry of resident and newly admitted patients.

2.7.1 Veterinary Experience

MINIMUM STANDARD

The attending veterinarian shall:

- Assume responsibility for diagnosis, treatment, and medical clearance for release or transport of marine mammals in rehabilitation (50 CFR 216.27).
- Ability to provide a schedule of veterinary care that includes a review of husbandry records, visual and physical examinations of all the marine mammals in rehabilitation, and a periodic visual inspection of the facilities and records.
- Be available to examine animals on a regular schedule and emergency basis.
- Be available to answer veterinary questions on a 24 hour basis.
- Have marine mammal experience or be in regular consultation with a veterinarian who has marine mammal experience and have access to a list of expert veterinarians to contact for assistance.
- Have an active veterinary license in the United States (means a person who has graduated from a veterinary school accredited by the American Veterinary Medical Association Council on Education, or has a certificate issued by the American Veterinary Graduates Association's Education Commission for Foreign Veterinary Graduates), or has received equivalent formal education as determined by NMFS Administrator (adapted from the Animal Welfare Act Regulations 9 CFR Ch. 1).
- Have the skills to be able to draw blood and give injections to the species most commonly encountered at the rehabilitation center.
- Facility management should have contingency plan for veterinary backup.
- Have the appropriate registrations and licenses (e.g., registered with the Drug Enforcement Administration for handling controlled substances) to obtain the necessary medications for the animals housed at that rehabilitation facility.
- Be able to conduct a full post-mortem exam on all species of pinnipeds treated at the facility.
- Be knowledgeable and able to perform pinniped euthanasia.

- Be knowledgeable about species-specific pharmacology.
- Must certify in writing that animals are fit for transport.
- Ability to write and submit timely disposition recommendations for marine mammals in rehabilitation.
- Be knowledgeable of marine mammal zoonotic diseases.

RECOMMENDED

All of the above plus:

- Membership in the International Association for Aquatic Animal Medicine.
- Complete a course which offers basic medical training with marine mammals such as Seavet, Aquavet, or MARVET.
- Have at least one year of clinical experience outside of veterinary school.
- Have access to a current version of the "Handbook of Marine Mammal Medicine" Have basic hands-on veterinary experience with the species most frequently rehabilitated at the facility.
- Be full time employee or the contract veterinarian of record at facilities managing over 50 pinniped cases per year (i.e., live and dead).

2.7.2 Veterinary Program

MINIMUM STANDARD

- Veterinary care for the animals must conform with any State Veterinary Practice Act or other laws governing veterinary medicine which applies to the state in which the facility is located.
- Standard operating procedures should be reviewed and initialed by the attending veterinarian or the animal care supervisor annually and/or whenever the document is changed or updated. This document may be reviewed by NMFS as part of the NMFS Stranding Agreement or as part of inspections.
- Staff caring for animals should be sufficiently trained to assist with veterinary procedures under the direction of the veterinarian and the rehabilitation facility should maintain at least one **Animal Care Supervisor** who is responsible for overseeing prescribed treatments, maintaining hospital equipment, and controlling drug supplies. The person should be adequately trained to deal with emergencies until the veterinarian arrives, be able to direct the restraint of the animals, be responsible for administration of post-surgical care, and be skilled in maintaining appropriate medical records. It is important that the animal care supervisor should communicate frequently

and directly with the attending veterinarian to ensure that there is a timely transfer of accurate information about medical issues.

- Veterinary decisions shall be based on "best practices" (i.e., based on informed opinions and expertise of veterinarians practicing marine mammal medicine).
- A schedule of veterinary care which includes a review of husbandry records, visual and physical examinations of the animals, and a visual inspection of the facilities should be implemented
- A health and safety plan for the staff shall be written and accessible at all times. It shall be reviewed by the attending veterinarian or the animal care supervisor annually or as prescribed by the NMFS Stranding Agreement. Also, it may be beneficial to consult with an occupational health medical professional when developing these plans. All animal care staff will be familiar with the plan. The plan shall include protocols for managing bite wounds.

The following reports may be requested annually by NMFS as required under the NMFS Stranding Agreement or as a part of inspections

- SOP reviews
- Health and Safety Plan reviews
- Animal acquisitions and dispositions
- NOAA Form 89864, OMB#0648-0178 (Level A data)
- NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report)
- Case summaries for any rehabilitation performed at a facility, including narrative descriptions of the cases as well as spreadsheets of treatments, blood values, etc.

2.8 Laboratory Tests and Frequency of Testing

Specific requirements for tests will be issued by the NMFS stranding coordinator (or UME Onsite Coordinator) in each region as outlined in the Marine Mammal Health and Stranding Response Program for release determinations, surveillance programs and UME investigations. Routine diagnostic sampling and testing protocols will be determined by the attending veterinarian. NMFS must be provided adequate time and information including a veterinary certificate of health before an animal is released as directed in 50 CFR 216.27 (see NMFS/FWS BEST PRACTICES for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release).

MINIMUM LABORATORY TESTING

- CBC/Serum Chemistry- For most cases, all animals shall have a minimum of two blood samples drawn for CBC with differential and serum chemistry; upon admission and prior to release (see *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*). If duration of rehabilitation is shorter than a week, one blood workup may suffice and is at the attending veterinarian's discretion.
- Fecal analysis for parasites- Fecal tests for parasites shall be run upon admission of each animal at the discretion of the attending veterinarian.
- Serology as necessary for release determination based on direction of the NMFS stranding coordinator and the Marine Mammal Health and Stranding Program each year and for additional clinical diagnosis as deemed appropriate by the attending veterinarian.
- If serology is positive for pathogens of concern NMFS must give final sign off before animal is released.
- Measure body weight, and length upon admission, and within one week of release/placement. Measure girth when possible, or whenever a scale is not available to measure weight.
- The attending veterinarian or a trained staff member shall perform a necropsy on every animal that dies within 24 hours of death if feasible. If necropsy is to be performed at a later date (ideally no longer than 72 hours postmortem), the carcass should be stored appropriately to delay tissue decomposition.
- Carcass disposal shall be handled in a manner consistent with local and state regulations.
- Perform histopathology on select tissues from each animal that dies at the discretion of the attending veterinarian. A complete set of all major tissues should be evaluated if the animal dies of an apparent infectious disease process.
- Culture and other diagnostic sampling shall be conducted as directed by the attending veterinarian to determine the cause of stranding or death.
- Contact NMFS for additional laboratory test requirements in all cases of unusual mortality outbreaks or disease outbreaks. More complete testing may be required for diseases of concern.
- For cases involving release decisions, unusual mortality investigations, or surveillance programs, serologic assays may only go to labs that have validated tests approved by NMFS, especially for release decisions or determinations. Guidance will be provided by the NMFS Stranding Coordinators or UME Onsite Coordinator.
- Notify the NMFS Stranding Coordinator of learning of any diseases of concern (e.g., emerging, reportable, and/or zoonotic diseases) that are detected and/or confirmed that could be a potential

hazard for public health or animal health (NMFS will provide guidance on reportable diseases as it becomes available).

- NMFS must be provided adequate time and information (including veterinary certificate of health) before the animal is released in all cases as directed in 50 CFR 216.27 (see NMFS Standards for Release). This information is required under 50 CFR 216.27(a) and must be submitted 15 days prior to release unless advanced notice is waived by the NMFS Regional Administrator. Guidance on the waivers is provided in the *NMFS/FWS Best Practices for Marine Mammal Stranding Response, Rehabilitation, and Release – Standards for Release*.

RECOMMENDED

- CBC/Serum Chemistry with electrolytes on admission, within the week prior to release, and every other week during rehabilitation if restraint for sampling is not detrimental to the health of the animal.
- More frequent blood sampling at the discretion of the veterinarian.
- Weight measured on admission, just before release, and weekly for growing pups and underweight animals.
- Weights should be measured monthly for all animals unless the stress of capturing the animal to weigh it outweighs the benefits of the data.
- Complete necropsy performed by a veterinarian or a pathologist within 24 hours of death.
- Full histopathology done on tissues from each animal that dies of apparent infectious disease.
- Bank 1cc of serum per blood draw in –80^{o}F freezer.

2.9 Record Keeping and Data Collection

Record keeping is an essential part of the rehabilitation process. Not only do accurate and complete medical records for each stranded pinniped allow the staff to provide consistent and optimal care for each animal, but retrospective records help scientists and veterinarians make better evaluations on how to treat individuals.

Record Keeping

MINIMUM RECORDS

- Record and report "Level A", and disposition reports as advised by Regional Coordinator and Marine Mammal Rehabilitation Disposition Report (NOAA 89-878, OMB #0648-0178) as in accordance with the NMFS Stranding Agreement.
- Maintain and update individual medical records daily on each animal at the rehabilitation center.
- Individually identify each animal with unique identifier
- Keep an accurate description of the animal, including identification/tag number, date and location of stranding, sex, weight, and length at stranding.
- Subjective, objective, assessment and plan (SOAP) based records are preferred
- Include food intake and medication administered to each animal in the records each day.
- Weight
    a. Recorded weekly for underweight pinnipeds or pups, and more often if the attending veterinarian feels it is necessary to properly care for the animal.
    b. Recorded on admission and release for larger pinnipeds.
- Record all treatments, blood work, test and results and daily observations in the medical records.
- Maintain individual medical records for each animal. Medical records remain on site where the animal is housed and are available for NMFS review upon request as stated in the NMFS Stranding Agreement.
- Hold medical records for a minimum of 15 years on site.
- Maintain up to date water quality records.
- Maintain life support system maintenance records.
- Maintain records of water quality additives.

RECOMMENDED RECORD KEEPING

All of the above plus:

- Full set of standard morphometrics prior to release.
- Photographic documentation of animals with significant lesions, identifying marks.
- Caloric value of daily food intake calculated and recorded for each animal.
- Daily weight of underweight pups. Larger species, where pups exceed 50 kg, may require obtaining weights less frequently.

- Monthly weights of larger pinnipeds (where the stress of capture to weigh does not adversely affect the rehabilitation efforts).
- Maintain food acquisition and analysis records.
- Maintain "paper copy" archive of required NMFS records.

2.9.1 Data Collection

MINIMUM STANDARD

- Written documentation of the medical history, food and observation records must be kept.
- NMFS Required Forms to be completed in writing or submitted electronically in the NMFS National Marine Mammal Stranding Database as prescribed in the NMFS Stranding Agreement:
  a. NOAA Form 89864, OMB#0648-0178 (Level A data)
  b. NOAA Form 89878, OMB#0648-0178 (Marine Mammal Rehabilitation Disposition Report).

RECOMMENDED

- Computerized documentation with hard copies.
- Ability to network with other institutions.
- Maintain real-time accessible compiled comparative data.

2.10 Euthanasia

- Each institution must have a written euthanasia protocol signed by the attending veterinarian.
- Persons administering the euthanasia must be knowledgeable and trained to perform the procedure.
- Maintain a list of individuals authorized to perform euthanasia signed by the veterinarian.
- Euthanasia shall be performed in a way to minimize distress in the animal.
- Refer to resources such as the American Veterinary Medical Association Panel Report on Euthanasia, the CRC Press Handbook of Marine Mammal Medicine and American Association for Zoo Veterinarians Guidelines for Euthanasia of Nondomestic Animals.
- Appropriate drugs for euthanasia in appropriate amounts for the largest species admitted to the facility shall be maintained in stock on site in an appropriate lockbox or under the control of a licensed veterinarian with a current DEA license.
- Drugs for euthanasia shall be kept with an accurate inventory system in place.
- DEA laws and regulations and State Veterinary Practice Acts must be followed when using controlled drugs

- NMFS may request this information (protocols and DEA number) as part of the NMFS Stranding Agreement.

2.11 Health and Safety for Personnel

There shall be a health and safety plan on site at each rehabilitation facility that identifies all health and safety issues that may be factors when working closely with wild marine mammals. The plan should identify all potential zoonotic diseases as well as including safety plans for the direct handling of all species and sizes of pinnipeds seen at that facility. Rehabilitation facilities are encouraged to comply with Occupational Safety and Health Administration regulations.

MINIMUM STANDARD

- Identify all potential zoonotic diseases in a written document available to all personnel.
- Include safety plans for the direct handling of all species and sizes of pinnipeds seen at that facility.
- Include safety plan for dealing with handling any untreated discharge water.

2.12 Contingency Plans

Contingency plans shall be in place at each facility and may be required by NMFS as part of the NMFS Stranding Agreement. NMFS may require approved variances or waivers prior to planned projects such as construction. These plans should address in detail the operation of the facility and care of the animals under the following conditions:

- Inclement weather plan, including a hurricane/big storm plans where appropriate.
- Construction in the vicinity of the animal rehabilitation pens or pools.
- Power outages, including plans of how to maintain frozen fish stores and life support systems.
- Water shortages.
- "Acts of God" plan which may include floods, earthquakes or other unpredictable problems known to occur on occasion in the region where the facility is located.

2.13 Viewing

NMFS Regulation, U.S.C. 50 CFR 216.2(c)(5) states that marine mammals undergoing rehabilitation shall not be subject to public display. The definition of public display under U.S.C. 50 CFR is "an activity that provides opportunity for the public to view living marine mammals at a facility holding

marine mammals captive". Only remote public viewing or distance viewing should be allowed and only when there is no possible impact of the public viewing on the animals being rehabilitated. There is a regulatory requirement for a variance or waiver by NMFS for facilities planning to offer public viewing of any marine mammal undergoing rehabilitation.

2.14 Training and Deconditioning Behaviors

Basic behavioral conditioning of wild pinnipeds for husbandry and medical procedure may be warranted during rehabilitation as long as every effort is made to limit reinforced contact with humans. Such conditioning may reduce stress for the animal during exams and acquisition of biological samples. Conditioning may assist with appetite assessment and ensuring that e each animal in a group receives the appropriate amount and type of diet and medications. In some cases, extensive contact with humans, including training, may benefit resolution of the medical case by providing mental stimulation and behavioral enrichment, and may facilitate medical procedures. The relative costs and benefits of training should be evaluated by the staff veterinarian, and the likelihood of contact with humans following release should be considered.

Behavioral conditioning of pinnipeds must be done for the shortest time necessary to achieve rehabilitation goals and is to be eliminated prior to release such that association of food rewards with humans is diminished. If an animal has become accustomed to hand-feeding the animal may approach humans after release. Therefore, these behaviors should be deconditioned before the animals can be considered for release. Most behaviors will extinguish through lack of reinforcement, but some may require more concentrated efforts.

Training for research that is above and beyond the scope of normal rehabilitation practices can be approved on a case-by case basis under a NMFS scientific research permit. An exception can be made if the attending veterinarian, facility, and NMFS officials all agree that the research will not be detrimental to the animals' health and welfare and will not impede their ability to be successfully released back to the wild.

2.15 References

Langman VA, Rowe M, Forthman D, Whitton B, Langman N, Roberts T, Kuston K, Boling C, and Maloney D. 1996. Thermal Assessment of Zoological Exhibits I: Sea Lion Enclosure at the Audubon Zoo. Zoo Biology 15:403-411.

3. Frequently Asked Questions

Why are there two sets of standards, "minimum" and "recommended", in the facilities guidelines?

The thought behind the two sets of guidelines was to establish a bare minimum standard which every facility should have to meet in order to rehabilitate either pinnipeds or cetaceans. The "recommended" standards are standards considered more ideal to help maximize the success of the rehabilitation effort, and to minimize the potential spread of disease. Many facilities exceed the recommended standard.

Facilities that just meet the minimum standards may wish to improve their facility over time. The Facilities Guidelines could serve as a method of justifying and helping to secure Prescott Funds or other funding to make improvements to bring a facility up to the recommended standards.

Why are there separate standards for pinnipeds and cetaceans?

While many aspects of rehabilitating cetaceans and pinnipeds that are the same, there are likewise many significant differences. Water quality, pool space and design, and handling debilitated animals are examples of the bigger differences between facility design and equipment required for rehabilitation of these animals. Rehabilitation of cetaceans requires more expensive facilities, as there must be larger, deeper pools available, salt water systems, and more elaborate filtration in closed system situations. While some facilities have adequate equipment and personnel to rehabilitate pinnipeds, they may not meet the standards required for the rehabilitation of cetaceans. Having two sets of guidelines allows NMFS the flexibility of issuing agreements specific to the types of animals that may be rehabilitated at each facility.

Many of the standards listed appear to be directly from the AWA standards. Why don't you just state that the facilities will meet all of the AWA regulations? What if the AWA regulations change?

AWA regulations have specific engineering standards to cover captive marine mammals. These standards for pool size and depth are based on captive adult-sized animals. The majority of pinnipeds admitted to most rehabilitation facilities are pups, juveniles, and sub-adults, and because they are not going to be permanent members of a collection, pool size may be smaller than the minimum sizes

stated in the AWA regulations. Cetacean facility guidelines minimum pool sizes are closer to the AWA regulations in pool size, but not identical, as these animals are not considered to be permanent residents.

AWA regulations may change, however these Facilities Guidelines were created with the consideration that animals being rehabilitated are not permanent residents of the facility. Therefore even if AWA regulations change, it is likely, the Stranding Network Facilities Guidelines will remain the same. Facilities Guidelines apply to the wild animals held by participants of the stranding network, whereas the AWA regulations refer to captive animals owned by the licensees.

Under Water Quality, no mention is made regarding protecting staff and public from discharged water.

This is covered by the statement that "All water must be discharged according to State and Local Regulations". Since state and local regulations vary, it is up to each institution to ensure their discharge policy conforms to the regulations in their area. These regulations should take into consideration the public exposure to the discharged water from the rehabilitation facility. Likewise all rehabilitation facilities should have Standard Operating Procedures in place to protect their staff from hazards which may be posed by the rehabilitation of marine mammals.

NOAA
National Marine Fisheries Service
Office of Protected Resources

U.S. Fish and Wildlife Service
Fisheries and Habitat Conservation
Marine Mammal Program

FINAL

POLICIES AND BEST PRACTICES

MARINE MAMMAL STRANDING RESPONSE, REHABILITATION, AND RELEASE

STANDARDS FOR RELEASE

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Standards for Release

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Executive Summary

Rescue, rehabilitation, and release of wild marine mammals is allowed for authorized individuals under listed conditions by the Marine Mammal Protection Act (MMPA) [16 U.S.C. 1379 § 109(h)]. Section 402(a) of Title IV of the MMPA specifically mandates that "The Secretary shall… provide guidance for determining at what point a rehabilitated marine mammal is releasable to the wild" [16 U.S.C. 1421 §402(a)]. This document fulfills the statutory mandate and is not intended to replace marine mammal laws or regulations.

In accordance with the MMPA, these guidelines were developed by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) in consultation with marine mammal experts through review and public comment on the 1997 draft NOAA Technical Memorandum "Release of Stranded Marine Mammals to the Wild: Background, Preparation, and Release Criteria." Comments from the public review process and other outstanding issues were compiled by NMFS and FWS. The agencies consulted with experts in three areas: cetaceans, pinnipeds and sea otters, and manatees. The experts reviewed and discussed the public comments and provided individual recommendations. This current document encompasses revisions and updates to the 1997 draft and is titled differently.

These guidelines provide an evaluative process to help determine if a stranded wild marine mammal, following a course of treatment and rehabilitation, is suitable for release to the wild. These guidelines describe "Release Categories" for rehabilitated marine mammals of each taxonomic group (i.e., cetaceans, pinnipeds, manatees, sea otters and polar bears). After completing a thorough assessment as prescribed, the release candidates are to be assigned to a Release Category as follows: **Releasable**, **Conditionally Releasable, Conditionally Non-releasable (Manatees only)**, and **Non-releasable**. This document establishes essential release criteria that trained experts should use to determine whether or not individual animals are healthy enough to release into the wild. The essential release criteria are assessed in the following categories:

1) Historical Assessment
2) Developmental and Life History Assessment
3) Behavior Assessment and Clearance
4) Medical Assessment and Clearance
5) Release Logistics
6) Post Release Monitoring

By using clearly defined Release Categories for rehabilitated marine mammals, NMFS and FWS can evaluate and support the professional discretion of the attending veterinarian and their assessment team (i.e., biologists, veterinarians, animal care supervisors, and other team members of the marine mammal stranding network). Based on these Release Categories, NMFS and FWS can consult experts on challenging cases in which the survival of the rehabilitated marine mammal or its potential to pose a health risk to wild marine mammals is in question.

Refinement of requirements and guidelines for release of rehabilitated marine mammals to the wild is a dynamic process. Use of these standardized guidelines will also aid in the evaluation of rehabilitation procedures, successes, and failures, and will allow for on-going improvement of such protocols. These guidelines are based on the best available science and thus will be revised periodically.

1. Introduction

1.1 Background

Prior to the early 1990s, release decisions for marine mammal species under the jurisdiction of the National Marine Fisheries Service (NMFS) were made by individual rehabilitation facilities without much direction or input from NMFS. Decisions were inconsistent and invoked controversy, especially for cetacean cases. The Marine Mammal Commission and NMFS sponsored several workshops focusing on procedures and needs regarding marine mammal strandings, rehabilitation, and release (see Appendix A). Discussions at these workshops provided starting points for establishing objective release criteria. A stronger impetus to formalize these release guidelines came in 1992 when, as part of the Marine Mammal Health and Stranding Response Act, Congress mandated establishing objective guidelines for determining releasability of rehabilitated marine mammals. The Marine Mammal Protection Act (MMPA) was amended to include Title IV, Section 402(a) which states that: ***"The Secretary [of Commerce] shall, in consultation with the Secretary of Interior, the Marine Mammal Commission, and individuals with knowledge and experience in marine science, marine mammal science, marine stranding network participants, develop objective criteria, after an opportunity for public review and comment, to provide guidance for determining at what point a rehabilitated marine mammal is releasable to the wild***."

In accordance with the MMPA, these guidelines were developed by NMFS and the U.S. Fish and Wildlife Service (FWS) in consultation with marine mammal experts through review and public comment of the 1997 draft National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum "Release of Stranded Marine Mammals to the Wild: Background, Preparation, and Release Criteria." Comments from the public review process and other outstanding issues were compiled by NMFS and FWS. The agencies consulted with experts in three areas: cetaceans, pinnipeds and sea otters (*Enhydra lutris*), and manatees (*Trichechus manatus*). The experts reviewed and discussed the public comments and provided individual recommendations. This current document encompasses revisions and updates to the 1997 draft and is titled differently.

The purposes of this document are as follows:

1. To provide guidance for determining release of rehabilitated marine mammals to the wild including marine mammal species under the jurisdiction of the NMFS (Department of Commerce) and those under the jurisdiction of the FWS (Department of the Interior);

2. To state the NMFS and FWS legal requirements and provide recommendations for medical, behavioral, and developmental assessment of rehabilitated marine mammals prior to release;
3. To identify the persons and agencies responsible for completing an assessment of a rehabilitated marine mammal for a release determination and to describe the communication requirements and process with NMFS or FWS;
4. To state the NMFS and FWS requirements and recommendations for identification of releasable rehabilitated marine mammal, selection of a release site, and post-release monitoring; and
5. This document does not include guidance for the following situations:
    a. Immediate release following health assessment and/or emergency triage typically associated with mass stranding events, out of habitat rescues, and disentanglement efforts.
    b. Release following relocation of healthy marine mammals.

1.2 Review of Key Legislation Pertinent to Marine Mammal Rehabilitation and Release to the Wild

Congress delegates the responsibility for implementing the MMPA to the Secretary of Commerce and the Secretary of the Interior. Cetaceans and pinnipeds, exclusive of walruses (*Odobenus rosmarus*), are the responsibility of NMFS (i.e., NMFS species). Walruses, polar bears (*Ursus maritimus*), manatees, and sea otters are the responsibility of FWS (i.e., FWS species). NMFS and FWS responsibilities for these species are regulated under 50 CFR (See Appendix B).

Rehabilitation and release of wild marine mammals is authorized by key statements within the MMPA (16 U.S.C. 1379 §109(h)) entitled "Taking of Marine Mammals as Part of Official Duties." This section allows for the humane taking of a marine mammal, by a Federal, State, or local government official or employee or a person designated under section 112(c) of the MMPA, for its protection or welfare and states that an animal so taken is to be returned to its natural habitat whenever feasible. Regulations that implement the MMPA for NMFS species (50 CFR 216.27(a)(1)) require that a marine mammal held for rehabilitation be released within six months unless "…the attending veterinarian determines that: (i) The marine mammal might adversely affect marine mammals in the wild; (ii) Release of the marine mammal to the wild will not likely be successful given the physical condition and behavior of the marine mammal; or (iii) More time is needed to determine whether the release of the marine mammal in the wild will likely be successful…" and (b)(1) "The attending veterinarian shall provide the Regional Director or Office Director with a

written report setting forth the basis of any determination." Also, (a)(iii) "releasability must be re-evaluated at intervals of no less that six months until 24 months from capture or import, at which time there will be a rebuttable presumption that release into the wild is not feasible."

For NMFS species, the MMPA section 112 (c) Stranding Agreements (formerly Letters of Agreement or LOAs) are formally established between the *NMFS Regions* and *Stranding Network Participants*. Understanding and following the MMPA and implementing regulations, policies, and guidelines, **is the responsibility of all persons involved** in marine mammal rescue, rehabilitation, and release. These guidelines are founded on and support the MMPA and related regulations. The laws and regulations outlined below are therefore fundamental to proper enactment of marine mammal rehabilitation and release. Appendix B contains the full titles and citations of these laws and regulations.

1.3 Structure of the Document

This document is organized as follows: General Procedures (Section 2); Guidelines for Release of Rehabilitated Cetaceans (Section 3); Guidelines for Release of Rehabilitated Pinnipeds (Section 4); Guidelines for Release of Rehabilitated Manatees (Section 5); Guidelines for Release of Rehabilitated Sea Otter (Section 6); Policies Regarding Release of Rehabilitated Polar Bears (Section 7); References (Section 8); Glossary of Terms (Section 9); and Appendices (Section 10).

The approach developed in this document primarily involves a complete assessment of an animal's health and behavior and release logistics. The assessment is completed by the attending veterinarian and their Assessment Team following this standardized guidance for determining the disposition of a marine mammal after treatment and rehabilitation. Section 2, "General Procedures," summarizes the pertinent laws and regulations and outlines the release requirements and recommendations for all species of rehabilitated marine mammals. This section provides an overview of documentation required throughout rehabilitation and release. Parties responsible for release determinations are identified. General principles for developmental, behavioral, and medical assessments of rehabilitated marine mammals are described, as well as methods for post-release identification (i.e., marking and tagging), monitoring, and selection of appropriate release sites.

There are several critical variables among each taxonomic group, such as natural history, social organization, and species specific rehabilitation and release considerations. These variables are addressed in separate chapters (Sections 3-7) for cetaceans, pinnipeds, manatees, sea otters, and polar

bears. These chapters provide greater detail and rationale for the release guidelines for each marine mammal group.

The reference section lists current literature on marine mammal biology, medicine, rehabilitation, and release. A glossary of terms is provided to define key terms initially noted in the text with italics. The appendices provide ready access to marine mammal laws and regulations and examples of required documentation for rehabilitated marine mammals. Additional appendices include examples correspondence letters between the Stranding Participant and NMFS, lists of Diseases of Concern, and related references for cetaceans, pinnipeds, manatees, and sea otters.

1.4 Funding

Funding of marine mammal rehabilitation is the responsibility of the rehabilitation facility. Specific resources, such as freezers for serum banking, histopathology services, equipment, and personnel for post-release monitoring may be provided through NMFS and FWS to support the biomonitoring program. Some costs associated with response and rehabilitation during a Marine Mammal Unusual Mortality Event (UME) may be reimbursed through the UME National Contingency Fund (in accordance with section 405 of the MMPA). For additional information regarding expense reimbursement, contact the appropriate NMFS or FWS coordinator. For NMFS species, the John H. Prescott Marine Mammal Rescue Assistance Grant Program is also available as a funding source for marine mammal stranding response and rehabilitation. More information on this program can be found on the following website: http://www.nmfs.noaa.gov/pr/health/prescott/.

2. General Procedures

2.1 Stranding Agreements, MMPA 109(h) Authority, and Permits for Stranding Response for ESA species

2.1.1 NMFS Policies

NMFS may enter into a Stranding Agreement (formerly known as a Letter of Agreement or LOA) with a person or organization for stranding response and rehabilitation. The NMFS Stranding Agreement states that the Stranding Network Participant will obey laws, regulations, and guidelines governing marine mammal stranding response and rehabilitation. This includes requirements for communications with NMFS, *humane care* and husbandry and veterinary care of rehabilitated marine mammals, and documentation of each stranding response and rehabilitation activity. The Stranding Agreement does not authorize the taking of any marine mammal species listed as endangered or threatened under the Endangered Species Act of 1973 (ESA), as amended. However, authorization to take ESA-listed species by the Stranding Network is currently provided under *MMPA/ESA Permit No. 932-1489-09*, as amended, and requires authorization and direction from the NMFS Regional Stranding Coordinator in the event of a stranding involving a threatened or endangered marine mammal.

2.1.2 FWS Policies

Rescue, rehabilitation, and release of non ESA-listed marine mammal species under FWS responsibility is authorized with a *Letter of Authorization (LOA)* issued by the *Division of Management Authority (DMA)* in the FWS Headquarters Office in Arlington, VA. For ESA-listed species, an LOA holder is authorized under a permit issued by the DMA. The *FWS Field Offices* in the lower 48 states or the *Marine Mammals Management Office in Alaska* coordinate with LOA and permit holders for all rescue, rehabilitation, and release activities for species under their jurisdiction.

2.2 Parties Responsible for Release Determinations and Overview of Agency Approval

The *attending veterinarian* and their *Assessment Team* (i.e., veterinarians, lead animal care supervisor, and/or consulting biologist with knowledge of species behavior and life history) representing the Stranding Network Participant, Designee, or 109(h) Stranding Participant will assess the animal and make a written recommendation for release or non-release**. For NMFS species, the recommendations are sent to the NMFS Regional Administrator. For FWS species, the**

recommendations are sent to the FWS Field Office and any recommendations for non-release are coordinated with the FWS Division of Management Authority.

In general, for NMFS species that are deemed "Releasable," a 15-day advance written notification is necessary. However, 50 CFR 216.27 (a)(2)(i)(A) allows for waiving this advance notification in writing by the Regional Administrator. Generally, these cases are anticipated (e.g., the typical annual cluster of cases where the etiology is known and diagnosis and treatment is routine) and can be appropriately planned. For such waivers, the Stranding Network Participant should submit a protocol for such cases, including location of release. These waivers will require pre-approval by the NMFS Regional Administrator on a schedule as prescribed in the Stranding Agreement. The *release determination recommendation* includes a signed statement from the attending veterinarian, in consultation with their Assessment Team, stating that the **marine mammal is medically and behaviorally suitable for release in accordance with the release criteria** (i.e., similar to a health certificate) and include a written *release plan and timeline*. NMFS may also require a concurrence signature from the "*Authorized Representative" or Signatory* of the Stranding Agreement. The Regional Administrator (i.e., NMFS staff) will review the recommendation and release plan and provide a signed written notification to the Stranding Network Participant indicating concurrence and authorization to release or direct an alternate disposition (*letter of concurrence from the Regional Administrator*) (50 CFR 216.27). For more challenging cases and potential "Conditionally Releasable" cases, plans for release should be submitted well in advance of the 15-day period to provide adequate time for evaluation. Also, it is highly recommended that dissenting opinions among members of the Assessment Team regarding an animal's suitability for release and/or the release plan be communicated to NMFS well in advance of the required 15-day advance notice so that additional consultation can be arranged in adequate time for resolution and planning.

By regulation (50 CFR 216.27 (a)(3), Appendix B), the NMFS Regional Administrator (or Office Director of Protected Resources) has the authority to modify requests for release of rehabilitated marine mammals. In accordance with 50 CFR 216.27 (a)(1), any marine mammal held for rehabilitation must be evaluated for releasability within six months of collection unless the "attending veterinarian determines that the marine mammal might adversely affect other marine mammals in the wild, release of the marine mammal to the wild will not likely be successful given the physical condition and behavior of the marine mammal, or more time is needed to determine whether the release of the marine mammal will likely be successful." If more time is needed, then NMFS will require periodic reporting in writing from the attending veterinarian, including a description of the

condition(s) of the animal that precludes release and a prognosis of release. NMFS may require that the marine mammal remain at the original rehabilitation facility or be transferred to another rehabilitation facility for an additional period of time, be placed in permanent captivity, or be euthanized. NMFS may also require a change of conditions of the release plan including the release site and post-release monitoring. An expanded release plan may be required including a justification and detailed description of the logistics, tagging, location, timing, crowd control, media coordination (if applicable) and post release monitoring. NMFS may require contingency plans should the release be unsuccessful including recapture of the animal following a specified time after release.

Generally for animals deemed "Non-releasable" and with the concurrence from the NMFS Regional Administrator, the animal can be permanently placed in a public display or research facility or euthanized. If the animals is to be placed in permanent captivity, the receiving facility must be registered or hold a license from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) [7 U.S.C. 2131 *et seq*.] and comply with MMPA (16 U.S.C. 1374 §104(c)(7)). These facilities (i.e., the rehabilitation facility or another authorized facility) are required to send a *Letter of Intent* to the Office of Protected Resources, Permits, Conservation and Education Division (NMFS PR1) to permanently retain or acquire the animal (information available at http://www.nmfs.noaa.gov/pr/permits/mmpa_permits.htm). This letter should include a signature of the "*Responsible Party of Record"*. As part of the decision making process, NMFS will consult with APHIS and may review the qualifications and experience of staff, transport protocols, and placement plans (i.e., integration based on appropriate composition of species, sex, and age and the intended proposed plan for public display or scientific research). Once approved, NMFS PR1 will respond with a *Transfer Authorization Letter* and include Marine Mammal Datasheets (MMDS), OMB Form 0648-0084, to be returned to NMFS PR1 within 30 days of transfer. Upon receipt of the MMDS, NMFS PR1 will acknowledge the transfer in writing and return updated MMDS to the receiving facility.

For FWS species, LOA and permit holders provide recommendations to the FWS Field Offices for decisions regarding releasability of rehabilitated marine mammals (see Appendix H for contact information). The FWS retains the authority to make the final determination on the disposition of these animals. If FWS determines that a marine mammal is non-releasable, the holding facility may request a permit for permanent placement in captivity as prescribed in section 104(c)(7) of the MMPA for non-depleted species, or section 104(c)(3) or section 104(c)(4) and section 10(a)(1)(A) of the ESA for depleted species.

Manatee releases require a minimum 30-day advance notice (although exceptions may be made in the event of extenuating circumstances) and must also include a signed statement from the attending veterinarian that the **animal is medically and behaviorally suitable for release in accordance with the release criteria** (i.e., similar to a health certificate) and include a written release plan and timeline. Upon receipt, FWS will evaluate and determine the suitability of the release site and release conditions (see taxa specific sections for further guidance).

For cases involving declared *UMEs*, the *Working Group on Marine Mammal Unusual Mortality Events* will be consulted to determine if event specific release standards should be implemented as stated in the **1996 NOAA Technical Memorandum – National Contingency Plan for Response to Unusual Marine Mammal Mortality Events**. Priority will be given to protecting the health of wild populations over the disposition of an individual animal. Provisions may require monitoring a representative subset of released animals to determine survivability impact on the affected population or holding rehabilitated animals beyond the projected release time to determine long term health effects.

2.3 Documentation for Rehabilitation and Release of Marine Mammals

2.3.1 NMFS

Pursuant to the Stranding Agreement between the Stranding Network Participant and appropriate NMFS Regional Office that allows a stranding organization to respond to and/or rehabilitate marine mammals, the Stranding Network Participant must provide documentation to NMFS regarding their activities that involve the taking and disposition of marine mammals as described below. The same holds true for actions under MMPA section 109(h). Figure 2.1 presents the documentation and procedures following submission of the written "release determination recommendation."

- **Marine Mammal Stranding Report Level A Data**, NOAA Form 89-864, OMB No. 0648-0178 (Appendix C).

  This report is mandatory for all stranding events and includes basic information regarding the site and nature of the stranding event, a statement that the animal was found alive or a description of the condition of its carcass, morphologic information, photo or video documentation, initial disposition of any live animal, tag data, and information on disposal, disposition, and necropsy of dead animals. This report must be sent to the appropriate NMFS Regional Office within the time stated in the Stranding Agreement.

- **Marine Mammal Rehabilitation Disposition Report,** NOAA Form 89-878, OMB No. 0648-0178 (Appendix C)

  This report is mandatory for all rehabilitation cases (i.e., long-term and short-term temporary holding) and includes a brief history of the stranding and related findings of an individual marine mammal. It also includes the disposition of samples taken from the animal and disposition of the animal including release site and tagging information. This report includes verification and date that a pre-release health screen was done on the animal. This document must be sent to the appropriate NMFS Regional Office no later than 30 days following the final disposition (e.g. released or non-released) of the marine mammal or as prescribed in the Stranding Agreement. NMFS compiles these data annually to monitor success of rehabilitation and identify where changes and enhancements should be made.

- **Release Determination Recommendation 50 CFR 216.27 (a)(2)** (Appendix B)

  This regulation states that the custodian of a rehabilitated marine mammal must provide the appropriate NMFS Regional Office with written notification at least 15 days prior to the release of any marine mammal to the wild, including a release plan. The pre-notification requirement may be waived in writing for certain circumstances (e.g., the typical annual cluster of cases where the etiology is known and diagnosis and treatment is routine) by the NMFS Regional Administrator in accordance with specific requirements as stated in the Stranding Agreement. The required notification (release determination recommendation) should provide information sufficient for determining the appropriateness of the release plan, including a description of the marine mammal (i.e., physical condition and estimated age), the date and location of release, and the method and duration of transport prior to release (50 CFR 216.27(a)(2)(ii)). The release recommendation should include a signed report or statement from the attending veterinarian that the marine mammal is medically and behaviorally suitable for release in accordance with NMFS release criteria (i.e., similar to a health certificate under the Animal Welfare Act). NMFS may also require a concurrence signature from the "Authorized Representative" or Signatory of the Stranding Agreement. In the case of more challenging releases such as animals considered Conditionally Releasable," requests for release should be submitted well in advance of the 15-day period to provide adequate time for review and planning. NMFS reserves the right to request additional information and impose additional requirements in any release plan to improve the likelihood of success or to protect wild populations (50 CFR 216.27 (a)(3)). NMFS also can order other disposition as authorized upon receipt of the report (release determination recommendation)

(50 CFR 216.27 (b)(2). For guidance, see Appendix J for a Recommended Standard Checklist for Release Determination.

- **Notification of Nonrelease/Transfer of Custody**

  For animals deemed "Non-releasable," and with the concurrence from the NMFS Regional Administrator, the animal can be permanently placed in a public display or research facility or be euthanized. If the animal is to be placed in permanent captivity, the receiving facility must be registered or hold a license from APHIS [7 U.S.C. 2131 *et seq*.] and comply with MMPA (16 U.S.C. 1374 §104(c)(7)). Facilities wishing to obtain non-releasable animals should send a *Letter of Intent* to NMFS PR1 to permanently retain (i.e., if affiliated with the rehabilitation facility) or acquire the animal. This letter should include a signature of the *"Responsible Party of Record"*. As part of the decision making process NMFS will consult with APHIS and may review the, qualifications and experience of staff, transport, and placement plans (i.e., integration based on appropriate composition of species, sex, and age and the intended proposed plan for public display or scientific research). Once approved, NMFS PR1 will respond with a *Transfer Authorization Letter* and include MMDS, OMB Form 0648-0084, to be returned to NMFS PR1 within 30 days of transfer. Upon receipt of the MMDS, NMFS PR1 will acknowledge the transfer in writing and return updated MMDS to the receiving facility.

2.3.2 FWS

Requirements for the rehabilitation and release of marine mammals under FWS jurisdiction are specified under individual permits or LOAs. These requirements are specific to the species, the organization, and the activity being conducted. The required documentation for manatee rescue, rehabilitation, and release activities is provided in Appendix C.

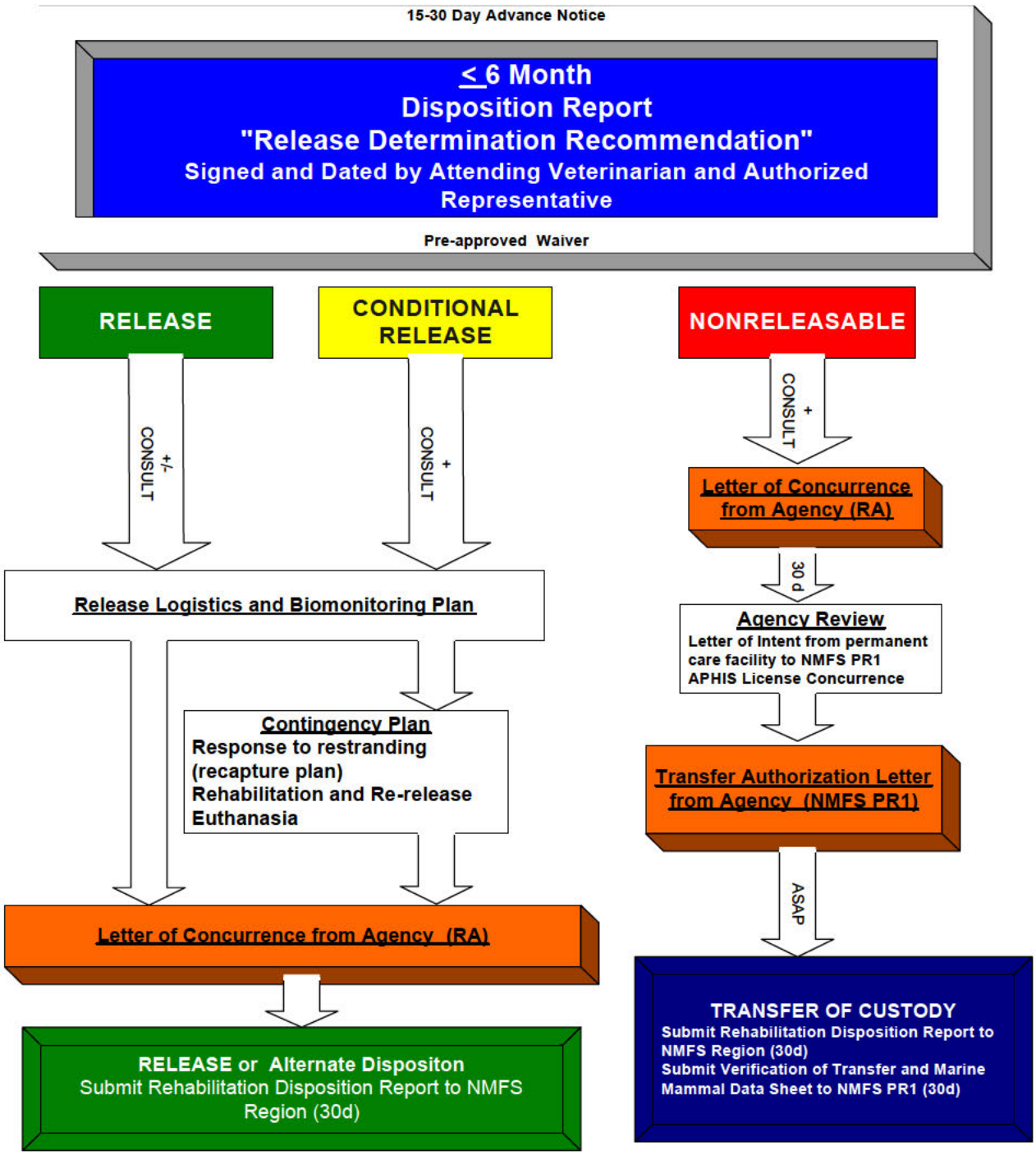

Figure 2.1 Documentation and Procedures Following Submission of the Written "Release Determination Recommendation."

2.4 Assessment Process for a Release Determination

These guidelines provide an evaluative process to determine if a stranded wild marine mammal, following a course of treatment and rehabilitation, is suitable for release to the wild. The basic format for these guidelines provides assignments for each taxonomic group (e.g., cetaceans, pinnipeds, manatees, sea otters, walrus, and polar bears) of rehabilitated marine mammals into "Release Categories." Release potential is characterized and categorized based on a thorough assessment of the health, behavior, and *ecological status* of the animal, as well as the release plan. It is critical that detailed historical, medical, and husbandry records are maintained and reviewed. Following a complete evaluation, the attending veterinarian and Assessment Team should categorize the animal into one of the following Release Categories: **Releasable**, **Conditionally Releasable**, **Conditionally Non-releasable (for manatees only)**, and **Non-releasable.** "Conditionally Non-releasable" is only a category for manatees because the FWS has had success releasing manatees that have been in captivity in excess of 20 years. NMFS species are deemed "Non-releasable" if they have been in captivity for over two years (see 50 CFR 216.27(a)(1)(iii)) and therefore a "Conditionally Non-releasable" category is not necessary. Based on the findings from the Assessment Team, the attending veterinarian provides a recommendation on releasability to NMFS or FWS. The Agencies will review and consider this information as a part of the release determination review process.

In most release cases, NMFS requires the release of marine mammals within six months of admission to rehabilitation (50 CFR 216.27(a)). This assessment can be done at more frequent intervals or earlier in the process of rehabilitation such as for obvious nonrelease cases (e.g., neonatal cetaceans, blind or deaf animals, etc). Rather than staying in a rehabilitation situation for up to six months, it may be in the best interest of the animal to immediately assess, determine releasability, and transfer to a more suitable permanent care facility. This is particularly important for all marine mammals that need socialization or expert care.

The Assessment should include the following steps and general parameters (see Figure 2.2 on page 2-16):

1. **Historical Assessment**. The Assessment Team should complete a historical evaluation that includes information gathered from the time of stranding through the duration of rehabilitation. Such information can impact the management of the case and determination of release. Circumstances such as an ongoing epidemic among other wild marine mammals, presence of environmental events such as a harmful algal bloom or hazardous waste spill,

acoustic insult; and special weather conditions (e.g., El Niño, hurricane, extreme cold, extreme heat, changes in oceanographic parameters, etc.) should be documented. It should be noted if the animal: had previously stranded and been released; was part of an official UME; had been exposed to other wild or domestic animals just prior to and/or during rehabilitation; or had attacked and/or bitten (including mouthing of unprotected skin) a human while being handled. This assessment should also include if the animal is evidence and part of a *human interaction* or criminal investigation. Such information can help guide the diagnostic and treatment strategy during rehabilitation and may impact the plan for post-release monitoring. It should be noted that strict measures are to be in place to prevent any disease transmission from other wild and domestic animals and humans during the rehabilitation process. Other considerations that should be taken into account include whether the animal was transferred from another facility (i.e., short-term triage/holding facility or rehabilitation facility) and the quality of care and treatment of each rehabilitation facility.

2. **Developmental and Life History Assessment.** In order to be deemed "Releasable," all rehabilitated marine mammals should have achieved a developmental stage wherein they are nutritionally independent. **Nursing nutritionally dependent animals should not be released in the absence of their mothers**. The ability of a young marine mammal to hunt and feed itself independently of its mother is critical to successful integration into the wild. Also of great importance is achievement of a robust body condition such that the animal has adequate reserves for survival. Other developmental issues, such as reproductive status and advanced age, seldom stand alone as determinants of release candidacy but are evaluated in conjunction with the overall health assessment. The Assessment Team should seriously consider information concerning the natural life history for the species. Therefore, it is important that the makeup of the team include someone with expertise or working understanding of the species behavior and life history. Important questions to be addressed include: 1.) does the species depend on a social unit for survival or does it exist solitarily in the wild?; 2.) has the animal developed the skills necessary to find and capture food in the wild?; 3.) has the animal developed the social skills required to successfully integrate into wild societies?; 4.) is there knowledge of their home range or migratory routes?; and 5.) does the animal have skills in predator recognition and avoidance? In other words, how important is it to the survival of the animal to be released with or near other cohorts? The Assessment Team can work with NMFS to consult with outside experts to evaluate the animal and

address these questions. Greater details regarding developmental assessment are included in the appropriate section for each taxonomic group.

3. **Behavioral and Ecological Assessment and Clearance.** In order to be deemed "Releasable," a marine mammal should meet basic behavioral criteria and some of which are specific for taxa. Across taxonomic groups, behavioral requirements for release include demonstration of normal breathing, swimming, and diving with absence of aberrant (i.e., abnormal) behavior, auditory, and/or visual dysfunction that may significantly compromise survival in the wild and/or suggest diseases of concern. The rehabilitated animal should also demonstrate the ability to recognize, capture, and consume live prey prior to its release when access to live natural prey is feasible, or, in the case of manatees, the ability to identify and feed on appropriate forage types. Because abnormal behavior may reflect illness or injury, this should be done in concert with the attending veterinarian and the medical assessment. The **behavioral clearance** should be part of the overall recommendation for release that is passed on to NMFS or FWS. Outstanding concerns regarding the behavioral suitability of the marine mammal for release are to be discussed with NMFS or FWS. Additional information is included in the behavioral assessment section for each taxonomic group.

   Also included in this thought process, is the concept of **ecological status**. This concept attempts to integrate the medical and behavioral evaluations into an extrapolation of how the animal would likely do in the wild when exposed to typical ecological pressures (personal comm. Wells 2005). It goes beyond the assessment of the current condition of the animal in an artificial environment at the rehabilitation facility relative to a limited set of immediately observable or measurable parameters. It places the animal in its current rehabilitated condition in the context of life in the wild. This process recognizes the importance of a team approach, involving complementary expertise, to evaluate the probability that a rehabilitated animal will survive and thrive back in the wild. It would be useful to include in the deliberations a behavioral ecologist with knowledge of the species specific (or closely related species) solutions to ecological challenges in the wild. The behavioral ecologist would be familiar with the species habitat, including oceanographic parameters, ranging patterns, life history, feeding ecology, potential predators, social structure, and anthropogenic threats likely to be faced by the animal once it is released.

4. **Medical Assessment and Clearance.** Although this document focuses on the evaluation and preparation of rehabilitated marine mammals for release, the medical assessment spans the entire time the animal is in rehabilitation and is critical to understanding the animal's health prior to release. The medical assessment includes information related to any health trend and diagnostic testing, treatment, and response to treatment. The attending veterinarian should perform a hands-on physical examination upon admission and prior to the release determination. The attending veterinarian should review the animal's complete history including all stranding information, diagnostic test results (i.e., required by NMFS or FWS), and medical and husbandry records. The goal of required testing requested by NMFS or FWS is to safeguard the health of wild marine mammal populations and this is achieved by testing for diseases (*reportable diseases*) that pose a significant morbidity or mortality risk to wild populations.

   Other reportable diseases include those that are of *zoonotic* or *public health and safety concern* and the agencies will require immediate notification to assure proper protocols are put into place. The agencies may request testing for other *emerging diseases* as part of a *surveillance program* to identify potential *epidemics* of concern or to determine health trends. Additional testing will be required if the animal was part of an official UME. Specific testing requirements (i.e., pre-release health screen) will come from the NMFS Marine Mammal Health and Stranding Response Program (MMHSRP) through the National Stranding Coordinator and follows the term and responsibilities stated in the NMFS Stranding Agreement. For FWS species, contact the appropriate Field Office for guidance (see Appendix H for contact information).

   Throughout the rehabilitation period, the frequency of physical exams and decisions for performance of additional diagnostic testing are determined by the attending veterinarian. The animal should be closely monitored for disease throughout rehabilitation. Regardless of the precise cause of the animal's stranding, the stranding event itself and the animal's abrupt transition to a captive environment can cause significant stress, which may increase its susceptibility to disease (St. Aubin and Dierauf 2001). The rehabilitation facility may also harbor pathogens not encountered in the wild or new antibiotic resistant strains (Measures 2004, Moore *et al*. 2007, Stoddard *et al*. in press). Should the animal become infected with such a pathogen during rehabilitation, it could become ill or become a carrier of that pathogen and may pose a threat to a naïve wild population or even public health if it is released.

Introduction of pathogens from rehabilitated animals to free-ranging wild animals is a significant concern for diseases with serious *epizootic or zoonotic* potential (Gilmartin *et al.* 1993, Griffith *et al.* 1993, Spalding and Forrester 1993). Pathogens, particularly viruses, bacteria, and some protozoans, can quickly replicate in their hosts and are susceptible to selective forces that can drive microbial adaptation and evolution leading to changes in transmission rates, virulence, and pathogenicity via genetic modification (Ewald 1980, 1983, 1994; Su *et al.* 2003). Thus, infectious agents may become more pathogenic as they pass through new individuals and naïve species.

The attending veterinarian is urged to utilize the full spectrum of diagnostic modalities available for health assessment of the animal. In addition to basic blood work, serology, microbial culture, cytology, urinalysis, and fecal exam, advanced techniques for pathogen detection such as Polymerase Chain Reaction (PCR), microarrays, and toxicology assessments are also available. A number of imaging techniques including radiology, bronchoscopy, and laparoscopy may also be utilized. The marine mammal literature has expanded to include numerous references on the performance and interpretation of diagnostic tests (see references and Appendices D, E, F, and G for partial list).

Except as otherwise noted, acquisition of blood for a complete blood count (CBC) and chemistry profile plus serum banking may be required by NMFS and FWS upon admission of a marine mammal to a rehabilitation facility. Such blood work should to be repeated by the original laboratory, to avoid problems with inter-laboratory variability, prior to release of the marine mammal. Microbial culture and isolation (i.e., aerobic and anaerobic bacterial, viral, fungal) should be a part of the medical evaluation and done upon admission and before exit from rehabilitation centers. Such paired tests help determine the types of pathogens that a marine mammal may have acquired in the wild and those that may have been acquired during its rehabilitation. Because the number of pinnipeds entering a rehabilitation facility annually may be quite high and presenting with similar diagnosis, particularly in El Niño years, NMFS may waive additional clinical evaluation as mentioned above for each pinniped but instead require that a percentage of these animals entering a facility have a thorough clinical work-up. This will be dependent on several factors, such as the stranding location, time of year, the clinical diagnosis upon admission, and disease status of the wild population (e.g., ongoing outbreaks, UMEs, etc). For walrus and polar bears, testing requirements will be on a case-by-

case basis. The NMFS or FWS stranding coordinator can provide guidance on this and other recommendations mentioned above.

The attending veterinarian interprets the results of blood work and additional diagnostic tests in light of physical exam findings, the animal's age, reproductive status, molt status, behavior, and other relevant or historical factors. Circumstances surrounding the stranding, recent environmental events, known health issues of resident wild marine mammals, and exposure to other animals are examples of historical factors that may provide information regarding the health status of the stranded marine mammal. The attending veterinarian should also consider if the animal was held in close proximity to other animals (e.g., penmates) undergoing rehabilitation and the disease history of those animals (e.g., within facility transmission). A number of references provide data useful for the interpretation of marine mammal diagnostic tests. Appendices E, F, G and H provide information on diseases of concern for cetaceans, pinnipeds, manatees and sea otters.

5. **Release Considerations**.

   a. **Required Identification Prior to Release.** Marine mammals must be marked prior to release for individual identification in the wild (see 50 CFR Sec. 216.27(a)(5) for species under NMFS jurisdiction). Examples of identification systems include flipper roto tags, flipper All-Flex tags, flipper Temple tags, passive integrated transponder tags (PIT tags), radio tags, satellite tags, and freeze branding (Geraci and Lounsbury 2005). Invasive tag application procedures should be done under the direct supervision of the attending veterinarian and will need prior approval from NMFS and FWS and may require a monitoring period following the procedure. Proper photo identification for some species should also be considered part of the protocol. Standard identification protocols exist for various groups of marine mammals that detail the methods and procedures for marking for future identification in the wild, and are included in the appropriate section for each taxonomic group. Contact the Agency stranding coordinator for additional information.

      As described, roto tags or flipper tags (basic tags) for cetaceans and pinnipeds (except walrus) are to be obtained from or coordinated through the NMFS Regional Stranding Coordinator. For FWS species, tags for walrus are to be obtained from the *USGS* and tags for polar bears are obtained from FWS. Tags for manatees are to be

obtained from FWS or the appropriate State Agency. Tags for sea otters are obtained by each individual LOA or permit holder.

Depending on the species, if the animal restrands or the tag is found, this information should be reported to the appropriate NMFS or FWS and/or USGS Stranding Coordinator. The NMFS National Marine Mammal Stranding Database centrally archives tag data for NMFS species. The FWS and/or USGS track these data for walruses, sea otters, and polar bears. For manatees, the State agencies maintain the tag data.

b. Release Site Requirements and Recommendations. Rehabilitated marine mammals are to be released to the wild under circumstances that reflect the natural history of their species and maximize the likelihood for their survival. This will vary with age and sex of the individual. Timing should be set to minimize additional energetic and social demands, and maximize foraging success and ease of social acceptance with conspecifics. For NMFS species, information regarding the date, location, and logistics of the release and any other information requested are included in the required 15-day advance notification of the Agency prior to release as cited in 50 CFR 216.27 (a)(2). Key factors in determining a release site include specific habitat, geographic and environmental factors such as weather and oceanographic states, past successful releases, public use, potential for predators, and availability of prey as well as transport time. Maintenance of stock fidelity, proximity of conspecifics, timing in relation to breeding seasons and migration activities are also crucial considerations. As the natural history of each species provides the framework for planning a release, greater details for each taxonomic group are provided in the appropriate section of this document.

6. Post-Release Monitoring. Post-release monitoring is a key method by which the efficacy of rehabilitation efforts can be assessed and revised. Such monitoring may also provide an opportunity to recover individuals that are unable to readjust to the wild. Simple post-release monitoring plans include such methods as visually tracking tagged or marked animals by land, air, or sea. More costly radio-telemetry and satellite tracking are highly desirable methods of post-release monitoring as they provide detailed information of the movement and behavior of released marine mammals. Post-release monitoring is recommended for all

rehabilitated marine mammals and is required for some taxonomic groups, such as cetaceans and manatees, depending on release category. The intensity of post-release monitoring efforts is determined by such factors as the age and species of the marine mammal, its status as threatened or endangered, and concerns regarding its health or developmental issues that may impact its ability to readjust to the wild. Advanced post-release monitoring techniques may be required for "Conditionally Releasable" animals when significant concerns regarding their chances of survival exist. All post-release monitoring plans for rehabilitated marine mammals are to be approved in writing by, and coordinated with, NMFS or FWS. NMFS may require the submission of follow-up monitoring summaries at specified intervals post-release (e.g., 90 day intervals), until such time as contact with the animal has ended. The final update should include tracking data and an evaluation of the success of the rehabilitation and release along with recommendations for future cases. NMFS may use these data in order to make future revisions to marine mammal rehabilitation and release guidelines. In order to compare individual cases, standardization of data collection protocols for monitoring released animals is highly recommended and may be required by NMFS. Formal study of monitoring data and its dissemination to the stranding network will aid in the assessment of marine mammal rehabilitation and release programs.

2.5 Emergency or Special Situations

NMFS and FWS are responsible for monitoring and protecting the health of wild marine mammal populations. To fulfill this responsibility, and as stated in the NMFS Stranding Agreements, these agencies may require or recommend increased documentation, testing, and/or post-release monitoring of rehabilitated marine mammals when a stranding event appears to be related to wide spread environmental events such as algal blooms, hazardous waste spills, outbreaks of disease, UMEs, etc. An increased incidence of illness or injury to marine mammals may prompt NMFS or FWS to require specific diagnostic testing as part of a surveillance program and additional communication regarding case outcomes. NMFS and FWS personnel are to provide Stranding Network Participants and rehabilitation facilities with this information and may be able to provide additional funding and other support regarding such circumstances. For example, NMFS holds contracts with specific diagnostic labs that can provide services for rehabilitation facilities free of charge.

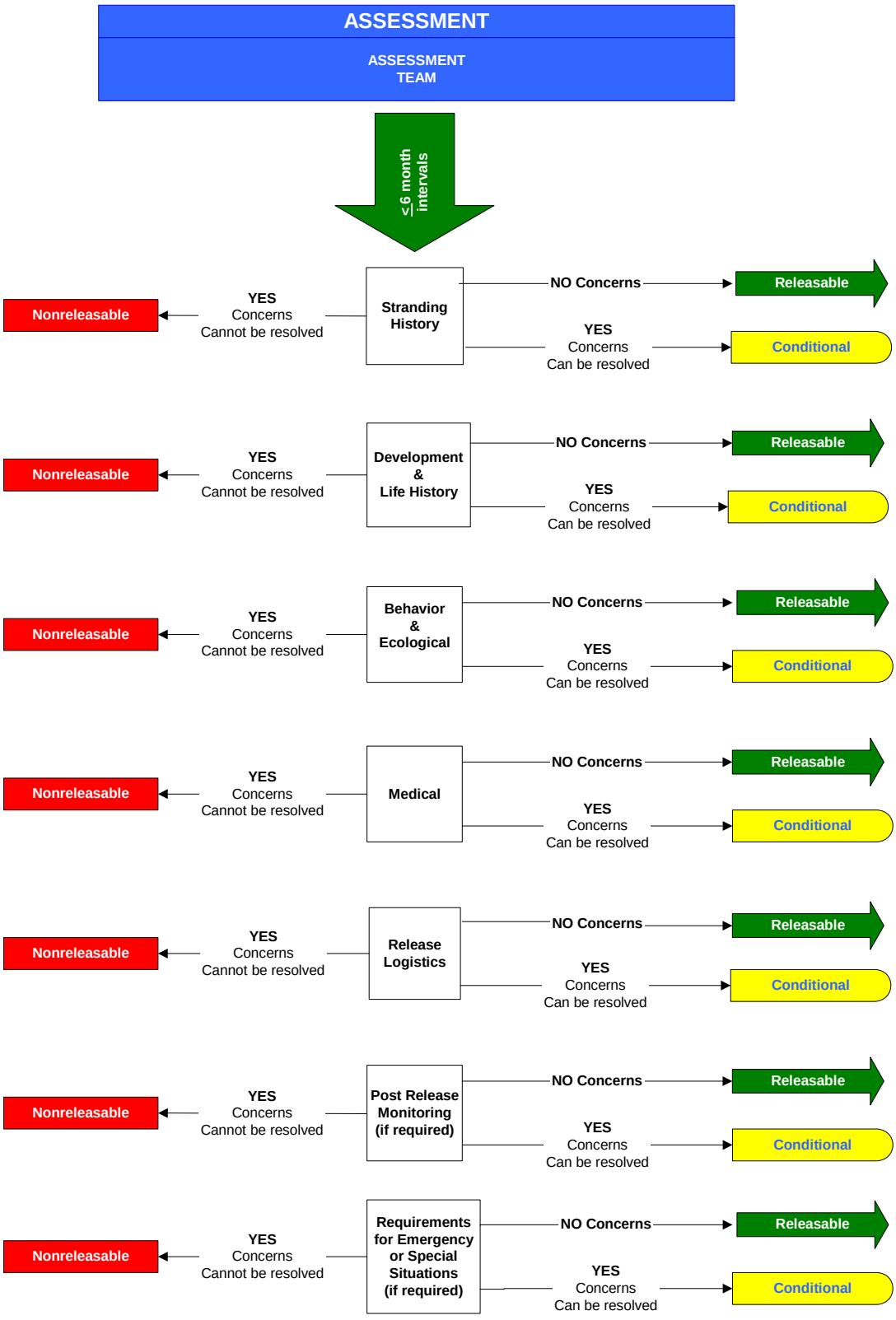

Figure 2.2 Steps and General Parameters for Animal Release Assessment

3. Guidelines for Release of Rehabilitated Cetaceans

3.1 Introduction

Few species of cetaceans (i.e., primarily bottlenose dolphins, rough-toothed dolphins, grampus dolphins, and harbor porpoise) are rehabilitated in the United States each year. Although the natural history of cetaceans differs among the various species, the general release criteria set forth in this document are applicable to all cetaceans in the United States. Prior to the release of any cetacean, NMFS requires that a thorough evaluation of the historical, developmental, behavioral, and medical records and status be completed by the Assessment Team (i.e., Stranding Network Participant, attending veterinarian, animal care supervisor, and biologist with knowledge of species behavior, ecology, and life history). For all cetacean cases, a release determination recommendation must be sent to the NMFS Regional Administrator at least 15 days (typically 30 days) in advance of a proposed release date. Waivers for advanced notice are not generally considered in cetacean cases. The release determination recommendation must include a signed statement from the attending veterinarian in consultation with their Assessment Team that the animal is **medically and behaviorally suitable for release in accordance with the release criteria** and include a written release plan and timeline. The request should also include a statement(s) from an expert biologist(s) with knowledge of the species or similar species that is being considered for release and should state that the animal meets behavior and ecological criteria for release in accordance with the release criteria. NMFS may recommend or require additional testing beyond these guidelines for reportable diseases in light of new findings regarding various disease and health issues. A release plan will require a justification statement and detailed description of the logistics for transporting, tagging, location, timing, crowd control, media coordination (if applicable), post-release monitoring, and recovery should the animal fail to thrive. NMFS may require a recapture contingency plan if the animal appears to be in distress or poses a risk following a specified time after release. NMFS may consult with individual experts for further guidance. NMFS reserves the right to impose additional requirements in the release plan as stated in 50 CFR 216.27 (a)(3).

3.2 Overview of "Release Categories" for Cetaceans

Cetaceans evaluated at rehabilitation facilities can be grouped into one of three "Release Categories" based on historical, developmental, behavioral, ecological, and medical criteria set forth in a **standardized checklist**. It is recommended that the standardized checklist (see Appendix J) be used to assess and document the release candidacy of rehabilitated cetaceans. The checklist includes a

health statement (i.e., health certificate) to be signed by the attending veterinarian and authorized representative, which verifies that a cetacean meets appropriate standards for release. This checklist could be used to determine and document releasability (i.e., as part of the required documentation sent to NMFS – refer to Figure 2.1) and as a final check just prior to release.

The case should fit into one of three **"RELEASE CATEGORIES:"**

1. **"RELEASABLE":** This category indicates that there are no significant concerns related to the likelihood of survival in the wild and/or risk of introducing disease into the wild population. Also, the animal meets basic historical, developmental, behavioral, ecological, and medical release criteria. The release plan has been approved in writing by NMFS Regional Administrator via a letter of concurrence to the applicant.
2. **"CONDITIONALLY RELEASABLE":** This category indicates that there are concerns about the historical, developmental, behavioral, ecological, and/or medical status of the animal, raising a question of survival or health risk to wild marine mammals. A cetacean may be deemed conditionally releasable if requirements for release cannot be currently met but may be met in the future without compromising the health and welfare of the individual animal. In such cases, more time may be needed to determine the feasibility of release (see 50 CFR 216.27(a)(1)(iii)).

   All "Conditionally Releasable" cetaceans must be discussed with NMFS. For some cases, NMFS may consult with individual experts to seek additional advice. The experts may include scientists and veterinarians with expertise in cetacean biology and medicine (i.e., particularly experts with species-specific knowledge). These discussions may reveal that additional medical testing, rehabilitative therapy, and strategies for post-release monitoring may be required to release a "Conditionally Releasable" cetacean.
3. **"NON-RELEASABLE":** This category indicates that there are significant historical, developmental, behavioral, ecological, and/or medical concerns regarding its release to the wild. It has a documented condition demonstrating little chance for survival in the wild and/or a diagnosed health risk to wild marine mammals. This category also includes animals that have been in rehabilitation greater than two years (see 50 CFR 216.27(a)(1)(iii)). Additionally, a cetacean may be deemed "Non-Releasable" if an appropriate release site or post-release monitoring plan cannot be arranged.

For animals deemed "Non-releasable," and with the concurrence from the NMFS Regional Administrator, the animal can be permanently placed in a public display or research facility or

euthanized. If the animal is to be placed in permanent captivity, the receiving facility must be registered or hold a license from APHIS [7 U.S.C. 2131 *et seq*.] and comply with MMPA (16 U.S.C. 1374 §104(c)(7)). Facilities wishing to obtain non-releasable animals should send a *Letter of Intent* to NMFS PR1 to permanently retain (i.e., if affiliated with the rehabilitation facility) or acquire the animal. This letter should include a signature of the *Responsible Party of Record*. As part of the decision making process NMFS will consult with APHIS and may review the qualifications and experience of staff, transport, and placement plans (i.e., integration based on appropriate composition of species, sex, and age and the intended proposed plan for public display or scientific research). Once approved, NMFS PR1 will respond with a *Transfer Authorization Letter* and include MMDS and OMB Form 0648-0084, to be returned to NMFS PR1 within 30 days of transfer. Upon receipt of the MMDS, NMFS PR1 will acknowledge the transfer in writing and return updated MMDS to the receiving facility.

3.3 Historical Assessment of Cetaceans

Historical stranding information may guide the management of rehabilitation and the plan for post-release monitoring. Important historical information should include:

1. **A record of previous stranding –** Stranded cetaceans that have previously stranded and been released, and subsequently strand again, are deemed "Conditionally Releasable" for further release attempts pending consultation with NMFS. Such animals should be reassessed and as they may have underlying health issues requiring additional evaluation, diagnostic testing, and advanced post-release monitoring. Alternatively, such cetaceans may be assessed as "Non-Releasable" and be transferred to permanent captivity or euthanized.
2. **A mother-calf pair –** A stranding of a mother/calf pair may be the result of illness or injury to either the mother, calf, or both. If the calf dies or is euthanized, the mother could be considered for release following a thorough and appropriate assessment. If the mother dies or is euthanized, a dependent calf is likely non-releasable because it cannot forage on its own and should be placed in permanent captivity or euthanized.
3. **An association with an ongoing epidemic among other wild marine animals or a UME** – If the stranding of a cetacean occurs close to (i.e., temporally and geographically) an ongoing epidemic of wild marine animals or to a UME, fish kill, harmful algal bloom, hazardous waste spill, or other such environmental event, the cetacean is deemed "Conditionally Releasable" and consultation with NMFS is required. NMFS may request additional testing, documentation, and/or post-release monitoring of such cetaceans.

4. **Stranding location and active/home range –** Stranded cetaceans may be deemed "Conditionally Releasable" if they stranded in areas where there is an increase in human activity (e.g., active fishery, increased recreational use, military activity, shipping activity, etc.) or hazardous environmental conditions (e.g., harmful algal bloom or hazardous waste spill, and/or special weather conditions like El Niño, hurricane, extreme cold, extreme heat, etc). The geographical distance between the stranding location and the rehabilitation facility is important to acknowledge, as there could be important differences in the microflora in the facility's water system. Information on areas of human activity and environmental hazards is also vital for determining an appropriate release site.
5. **The animal has been exposed to (or injured by) other wild or domestic animals –** Stranded cetaceans with a history of exposure to terrestrial wild (e.g., raccoons, coyotes, etc.) or domestic animals (e.g., cats, dogs, etc.) are deemed "Conditionally Releasable" and must be discussed with NMFS. There is a potential for zoonotic pathogens to be transmitted between wild or domestic animals to marine mammals but signs of clinical disease are undetectable. Additional testing may be required to better assess the health status and decrease the potential for transmitting diseases of concern to wild marine mammal populations following release. Consultation with NMFS is required for cetaceans that have a history of exposure to terrestrial animals.
6. **The animal was transferred from another holding, triage or rehabilitation facility** – The opportunity for exposure to pathogens can occur at different stages of response and rehabilitation. Therefore, it is important to obtain medical records and document the quality of care and treatment at each stage of this process.
7. **The animal was evidence or part of a human interaction or criminal investigation** – **This includes an investigation by** NOAA Office of Law Enforcement, the U.S. Department of Justice, or other Federal, state or local authorities.
8. **The animal was part of a mass stranding (stranding involving more than one cetacean if not a cow-calf pair)** – Mass strandings are typically influenced by behavior, with the majority of stranded animals being healthy but in need of assistance to return to the ocean. If a stranding response can be mounted quickly and safely and the animals are assessed and deemed healthy, individuals of a mass stranding may be released or relocated for immediate release. However, some individuals may be admitted into rehabilitation and may be "Conditionally Releasable" based on the pathologic findings of the pod mates that perished during the event.

9. **The animal was transferred from a research facility or undergoing permitted research during rehabilitation** – Research activity may extend the frequency and intensity of handling time and could increase the risk of altering behavior or increasing the chance of exposure to facility pathogens or chemicals (e.g., anesthetic agents, metabolic agents, etc). These animals will be considered "Conditionally Releasable" or "Nonreleasable."

3.4 Developmental Assessment of Cetaceans

A fundamental criterion for developmental clearance of a rehabilitated cetacean is that it has attained a sufficient age to be nutritionally independent, including the ability to forage and hunt. The cetacean calf grows from a state of total nutritional dependence through nursing to partial maternal dependence as it learns to forage for fish and/or squid. Eventually the young cetacean achieves total nutritional independence and forages completely on its own. Factors including individual and species variations, rehabilitation practices, health status, plus environmental factors affect the rate at which such development occurs (see Appendix I for Developmental Stages by Cetacean Species). For bottlenose dolphins (*Tursiops truncatus*), the age at which a calf may be completely weaned is approximately 1-4 yrs. Calves that are nutritionally dependent at the time of admission to rehabilitation are automatically placed in the "Conditionally Releasable" category and must be discussed with NMFS. In situations where a nursing, dependent calf strands with its mother and both animals achieve medical, behavioral and ecological clearance, the calf must be released with its mother. Very young nursing calves that strand alone or whose mothers die may lack socialization and basic acquired survival skills as they grow older. Neonatal and very young nursing calves will be deemed "Non-Releasable." Cases involving older calves and juveniles having some foraging skills may be considered "Conditionally Releasable" but require a thorough assessment and optimum planning for release and subsequent monitoring.

Reproductive status in and of itself does not impact release candidacy unless a female strands with its calf or gives birth during rehabilitation. For instance, a single pregnant female should be returned to the wild as soon as both medical and behavioral clearance has been achieved and NMFS approves of the release plan. However, all mother-calf cetacean pairs are deemed "Conditionally Releasable" and must be fully discussed with NMFS and its advisors. The well-being of both the mother and the calf is to be carefully considered in such cases. Efforts should be made to reduce their time in captivity and to keep the mother-calf pair together, yet allow for continued treatment and rehabilitation of both individuals if warranted.

Cases involving cetaceans showing signs of advanced age are considered "Conditionally Releasable" and should also be thoroughly evaluated and discussed with NMFS. Although it is not always feasible to precisely determine the age of a living adult cetacean, the physical condition of the animal may suggest to the Assessment Team that it is geriatric. Geriatric animals may have underlying clinical conditions that contributed to their stranding or may be behaviorally or ecologically unsuited for continued life in the wild.

3.5 Behavioral Assessment of Cetaceans

Complete assessment of the behavior and ecological potential may be limited by the confines of a temporary captive environment and behavior of the animal will differ from that displayed in the wild. A full understanding of what constitutes “normal” for a given cetacean species also may be lacking. Behavioral and ecological clearance is thus founded on evaluation of basic criteria necessary for the survival of the animal in the wild. Behavioral evaluation often overlaps with medical evaluation as abnormal behavior may indicate an underlying disease process. Experts with species specific knowledge of cetacean behavior and ecology, in addition to the attending veterinarian, should assess the behavior of the rehabilitated cetacean. These assessments should involve closely evaluating and documenting behavior throughout rehabilitation (i.e., *ethogram*), relating the behavioral, sensory, and physical capabilities of the animal to its prospects of surviving and thriving in the wild.

To achieve basic behavioral clearance, a cetacean should breathe normally, including rate, pattern, quality, and absence of respiratory noise. A cetacean should swim and dive effectively without evidence of aberrant behavior or auditory or visual dysfunction that may compromise its survival in the wild or suggest underlying disease that may threaten wild marine mammals. Behavioral clearance also should include confirmation that the cetacean is able to recognize, capture, and consume live prey when such tests are practical (for example, it may not be possible to obtain live prey for offshore or deep water species). Documented dependency on or attraction to humans and human activities in the wild would warrant special consideration as a possible conditional release or non-release decision.

Basic behavioral conditioning of wild cetaceans for husbandry and medical procedures may be necessary during rehabilitation as long as every effort is made to limit reinforced contact with humans. Station training may be necessary to assure animals are appropriately fed and to control social dominance when multiple animals are being treated in the same pool or pen. Also, such conditioning may reduce stress for the animal during examinations and acquisition of biological samples. Behavioral conditioning of cetaceans is to be done for the shortest time necessary to achieve

rehabilitation goals and is to be eliminated prior to release such that association of food rewards with humans is diminished. Additional information on behavioral conditioning of marine mammals is provided in the references.

3.5.1 Breathing, Swimming, and Diving

The Assessment Team should evaluate respiration at the pre-release exam to determine that the animal does not exhibit abnormal breathing patterns or labored breathing. Respiratory measurements should be standardized to record the number of breaths per five-minute intervals. Evaluation of swimming and diving should confirm that the cetacean moves effectively and does not display abnormalities such as listing, difficulty submerging, asymmetrical motor patterns, or other potentially disabling conditions. In small pools (i.e., less that 50 ft diameter), cetaceans may not be able to demonstrate a full range of locomotor and maneuvering abilities; therefore, evaluation in larger pools is highly recommended. Cetaceans exhibiting persistent abnormalities of breathing, swimming, or diving, are to be considered "Conditionally Releasable" or "Non-releasable" and must be discussed with NMFS.

3.5.2 Aberrant Behavior

The behavioral clearance of the cetacean should include confirmation that the animal does not exhibit aberrant behavior. Examples of aberrant behavior include, but are not limited to, regurgitation, head pressing, postural abnormalities such as repetitive arching or tucking, decreased range of motion, abnormal swimming or breathing as described above or excessive interest in interaction with humans. Cetaceans displaying abnormal behavior may have an underlying disease process or may have permanent injury or tendencies that will decrease their chance of survival in the wild. Cetaceans displaying aberrant behavior are considered "Conditionally Releasable" or "Non-releasable" and thus are to be fully discussed with NMFS.

3.5.3 Auditory and Visual Acuity

The behavioral and ecological clearance of the cetacean should include evaluation of auditory and visual acuity. Auditory dysfunction, involving production or reception of typical sounds or signals occurring in the wild, may be a reflection of active disease, permanent injury, or degenerative changes associated with aging. Evaluators may suspect that a cetacean has compromised auditory function if it appears to have difficulty locating prey items or various objects via echolocation or if it minimally responds to novel noises. Reduced auditory abilities can compromise the ecological

functionality and social abilities of some species, thus reducing the probability of survival in the wild. In each case, it is highly recommended that hydrophone-recording systems with an appropriate frequency response be used to record sound production in the water to document production of normal classes and qualities of sounds made by the cetacean. It is important to evaluate hearing if there are signs of compromised auditory function and diagnostic testing such as auditory evoked potential (AEP) may be necessary to further evaluate the anima. Such testing requires approval and coordination with NMFS. Cetaceans having discoloration, swelling, abnormal shape, position or appearance of the eye or eyelids may have visual dysfunction and also require discussion with NMFS.

3.5.4 Prey Capture

The rehabilitated cetacean should demonstrate foraging behavior (i.e., the ability to hunt and capture live prey) prior to its release when practical. Normal consumption of solid food should also be part of the medical assessment. This demonstrates the ability to swallow and that there is no pharangeal and/or gastrointestinal abnormalities. This evaluation is especially important for young and geriatric animals. Prey items normally found in the animal's environment and of good quality should be used whenever possible. Natural prey items may not be available for rehabilitating pelagic cetacean species; evaluators may try to utilize other prey species. However, many cetaceans often will not consume non-prey species. For social species, it may be just as important to look for cooperative or coordinated feeding behavior. NMFS should be notified if a rehabilitated cetacean appears compromised in its ability to recognize and/or capture live prey or if logistical issues preclude assessment of this behavior.

Cetaceans that are believed to have had limited foraging experience prior to stranding (i.e., young juveniles) require particularly careful assessment of prey capture ability. This behavior is learned and cetaceans that strand at a young age may not have gained adequate foraging skills to sustain themselves in the wild. Also, knowledge of the natural history of the species may be useful. If the species forages and hunts as a social unit, this may affect its ability to survive in the wild if released as a solitary animal. Similarly, amputated appendages may preclude the use of some specialized feeding techniques or attainment of sufficient speed or maneuverability for prey capture, or diminished auditory function may prevent individuals that prey on soniferous (i.e., noise-producing) fishes from locating sufficient prey to survive (e.g., coastal bottlenose dolphins).

3.5.5 Predatory Avoidance

Testing a cetacean's ability to avoid predators is not practical in most cases, but indirect evidence of abilities can be evaluated. If the individual is determined to have stranded primarily as a direct result of a shark attack (as opposed to secondarily, as an attack on an otherwise compromised animal), then this suggests that the animal may lack the skills or physical abilities to continue to survive in the wild. This would be especially important in the case of young animals, recently separated from their mothers. For social species, observations of group behavior may indicate the cohesiveness of the group which is an important behavioral mechanism for predatory avoidance.

3.5.6 Social Factors

The survival of an individual cetacean may be critically dependent on social organization and conspecifics (see Appendix I for Cetacean Species Specific Group Occurrence). A tremendous range of variability of sociality exists across the cetaceans. Members of species involved in mass strandings (i.e., presumably a social species) should not be rehabilitated singly or in unnatural social groups. The composition of these groups should be carefully considered when animals are recovered from a stranding and considered for release. It would be naïve to assume that any two cetacean species can be put together to form a functional social unit or that even two unfamiliar members of the same species will bond into a functional social unit. Therefore, for social species it is important to assess the group dynamics and behavior (*reasonable social group*) in the same manner as for individuals. Cetaceans that do not live in social groups do not necessarily require conspecifics for release, as long as they are released into an appropriate habitat where conspecifics are likely to occur. Indications of social problems that may be a contributing factor of the stranding (e.g., evidence of extensive fresh tooth raking marks in the absence of other medical factors) and should be considered. Other factors that are important for proper socialization and should be evaluated include hearing, sound production, missing appendages, and missing teeth.

3.6 Medical and Rehabilitation Assessment of Cetaceans

The medical assessment includes information related to any diagnostic testing, treatment, and response to treatment. The attending veterinarian should perform a hands-on-physical examination upon admission and prior to the release determination. The attending veterinarian should review the animal's complete history including all stranding information and diagnostic testing, and medical and husbandry records. The primary goal of the testing required by NMFS is to determine the risk to the health of wild marine mammal populations. This is achieved by testing for diseases that pose a

significant morbidity or mortality risk to wild populations (i.e., reportable diseases). Those that are zoonotic or a public health and safety concern require immediate NMFS notification to assure proper protocols are put into place. Additional testing will be required if the animal was part of an official UME or suspected anthropogenic exposure (e.g., acoustic insult, hazardous waste spill, etc.). NMFS may request testing for other emerging diseases to support surveillance for potential epidemics of concern and to monitor changes in disease status due to rehabilitation practices. The directive for the pre-release health screen will come from the NMFS Regional Stranding Coordinator through the MMHSRP. Appendix D lists diseases of concern for cetaceans.

A complete health screen should be completed upon admission and just prior to release including basic blood collection for a CBC, chemistry profile (including BUN and creatinine, enzymes and electrolytes), serology, microbial and fungal culture (i.e., blow hole, rectal, ocular, and lesions), cytology, urinalysis, and fecal exam. If the animal is female and at reproductive age, it is advisable that pregnancy be determined as soon as possible to avoid potentially fetal toxic medication. Serum (3ml/each) should be banked at the time of admission and just prior to release for retrospective studies. Cessation of antibiotics should occur two weeks prior to release examination to assure that the animals is no longer dependant on the medication and that the drug has cleared based on the pharmacokinetics and requirements made by the veterinary community and the Food and Drug Administration. Some antibiotics clear the body quickly and require shorter withdrawal time. When this recommendation cannot be met, seek advice from NMFS. **The attending veterinarian should provide written notification to the NMFS Regional Stranding Coordinator that a health screen and assessment of the cetacean has been performed. The notification must also include the final release plan and a plan for hands-on physical examination by the attending veterinarian (including last blood draw and evaluation) within 72 hours of its release. The required documentation and signed release determination will be part of the administrative record along with the signed (by the NMFS Regional Administrator) letter of concurrence approval for release.**

It is of extreme importance that the cetacean be monitored closely for disease throughout its rehabilitation. Regardless of the stranding etiology, handling and care can stress the animal increasing its susceptibility to disease. If not properly managed, rehabilitation facilities provide an environment where mutated or novel pathogens not typically encountered in the wild can easily be transmitted from animal to animal. This scenario can become problematic if an animal is exposed during rehabilitation and may carry a pathogen to a naïve wild population upon release. Introduction

of pathogens from rehabilitation centers to the wild is a concern as diseases with serious epizootic potential have previously been detected (Measures 2004, Moore *et al*. 2007, and Stoddard *et al.* in press). During rehabilitation, infectious agents may become altered (i.e., change in virulence and infectivity) as they pass through new hosts or mix with other microbes and potentially result in a multi-antibiotic resistance strain.

The attending veterinarian is urged to utilize the full spectrum of diagnostic modalities available for health assessment of the cetacean. In addition to the complete health screen analyses, advanced techniques for pathogen detection such as PCR and toxicology analyses are available. A number of diagnostic imaging techniques including radiology, CAT scans, and MRI may be used as well as bronchoscopy and laparoscopy. The cetacean literature has expanded to include numerous references on the performance and interpretation of diagnostic tests.

3.7 Release Site Selection for Cetaceans

Ideally, the rehabilitated cetacean is released into its home range, genetic stock, and social unit. For species such as coastal resident bottlenose dolphins, returning the animal to its exact home range may be extremely important. For widely ranging species such as the pilot whale, specificity of the release site may be less critical as the genetics of these cetaceans may be more *panmictic*. Returning the animal to its home range or species range may increase the likelihood that the animal will have a knowledge of available resources, potential predators, environmental features, and social relationships that would support its successful return to the wild. Consideration should also be given to the time of year, since the range of the animal may change based on season and where conspecifics are along their migration route at a given point in time.

In many cases, the precise home range of the individual will not be known. There may not be any information regarding the animal's social unit or its individual ranging patterns prior to its stranding. In some cases, photographic identification records may help identify the home range or social group for some species. When the home range of the cetacean is unknown, the animal should be released at a location near to its stranding site that is occupied regularly by its conspecifics, ideally those of the same genetic stock. Genetic analyses of a tissue sample via a qualified laboratory and appropriate tissue archive may aid with determining the appropriate stock of origin. Pelagic cetaceans are to be released offshore into a habitat occupied by conspecifics at that time of year. For animals that mass strand, depending on the life history, social units should be maintained whenever possible thus cetaceans that stranded together should be released together as a group. Because much of cetacean

behavior is learned, juveniles should be released with adults or in the presence of conspecifics and mothers with their dependent young.

Other factors to be considered in release site selection are availability of resources and condition of the habitat. NMFS and the Stranding Network Participant are to ensure that severely depleted resources or degraded habitat at the release site do not pose an obvious threat to the released animal. Release plans should include alternative release sites or schedules if there is a substantial decline in resources or habitat quality such as massive fish kills, significant declines in commercial and/or recreational fish landings, harmful algal blooms, or high concentrations of environmental contaminants. Animals should not be released into areas of dense public use and/or high commercial and recreational fishing activity.

3.8 Marking for Individual Identification of Cetaceans Prior to Release

Three forms of identification have routinely been used for cetaceans including photo-identification (documenting individual identifying physical characteristics such as scars, color pattern, dorsal fin shape, etc.), freeze branding, and dorsal fin tags. NMFS recommends the use of all three forms of identification for all releases. For delphinids, photo-identification should include body, face, dorsal fin, flukes, and pectoral flippers. Numerical freeze brands should be at least 2" high and may be placed on both sides of the dorsal fin and/or on the animal's side just below the dorsal fin, except for species that lack a dorsal fin or have small dorsal fins such as the harbor porpoise. Roto-tags should be attached on the trailing edge of the dorsal fin. Tag application and freeze branding should only be done by experienced personnel as improper tagging may cause excessive tissue damage, infection, or premature loss of the tag or mark. Marking of non-delphinid cetaceans can be more challenging due to unique anatomical features and should be determined in consultation with NMFS. NMFS must receive advance notification of and approve any additional forms of identification that a rehabilitation facility voluntarily wants to place on a cetacean besides those mentioned above. NMFS authorization is required prior to placement of VHF radio or satellite-linked radio tag.

The identification system to be used on cetaceans deemed "Conditionally Releasable" must be approved by NMFS. As these animals are required to have an advanced post-release monitoring plan, conditionally releasable cetaceans will often require VHF or satellite tagging in addition to photo-identification, freeze-branding, and placement of a visual fin tag.

3.9 Post-Release Monitoring of Cetaceans

Few data is currently available regarding the long-term fates of released cetaceans. Post-release monitoring provides essential information to develop and refine marine mammal rehabilitation and release practices. "Conditionally Releasable" cetaceans should be monitored daily for at least two months after release. The specific post-release monitoring plan for each cetacean is to be coordinated through NMFS. Post-release monitoring methods may include visual observations from land, sea, or air, and/or radio or satellite-linked monitoring. It is understood that post-release monitoring of cetaceans, particularly pelagic species, is an extensive undertaking for which significant support is required, often from multiple sources. In a few instances, NMFS has provided resources such as financial support, personnel, and equipment for post-release monitoring but it is not standard practice. Therefore, the rehabilitation facility is encouraged to seek funding to enhance their post-release monitoring program.

The first month after release is a particularly critical period during which it will become evident whether the animal is thriving, including avoiding predators, capturing sufficient prey, and being accepted by conspecifics. For coastal species it is recommended that monitoring continue on a regular basis for at least one year. Funding resources, such as the Prescott Grant Program, can assist with the financial burden of such endeavors. NMFS requires periodic and final reports on released animals. These reports will facilitate future revisions to the marine mammal rehabilitation and release guidelines. In order to compare individual cases, standardization of data collection protocols for monitoring released cetaceans will be required. NMFS will provide the stranding network with the desired format for receipt of tracking data in reports. Presentation, discussion, and formal study of monitoring data and its dissemination to the stranding network will aid in the assessment of cetacean rehabilitation and release programs.

Release plans should include the contingency plans that are available for recovering the animal, should monitoring indicate its failure to thrive. The release plans should also address treatment and euthanasia if the animal is retrieved or restrands. In addition, NMFS may require such contingency plans for "Conditionally Releasable" cetaceans, depending on the circumstances.

3.10 Decision Tree – Cetacean Release Categories

3.10.1 Releasable

The cetacean is cleared for release by the attending veterinarian (including the Assessment Team) and the NMFS Regional Administrator concurs in writing. This means that the requirements for the health and behavior assessment, marking/tagging, and release plan have been met and both veterinary and biological opinions regarding release have been received (see text for details). For an animal to be considered "releasable" the response to all of the essential release criteria below should be met.

History

Cetacean has no historical information requiring consultation with NMFS such as stranding in close temporal or geographic relation to a UME, stranding associated with an environmental event of concern,, an acoustic insult, a human interaction or criminal investigation, or a mass stranding.

Developmental Stage/Life History

a) Cetacean has attained sufficient size and age to be nutritionally independent.
b) Cetacean is not a female with calf.
c) Cetacean is not a geriatric animal and not compromised due to age related conditions.
d) Cetacean was not exposed to captive or domestic animals during rehabilitation.

Behavioral Clearance

a) Cetacean breathes normally, swims and dives effectively.
b) Cetacean does not exhibit aberrant behavior, auditory, or visual deficits.
c) Cetacean demonstrates appropriate foraging ability.
d) Cetacean did not strand as direct result of a failure to avoid predators.
e) Cetacean did not strand as a result of taking food from humans in the wild.
f) Cetacean did not strand as a direct result of a demonstrated inability to obtain sufficient food in the wild.
g) Cetacean did not strand as a direct result of conspecific injury.

Medical Clearance

a) Health status of the cetacean is deemed appropriate for release by the attending veterinarian.
b) Hands-on physical exam by the veterinarian at time of admission to rehabilitation and within 72 hours of release.
c) Laboratory tests performed at time of admission and within seven days of release are complete and submitted for review:
    - CBC;
    - Chemistry Profile to include: Glucose, Sodium, Potassium, Chloride, Calcium, Phosphorus, Iron, Bicarbonate, Alkaline Phosphatase, ALT, AST, GGT, BUN, Creatinine, Uric Acid, CPK;
    - Serum Banking (3 ml upon admission and 3 ml at time of release, more if available; and
    - Aerobic Bacterial Cultures (Blowhole, Rectal, Lesions).
d) Cetacean is free of drugs (excluding sedatives used for transport) a minimum of 2 weeks prior to release.

Release Logistics

a) Tagging/Marking - Delphinids: 3 forms of identification approved by NMFS (dorsal fin tag, freeze brand, photo, other).
b) Release Site - Return to appropriate stock and geographical site under favorable environmental conditions, and for social species, introduced in areas with conspecifics.
c) Tracking - minimum of 2 months post-release monitoring coordinated with NMFS (provide NMFS with regular tracking updates).
d) Provide NMFS a report at the end of the tracking period.

3.10.2 Conditionally Releasable

The cetacean did not meet one or more of the essential release criteria but may be releasable in the future pending resolution of the problems identified by the attending veterinarian and Assessment Team.. This may involve discussion with outside experts in consultation with NMFS. Contingency plans for recapture, treatment, permanent care, and euthanasia should be required if release is unsuccessful and the animal restrands. The following may be true for one or more assessment points.

History

a) Cetacean stranded in close temporal or geographic relation to a UME.
b) Cetacean stranded in association with an environmental event of concern or an anthropogenic acoustic insult.
c) Cetacean was involved in a mass stranding.
d) Cetacean stranded previously on one or more occasions.
e) Single stranding of a social species.
f) Cetacean was part of a NMFS permitted research project, potentially being handled more frequently.

Developmental Stage/Life History

a) Cetacean is nutritionally dependent, but older calf with some foraging skills.
b) Cetacean is recently weaned.
c) Cetacean is a female with calf.
d) Cetacean is a geriatric animal and is compromised due to age related conditions.

Behavioral Assessment

a) Cetacean exhibits aberrant behavior, which may include but is not limited to, abnormal breathing, swimming, and/or diving, auditory or visual dysfunction.
b) Ability of the cetacean to forage for prey is questionable or logistical circumstances prevent testing of forage or prey capture ability.
c) Cetacean requires significant conditioning due to developmental stage and/or medical condition.
d) Predator wounds were likely secondary to another cause of the stranding.
e) Attraction to humans in the wild has been extinguished.
f) Cetacean is a social species and has stranded due to injury from conspecifics.

Medical Assessment - The attending veterinarian determines that the health status of the cetacean is uncertain regarding suitability for release. The veterinarian arrives at a determination of "Conditionally Releasable" through performance and interpretation of physical examinations and interpretations of tests such as CBC, chemistry profile, cultures, and other tests required by NMFS, plus any other diagnostic tests deemed necessary to fully evaluate the animal. Response of the cetacean to therapy and the clinical judgment of the veterinarian may also contribute to a

determination of "Conditionally Releasable." Further tests may be required including ultrasound or radiographs to clarify medical issues.

Cetaceans exhibiting any of the following medical or physical conditions are to be discussed with NMFS, with the expectation that without resolution, such conditions will make the animal an unsuitable candidate for release:

a) Compromised function of sensory systems (auditory, visual).
b) Decreased range of motion.
c) Deformed or amputated appendage.
d) Laboratory tests interpreted as abnormal or suspicious of disease (CBC, chemistry, cultures, or other tests).

Release Logistics

a) Tagging, marking, post-release monitoring - Extensive post-release monitoring of cetaceans deemed "Conditionally Releasable" is required and is to be approved and coordinated through NMFS. Post-release monitoring of such animals should be at least two months duration, likely longer. Monitoring is likely to include advanced tracking techniques, such as satellite tracking via radio-tracking or photographic identification searches if the animal is likely to move outside of the range of monitoring. The cetacean will continue to be deemed "Conditionally Releasable" until the post-release monitoring plan required by NMFS can be implemented.
b) Stock of origin is unknown, uncertain, or temporarily unreachable due to environmental or natural history factors - When such circumstances exist, the case is to be discussed with NMFS. The cetacean will be deemed "Conditionally Releasable" until specifics of release are approved by NMFS.
c) Plan for recapture - NMFS may request a contingency plan if feasible for a "Conditionally Releasable" cetacean prior to its release should the animal appear to be unable to readjust to the wild. This should include plans for follow up treatment, permanent care and/or euthanasia. The cetacean will continue to be deemed "Conditionally Releasable" until NMFS approves a contingency plan.

3.10.3 Non-Releasable

The cetacean is determined to be unsuitable for release by the attending veterinarian and Assessment Team and the NMFS Regional Administrator concurs. The animal did not meet the essential release criteria, and thus does not have a reasonable chance of survival in the wild or poses health risks to wild marine mammals.

History

a) Cetacean has been in captivity for more than two years or is otherwise too habituated and counter-conditioning techniques have been unsuccessful.
b) Cetacean stranded previously on one or more occasions.
c) Cetacean was part of a NMFS permitted research project, potentially being handled more frequently, and circumstances preclude its suitability for release.

Developmental Stage/Life History

a) Cetacean is nutritionally and socially dependent (neonate and young nursing calf without foraging skills).
b) Cetacean is geriatric and exhibiting other medical and/or behavioral abnormalities.

Behavioral Clearance

a) Exhibits abnormal breathing, swimming, diving, or other aberrant behavior that may compromise survival in the wild or may be caused by a disease of concern to wild marine mammals.
b) Exhibits auditory or visual dysfunction that would compromise survival in the wild or may be caused by an ongoing disease process of concern to wild marine mammals.
c) Unable to capture and consume live prey.
d) Demonstrated inability to avoid predators.

Medical Clearance - The attending veterinarian determines that the health of the cetacean precludes release. In such cases, the medical condition of the animal prevents normal function to a degree that would compromise its survival in the wild or pose a health risk to wild marine mammals. The veterinarian supports the determination of "Non-Releasable" status with required physical examinations and tests such as CBC, chemistry profile, cultures, and those required by NMFS plus any other tests deemed necessary to fully evaluate the animal. Further tests may be required,

including ultrasound or radiographs, to clarify medical issues. The veterinarian presents their findings to the NMFS Regional Stranding Coordinator and recommends that the cetacean be maintained in captivity or be euthanized.

Conditions that warrant consideration that a cetacean is deemed "Non-Releasable" include, and are not limited to, the following:

a) Compromised function of sensory systems (auditory, visual).
b) Decreased range of motion.
c) Deformed or amputated appendage.
d) Laboratory tests interpreted as abnormal or suspicious of disease of concern.
e) Geriatric, or believed to have chronic disease, which may compromise survival in the wild.

Release Logistics

a) Tagging/Biomonitoring - The cetacean requires extensive post-release monitoring for which there are insufficient resources.

4. Guidelines for Release of Rehabilitated Pinnipeds

4.1 Introduction

Each year in the United States, several different species of pinnipeds from three taxonomic families, Phocidae (true seals), Otariidae (eared seals), and Odobenidae (walrus), are rescued and rehabilitated. As walrus are under the jurisdiction of FWS, these guidelines should be generally applied but there are a few exceptions. Close consultation with FWS is required with each walrus case.

Except as otherwise noted, each pinniped is required to have a complete historical, developmental, behavioral, and medical status assessment by the attending veterinarian and animal care supervisor and be properly marked for identification prior to release. The release determination recommendation must include a signed statement from the attending veterinarian in consultation with the Assessment Team that the animal is **medically and behaviorally suitable for release in accordance with the release criteria** and include a written release plan and timeline. NMFS or FWS may require additional testing for reportable diseases in light of new findings regarding various disease and health issues and this information should be included in the release request. A release plan will require a justification statement and detailed description of the logistics for transporting, tagging, location, timing, crowd control, media coordination (if applicable), post release monitoring, and recovery should the animal fail to thrive (e.g., restrands). NMFS or FWS may require recapture if the animal appears to be in distress following a specified time after release. Recapture will require special authorization from NMFS or FWS prior to this activity. NMFS or FWS may consult with individual experts for further guidance. NMFS reserves the right to impose additional requirements in the release plan as stated in 50 CFR 216.27 (a)(3).

The NMFS Regional Administrator may allow for pre-approved waivers for routine pinniped cases as stated in 50 CFR 216.27(a)(2)(i)(A). Typically these cases are anticipated (e.g., the typical annual cluster of cases where the etiology is known and diagnosis and treatment is routine) and can be appropriately planned. For such waivers, the Stranding Network Participant should submit a protocol for such cases including location of release. These waivers will require pre-approval by the NMFS Regional Administrator on a schedule as prescribed in the Stranding Agreement. NMFS may require that a certain percentage of these cases that present with similar clinical signs and diagnosis be thoroughly tested and assessed each year. Similarly, NMFS may give blanket authorization for pre-approved release sites and for post-release monitoring plans.

4.2 Overview of Release Categories for Pinnipeds

Pinnipeds evaluated at rehabilitation facilities can be grouped into one of three "Release Categories" based on historical, developmental, behavioral, ecological, and medical criteria set forth in a **standardized checklist**. It is recommended that the standardized checklist (see Appendix J) should be used to assess and document the release candidacy of rehabilitated pinnipeds. The checklist includes a health statement (i.e., health certificate) to be signed by the attending veterinarian and authorized representative, which verifies that a pinniped meets appropriate standards for release. This checklist could be used to determine and document releasability (i.e., as part of the required documentation sent to NMFS) and as a final check just prior to release.

The majority of walrus typically strand as calves and are not good release candidates due to the extended period of maternal dependency. FWS generally considers walrus calves to be "non-releasable" and considers all stranded walrus on a case-by-case basis for permanent placement. If the animal is placed in permanent captivity, the receiving facility must hold an Exhibitor's License from APHIS [7 U.S.C. 2131 *et seq*.] and comply with MMPA (16 U.S.C. 1374 §104(c)(7)). Questions regarding disposition of stranded walrus should be directed to the FWS contact as identified in Appendix H.

1. **"RELEASABLE":** There are no significant concerns and the animal meets basic historical, developmental, behavioral, ecological, and medical criteria, supporting the likelihood of survival and a lack of risk to the health of wild marine mammals. The release plan (post-release identification, release site, contingency plans, and post-release monitoring) has been approved in writing by NMFS via the letter of concurrence. For the pinniped to be deemed "Releasable," **all** items on the checklist should be answered as **"Yes."** The attending veterinarian signs the checklist confirming the information and the assessment.

2. **"CONDITIONALLY RELEASABLE":** One or more items on the standardized checklist have been marked **"No"** for pinnipeds in this category. This may pertain to historical, developmental, behavioral, ecological, and/or medical status concerns regarding the animal's potential to survive in the wild and/or its potential to pose a health risk to other marine mammals. A pinniped may also be deemed conditionally releasable if requirements for release cannot be met at present but may be met in the future and without compromising the health and welfare of the individual animal. In such cases, more time may be needed to

determine the feasibility of release (see 50 CFR 216.27(a)(1)(iii) for species under NMFS jurisdiction).

All "Conditionally Releasable" pinnipeds must be discussed with NMFS or FWS. NMFS or FWS may consult with individual experts to discuss specific cases. Experts include scientists and veterinarians with expertise in pinniped biology and medicine (particularly experts with species specific knowledge). Such discussions will clarify the most appropriate disposition. For example, additional medical testing, rehabilitative therapy, and additional strategies for post-release monitoring may be required to release a "Conditionally Releasable" pinniped.

3. **"NON-RELEASABLE":** One or more items on the standardized checklist have been marked **"No"** for pinnipeds in this category. This may pertain to historical, developmental, behavioral, ecological, and/or medical status concerns that preclude release to the wild. It has a documented condition demonstrating little chance for survival in the wild and/or a diagnosed health risk to wild marine mammals. For NMFS species, this category also includes animals that have been in rehabilitation greater than two years (see 50 CFR 216.27(a)(1)(iii)). Additionally, a pinniped may be deemed "Non-Releasable" if an appropriate release site or post-release monitoring plan cannot be arranged. Rehabilitation facilities that believe that they may have a walrus that is non-releasable must contact the FWS Marine Mammals Management Office (as identified in Appendix H) for concurrence on this finding and eventual disposition of the animal. If FWS determines that a walrus is non-releasable, the holding facility may request a permit for permanent placement of the animal as long as the facility meets the requirements under section 104(c)(7) of the MMPA.

   For animals deemed "Non-releasable" and with the concurrence from the NMFS Regional Administrator, the animal can be permanently placed in a public display or research facility or euthanized. If the animal is to be placed in permanent captivity, the receiving facility must be registered or hold a license from APHIS [7 USC 2131 et seq.] and comply with MMPA (16 USC 1374 Section 104(c)(7)). Facilities wishing to obtain non-releasable animals should send a *Letter of Intent* to NMFS PR1 to permanently retain (i.e., if affiliated with the rehabilitation facility) or acquire the animal. This letter should include a signature of the *"Responsible Party of Record"*. As part of the decision making process will consult with APHIS and may review the qualifications and experience of staff, transport, and placement plans (i.e., integration based on appropriate composition of species, sex, and age and the intended proposed plan for public display or scientific research). Once approved, NMFS PR1

will respond with a *Transfer Authorization Letter* and include MMDS, OMB Form 0648-0084, to be returned to NMFS PR1 within 30 days of transfer. Upon receipt of the MMDS, NMFS PR1 will acknowledge the transfer in writing and return updated MMDS to the receiving facility.

4.3 Historical Assessment of Pinnipeds

Historical stranding information may guide the management of rehabilitation and the plan for post-release monitoring. Important historical information should include:

1. **A record of previous stranding -** Pinnipeds that have previously stranded and been released, and subsequently strand again, are deemed "Conditionally Releasable" pending consultation with NMFS or FWS. Such animals should be reassessed as they may have underlying health issues requiring additional evaluation, diagnostic testing, and advanced post-release monitoring. Alternatively, such pinnipeds may be assessed as "Non-Releasable" and be transferred to permanent captivity or euthanized.

2. **An association with an ongoing epidemic among other animals or with a UME -** If the stranding of a pinniped occurs in close temporal or geographic proximity to a UME, fish kill, harmful algal bloom, hazardous waste spill, or other such environmental event, the pinniped is deemed "Conditionally Releasable" and consultation with NMFS or FWS is required. The agencies may request additional testing, documentation, and/or post-release monitoring of such pinnipeds.

3. **Stranding location and active or home range -** Areas that are worth assessing are increased human activity (e.g. active fishery, increased recreational use, military activity, shipping activity, etc.) or hazardous environmental conditions (e.g., harmful algal bloom or hazardous waste spill, and/or special weather conditions like El Niño, hurricane, extreme cold, extreme heat, etc). During an El Niño event, the rehabilitation center should consult with NMFS regarding management and release of the animal because unfavorable environmental conditions may persist once an animal is ready for release and thus the animal should be deemed "Conditionally Releasable." Also, the geographical distance between the stranding location and the rehabilitation facility is important to acknowledge as there could be important differences in the microflora at the facility. Information on areas of human activity and environmental hazards is also vital for determining an appropriate release site.

4. **The animal was exposed to (or injured by) other wild or domestic animals -** Pinnipeds having a history of exposure (i.e., confirmed or suspected) to terrestrial wild or domestic animals are deemed "Conditionally Releasable" and must be discussed with NMFS or FWS. Pinnipeds may contract disease from terrestrial wild or domestic animals such as foxes or dogs. For instance, canine distemper represents a serious health threat to pinnipeds. Should a rehabilitating pinniped contract such an pathogen, it could transmit the illness to its wild cohorts. Such transmission of pathogens can occur even when a rehabilitated pinniped is not showing clinical signs of disease. Consultation with NMFS or FWS is thus required for pinnipeds that have a history of exposure (i.e., confirmed or suspected) to terrestrial animals.

5. **The animal has a record of attacking or biting a human -** Pinnipeds that have inflicted a bite (including mouthing of unprotected skin) of a human are deemed "Conditionally Releasable" and must be discussed with NMFS or FWS. A variety of infectious diseases may be transmitted from animals to humans via bite wounds. Although documentation of rabies among pinnipeds is rare (there is one published case of rabies in a ringed seal from the Svalbard Islands, Norway [Odegaard and Krogsrud 1981]) the fatal outcome of this disease in humans warrants careful consideration of factors surrounding pinniped bites to people. NMFS or FWS may require consultation with state public health officials regarding pinnipeds that inflict bites on humans and may request that the facility follow state policies and guidelines for unvaccinated non- domestic animal bites. NMFS may also impose quarantine or additional diagnostic testing requirements prior to authorizing release.

6. **The animal was evidence or part of a human interaction or criminal investigation – This includes an investigation by** NOAA Office of Law Enforcement, the U.S. Department of Justice, or other Federal, state or local authorities.

7. **The animal was transferred from another holding, triage or rehabilitation facility –** The opportunity for exposure to pathogens can occur at different stages of response and rehabilitation. Therefore, it is important to obtain medical records and document the quality of care and treatment at each stage of this process.

8. **The animal was transferred from research facility or undergoing permitted research during rehabilitation** – Research activity may extend the frequency and intensity of handling time and therefore could increase the risk of altering behavior or increasing the

chance of exposure to facility pathogens or chemicals (e.g., anesthetic agents, metabolic agents, etc). These animals will be considered "Conditionally Releasable" or "Non-releasable."

4.4 Developmental Assessment of Pinnipeds

In order to be deemed "Releasable," a young pinniped should be able to feed itself and have adequate body condition to survive readjustment to the wild. Generally, pups are to be held in rehabilitation centers for roughly the normal duration of lactation. Because maternal dependence may vary greatly in some species, it is recommended that the straight length and weight of each pinniped pup be taken at admission and again when evaluating the animal for release to aid in the assessment of the animal's body condition. Such measurements may be compared to known weaning lengths and weights of appropriate wild pinniped species or to data from successfully rehabilitated and released stranded pups (see Appendix I for species specific developmental stages and pupping information). The risk of altered behavior can be related to both the length of treatment and the age of the animal at the time of stranding. Pups stranded as maternally dependent neonates and animals spending an extended time in rehabilitation being at highest risk. Special care should be taken with these species especially if rehabilitating very young pups and should be considered "Conditionally Releasable".

Reproductive status in and of itself does not impact release candidacy of a pinniped unless a female strands with her pup or gives birth during rehabilitation. Such females and their offspring are "Conditionally Releasable" and are to be discussed with NMFS or FWS. The natural history of the pinniped species involved and factors related to maternal relationship may impact the timing and conditions of release for mother or pup. For instance, a pup that has not reached weaning weight may be releasable with its mother, but not alone. A healthy mother may be kept in rehabilitation to assist its sick or injured pup; however, this should be weighed against the risk of habituation that could minimize the chance of a successful release. Female pinnipeds in estrus or late pregnancy are releasable unless the attending veterinarian believes that the health history of the animal warrants extra precautions to minimize stress during its return to the wild. Such animals are "Conditionally Releasable" due to health concerns and are to be discussed with NMFS or FWS.

Pinnipeds that are in molt are "Conditionally Releasable" and these cases should be discussed with NMFS. Because behavior and physiology change during a molt, factors related to the pinnipeds health history, age, reproductive status, and other relevant parameters should be considered in order to determine if release is preferable to holding the animal until molting is completed.

4.5 Behavioral Assessment of Pinnipeds

The limitations imposed by the captive environment of rehabilitation may preclude a detailed behavioral assessment where behavior of the captive animal may differ from that displayed in the wild. Also, there lacks a set of behavioral and functional tests that relate to behavior in the wild and there are limitations on the complete knowledge of "normal" behavioral parameters of each species. Behavioral clearance is thus founded on basic criteria necessary for survival of the animal in the wild. The behavioral evaluation often overlaps with the medical evaluation as abnormal behavior may indicate an underlying illness. Biologists and animal care supervisors with expertise in pinniped behavior and the attending veterinarian should jointly assess the behavior of the animal.

To achieve behavioral clearance, a pinniped should breathe normally and demonstrate effective swimming, diving, and locomotion on land (if appropriate for its species). The animal should not display aberrant behavior or auditory or visual dysfunction that may compromise its survival in the wild or suggest an underlying disease of concern to wild marine mammals (i.e., reportable disease). Behavioral clearance also includes confirmation that the animal can respond to, and is able to capture and consume, live prey.

4.5.1 Breathing, Swimming, Diving, and Locomotion on Land

Evaluation of respiration is done to determine that the pinniped does not exhibit abnormal breathing patterns or labored breathing during exertion. Evaluation of swimming, diving, and locomotion on land is done to confirm that the pinniped moves effectively and does not exhibit abnormalities such as listing to one side, decreased capacity to submerge, asymmetrical motor patterns, etc. Pinnipeds that display abnormalities of breathing, swimming, diving, or locomotion on land are deemed "Conditionally Releasable" or "Non-Releasable," depending on the nature and degree of their dysfunction.

4.5.2 Aberrant Behavior

Behavioral clearance of the pinniped includes confirmation that the animal does not exhibit aberrant behavior that may compromise survival in the wild or suggest an underlying disease of concern to wild marine mammals. Examples of aberrant behavior include, but are not limited to, regurgitation, head pressing, postural abnormalities such as repetitive arching or tucking, head swaying, stereotypic or idiosyncratic pacing, decreased or unusual range of motion, and abnormalities of breathing, swimming, diving, and locomotion on land as previously discussed. Other examples include

attraction to or desensitization to the presence of humans such as in the case of pups imprinting on humans. Pinnipeds displaying aberrant behavior are deemed "Conditionally Releasable" or "Non-Releasable" depending on the nature and degree of the behavior.

4.5.3 Auditory and Visual Function

Behavioral clearance of the pinniped includes evaluation of auditory and visual function. Auditory dysfunction may be a reflection of active disease, permanent injury, or degenerative changes associated with aging. Evaluators may suspect that a pinniped has compromised auditory function if it responds minimally to loud noises created above or below water. Pinnipeds that have visual dysfunction may show difficulty locating prey items, tendency to collide with boundaries of their enclosure, or difficulty maneuvering about objects placed in their path. Discoloration, swelling, abnormal shape, position, or appearance of the eye or eyelids may suggest visual dysfunction. Pinnipeds with auditory or visual dysfunction should be deemed "Conditionally Releasable" or "Non-Releasable" depending on the degree and nature of their condition.

4.5.4 Prey Capture

Rehabilitated pinnipeds should demonstrate the ability to chase, capture, and consume live prey prior to their release. Prey items found in the animal's natural environment should be used whenever possible. If natural prey items are not available, evaluators may utilize other prey species. Evaluation of the pinniped includes assessment of each component of feeding behavior including the ability to chase prey, to actually capture prey, and to consume prey without assistance from humans. Pinnipeds that display ineffective prey capture and consumption are deemed "Conditionally Releasable" or "Non-releasable." If logistical issues preclude evaluation of prey capture and consumption or there is a question about the quality of live prey, NMFS or FWS should be consulted.

Rehabilitated pinnipeds that have been in captivity longer than one year and young pinnipeds having little or no previous foraging experience in the wild require particularly careful assessment of feeding behavior. Repeated feeding trials using live prey with concurrent assessment of the animal's ability to maintain good body condition are helpful in thoroughly evaluating such animals.

4.6 Medical Assessment of Pinnipeds

The medical assessment includes information related to any diagnostic testing, treatment, and response to treatment. The attending veterinarian should perform a hands-on-physical examination upon admission and prior to the release determination. The attending veterinarian should review the

animal's complete history including all stranding information and diagnostic testing (i.e., required by NMFS and any additional data), and medical and husbandry records (including food consumption and weight and length progression). The primary goal of testing required by NMFS or FWS is to safeguard the health of wild marine mammal populations. This is achieved by testing for diseases that pose a significant morbidity or mortality risk to wild populations (i.e., reportable diseases). Those that are zoonotic or public health and safety concern require immediate NMFS notification to assure proper protocols are put into place. Additional testing will be required if the animal was part of an official UME. NMFS may request testing for other emerging diseases as part of a surveillance program to identify potential epidemics of concern and to monitor changes in disease status that may have occurred due to rehabilitation practices. The directive for the pre-release health screen will come from the NMFS Regional Stranding Coordinator through the MMHSRP. Appendix E lists diseases of concern for pinnipeds.

A complete health screen should be completed upon admission and just prior to release including basic blood collection for a CBC, chemistry profile (including BUN and creatinine, enzymes and electrolytes), serology, microbial and fungal culture (i.e., nasal, rectal, ocular, and lesions), cytology, urinalysis, and fecal exam. If the animal is female and at reproductive age, it is advisable that pregnancy is ruled out prior to prescribing potentially fetal toxic medication. Serum (3ml/each) should be banked at the time of admission and just prior to release for retrospective studies. Cessation of antibiotics should occur two weeks prior to release examination to assure that the animals is no longer dependent on the medication and that the drug has cleared based on the pharmacokinetics and requirements made by the veterinary community and the Food and Drug Administration. Some antibiotics clear the body quickly and require shorter withdrawal time; therefore, when this recommendation cannot be met seek advice from NMFS. **The attending veterinarian should provide written notification to the NMFS Regional Stranding Coordinator that a pre-release health screen of the pinniped has been performed two weeks prior to release and will be conducted within 72 hours of release as a final check. The two week notification must also include the final release plan. The final assessment at the 72 hour mark can be emailed just prior to the release or immediately following the release as prescribed by the NMFS Regional Stranding Coordinator. The required documentation and signed release determination recommendation will be part of the administrative record along with the signed (by the NMFS Regional Administrator) letter of concurrence approval for release.**

It is of extreme importance that the pinniped be monitored closely for disease throughout its rehabilitation. Regardless of the stranding etiology, handling and care can cause significant stress increasing susceptibility to disease. If not properly managed, rehabilitation facilities provide an environment where genetically altered or novel pathogens not typically encountered in the wild can easily be transmitted from animal to animal. This scenario can be problematic when an animal is exposed and becomes a carrier of that pathogen to a naïve wild population if released. Introduction of pathogens from rehabilitation centers to the wild is a significant concern as diseases with serious epizootic potential have been detected (Measures 2004, Moore et. al., 2007). Infectious agents may become more pathogenic as they pass through new individuals and naïve species or genetically altered from indiscriminant use of antibiotics.

The attending veterinarian is urged to utilize the full spectrum of diagnostic modalities available for health assessment of the pinniped. In addition to basic blood work, serology, microbial culture, cytology, urinalysis, and fecal exam, advanced techniques for pathogen detection such as PCR and toxicology analyses are available. A number of diagnostic imaging techniques including radiology, CAT scans, and MRI may be used as well as bronchoscopy and laparoscopy. The pinniped literature has expanded to include numerous references on the performance and interpretation of diagnostic tests.

Both agencies may request testing for other emerging diseases as part of a surveillance program to identify potential epidemics of concern and identify health trends. Additional testing will be required if the animal was part of an official UME. Specific testing requirements (i.e., pre-release health screen) will come from the NMFS Regional Stranding Coordinator through the MMHSRP and follows the term and responsibilities stated in the NMFS Stranding Agreement.

4.7 Release Site Selection for Pinnipeds

The release of a rehabilitated pinniped should be planned to maximize its chances for survival. The release should be timed and staged to increase its likelihood of foraging success and acceptance by conspecifics. Factors including its species, age, reproductive status, previous home range, social unit, and migratory patterns should be considered. Weather conditions at the release site and other environmental factors impacting the habitat and food availability should also be evaluated.

The rehabilitated pinniped is to be released into its home range, genetic stock, and social unit whenever possible. Return of the animal to its home range is preferable as the reacclimating pinniped would presumably have familiarity with available resources, potential predators, environmental

features, and social relationships. In many cases, this can be accomplished by releasing the pinniped at its stranding site through a simple hard-release process (i.e., the animal is released directly after transport to the release site without acclimation through holding in a temporary enclosure at the site).

For wide ranging species, such as hooded and ringed seals, the release site selection is considered on a case-by-case basis. Consultation with NMFS is required for these cases. If the range of conspecifics is distant form the original stranding site, rehabilitators may consider various options depending on the natural history of the species and the temporal relationship of release to seasonal distribution. The pinniped may be released to migrate on its own or with conspecifics still in the vicinity. Alternatively, the pinniped may be held in captivity until conspecifics return or it may be transported to the location of its migrated cohorts. The risks of extended time for the pinniped in captivity, logistics of transport to a migration site, and costs associated with the extended stay are examples of factors to be considered. As explained later in this section, movement of pinnipeds recovering from infectious disease to other sites should be carefully considered regarding disease risk to wild pinnipeds.

When information on the animal's ranging patterns or social unit prior to stranding is not known, or when a pinniped strands outside of the previously known range of its species, NMFS is to be consulted regarding an appropriate release strategy. For pinniped species that have vast territorial ranges, such as those that naturally traverse the length of the North American continent, knowledge of the animal's specific ranging patterns previous to stranding may not be necessary. Such pinnipeds may be released in the general vicinity of their stranding site or anywhere within the vast range inhabited by that species with the following important exception (see below).

When a pinniped has recovered from an infectious disease, it may be preferable to release the animal near its original stranding site in order to minimize disease risks to wild pinnipeds. For example, even if the entire population of a far-ranging pinniped species has been exposed to a particular infectious agent, changes in the virulence of the pathogen may initially occur at distinct geographical sites. A seal exposed to a particularly virulent strain of pathogen in the far Northeast may pose a health risk to pinnipeds in the Mid-Atlantic that have not yet encountered that particular strain of virus. Additionally, the clinical signs of many infectious diseases mimic each other. As rehabilitation centers cannot always perform definitive diagnostic tests for all viral agents, moving rehabilitated pinnipeds from the general region of their stranding to distant locations for release may pose some risk to wild marine mammals. NMFS is to be consulted regarding the preferred release site when pinnipeds recovering from an infectious disease cannot be released near their original

stranding site. Another important consideration is the location of the rehabilitation facility to the normal habitat range for the species, e.g., the rehabilitation of an ice seal in the Caribbean. The decision to release in the normal habitat range would need to be thoroughly discussed with NMFS.

It is important to ensure that conditions at the release site do not pose any obvious immediate threat to the released animal, such as areas where resources and habitat is severely depleted or degraded. If evidence exists of a substantial decline in resources or habitat quality such as massive fish kills, significant declines in commercial and/or recreational fish landings, red tides, etc., it may not be appropriate to release the pinniped until conditions at the release site improve or a different release site is found. Also, release in areas of dense public use and/or high commercial and recreational fishing activity should be avoided.

4.8 Identification of Rehabilitated Pinnipeds Prior to Release

NMFS and FWS have determined that all pinnipeds must be flipper tagged for identification prior to release to the wild. Tags and placement instructions are to be obtained from NMFS or FWS and/or USGS (for walrus) as appropriate for the pinniped species (see Appendix H for contact information. Although resightings of flipper-tagged individuals may provide some information regarding the relative success of a rehabilitation effort, flipper tags are not reliable for long-term monitoring. They may be difficult to read from a distance and may become damaged or lost. Other methods for identification such as freeze-branding, glue tags, etc. may be used in addition to flipper tags (Geraci and Lounsbury 2005).

4.9 Post-Release Monitoring of Pinnipeds

Post-release monitoring of pinnipeds provides essential information for the development and refinement of marine mammal rehabilitation and release practices. Post-release monitoring methods may include visual observations of tagged or freeze-branded pinnipeds from land, sea, or air, as well as radio or satellite-linked monitoring. Radio and satellite-linked monitoring programs are highly desirable as they provide a wealth of information regarding the activities and fates of released animals. NMFS or FWS may require and coordinate post-release monitoring plans for "Conditionally Releasable" pinnipeds. Additionally, rehabilitation centers may voluntarily provide post-release monitoring plans for routinely released pinnipeds. When such monitoring will be performed voluntarily, the rehabilitation center is required to inform NMFS or FWS of the intent to implement post-release monitoring when seeking authorization for release of the pinniped.

The first month after release of the pinniped is a particularly critical period during which it will become evident whether the animal is thriving, including capturing sufficient prey and being accepted by conspecifics. It is recommended that monitoring continue on a regular basis via field observations, radio, or satellite-linked monitoring for up to one full year and such funding resources as the Prescott Grant Program can assist with the financial burden of such endeavors. NMFS may request these data in order to make future revisions to pinniped rehabilitation and release guidelines. In order to compare individual cases, standardization of data collection protocols for monitoring released pinnipeds may be helpful, and this should include the length of the tracking time, the type of tracking equipment, and assessment of outcome. Formal study of monitoring data and its dissemination to the stranding network can aid in the assessment of pinniped rehabilitation and release programs.

Release plans should include contingency plans for recovering the released pinniped, should monitoring indicate its failure to thrive, including options for treatment, permanent care, or euthanasia. In addition, NMFS will request such contingency plans for "Conditionally Releasable" pinnipeds, depending on the circumstances.

5. Guidelines for Release of Rehabilitated Manatees

5.1 Introduction

West Indian manatees (*Trichechus manatus*) are found throughout the Caribbean basin. In the United States, the Florida subspecies (*Trichechus manatus latirostris*) is commonly found in southeastern coastal waters, with Florida at the core of its range. The Antillean subspecies (*Trichechus manatus manatus*) is found outside of Florida throughout the Caribbean basin (including Puerto Rico and possibly Texas). While most reports of distressed manatees occur in Florida, manatees have been rescued throughout the region. The focus of manatee rescue and release activities is to promote the conservation of wild manatee populations.

Reports of distressed manatees include animals compromised by human activities and natural causes. Human causes of distress include collisions with watercraft, entrapment in structures, entanglement in and ingestion of fishing gear and debris, and other sources. Natural causes of distress include exposure to cold and brevetoxins, mother/calf separation, seasonal disorientation, etc. All rescue-related communications and the day to day decision making process in the field are generally handled by the local field Stations of the Florida Fish and Wildlife Conservation Commission (FWC) in conjunction with report from the public utilizing the FWC hotline (1-888-404-FWCC). All activities related to the verification of a report of a manatee in trouble, subsequent rescue, and transport to rehabilitation facilities are communicated through the FWC Field Stations, according to established protocols. The FWS Jacksonville Field Office coordinates the manatee rescue, rehabilitation, and release program to assist these animals. The FWS Jacksonville Field Office conducts this program according to the provisions of an ESA/MMPA marine mammal enhancement permit issued by the FWS DMA. The permit authorizes “take” activities for an unspecified number of manatees for the purpose of enhancing its survival and recovery, consistent with the FWS manatee recovery plan developed pursuant to the ESA.

The FWS Jacksonville Field Office coordinates a network of individuals, facilities, and agencies authorized as subpermittees under their enhancement permit and through LOAs issued under section 109(h) and section 112(c) of the MMPA [16 U.S.C. 1379(h) and 16 U.S.C. 1382(c)] to authorize activities related to the rescue (including temporary capture, possession, transport, and transfer), rehabilitation, and post-release monitoring of manatees.

The following guidelines were first developed by program participants in 1991 and subsequently revised in 2001. They are based on more than twenty years of program history and include the experiences, advice, and expertise of resource managers, field biologists, veterinarians, behavioral experts, animal keepers, and other dedicated individuals. The guidelines are to be used by authorized participants to guide the return of rehabilitated manatees to the wild.

5.2 Overview of Release Categories for Manatees

Manatees undergoing rehabilitation are evaluated by program participants and placed into one of four Release Categories:

1. **"RELEASABLE":** Manatees that have been successfully treated, are of an appropriate size, demonstrate appropriate behaviors, have the skills necessary to thrive in the wild, and do not pose a threat to wild populations will be considered releasable. Additionally, distressed manatees that are assisted in the wild and then released on-site are characterized as "Releasable". These include fit (healthy, non-injured) manatees superficially entangled in fishing gear, animals isolated by high water or detained by structures (such as water control structures, sheet pile walls, booms, and other barriers), seasonally disoriented animals, and others. "Seasonally disoriented" manatees include otherwise fit animals that fail to migrate to appropriate winter habitats during the periods of cold weather. These animals are typically relocated to warm water sites within their region of origin.

2. **"CONDITIONALLY RELEASABLE":** Manatees with a condition and/or circumstances that present a question regarding the success of release or ability to thrive in the wild but likely not pose a threat to wild populations will be considered conditionally releasable. Animals described as "Conditionally Releasable" typically include medically-cleared, captive-reared animals and older, long term-captives. The status of animals considered to be "Conditionally Releasable" may change to "Releasable" if their condition or circumstances improve or to "Conditionally Non-releasable" if their condition or circumstances deteriorate.

3. **"CONDITIONALLY NON-RELEASABLE":** Manatees that cannot be released because their condition and/or circumstances threaten the well-being of the animal and/or may pose a threat to the wild population will be considered conditionally non-releasable. The status of animals considered to be "Conditionally Non-releasable" may change to "Releasable" or "Conditionally Releasable" if their condition or circumstances improve over time. This

category may include individuals with permanently debilitating medical conditions. Because manatees are closely monitored post release (i.e., their normal habitat range is coastal and thus easier to monitor post release) and data have shown that they can survive and thrive post release even after many years in captivity, this category has been added.

4. **"NON-RELEASABLE":** The FWS will review, on a case-by-case basis, requests to establish the non-releasability of certain captive-held manatees. Manatees deemed non-releasable will be medically characterized by a disease process that proves to be a significant risk to the wild population or by significant physical injuries (such as loss of paddle or significant spinal trauma) that would preclude the ability of an animal to thrive in the wild. Petitions to establish non-releasability of individual manatees will be reviewed by an independent panel which will make their recommendations to the FWS. The FWS will consider the request and recommendation and will then determine the status of the animal. Should an animal be deemed non-releasable by the FWS, the receiving facility will need to meet the requirements to receive an enhancement permit in accordance with section 104 (c)(4) of the MMPA (16 U.S.C. 1374(c)(4)), section 10(a) of the ESA (16 U.S.C. 153(a)) and the FWS issuance criteria at 50 CRF 17.22.

5.3 Historical Assessment of Manatees

Efforts are made to maintain complete, detailed records that document rescued manatees from the time of rescue to their eventual disposition. These records generally include information describing the rescue, circumstances surrounding the stranding (e.g., red tide, cold weather, etc.), treatment(s), captive care, and resolution of the case (i.e., death, euthanasia, or release). In the case of previously known wild individuals, these records can include documentation of behavioral and reproductive patterns, migratory habits, and site fidelity. For all released animals, these records should also include all post-release monitoring information.

These records guide the treatment of individual stranded manatees and provide an evaluative tool that allows program managers and participants to assess and improve methods and procedures to better ensure success. As an example, in the case of red tide-related strandings, records detail the rescue of a manatee(s), noting the stranding site in the context of a red tide event, the presentation of the animal (beached, convulsing, etc.), any behaviors noted during transport, appropriate neurologic treatment, post treatment observations, and eventual release. Release plans for the animal should require information characterizing the status of red tide within the planned release area. Such detailed

documentation has helped with efforts to develop effective rescue, rehabilitation, and release methods for red tide stranded animals.

5.4 Developmental Assessment of Manatees

"Releasable" animals must be nutritionally independent (weaned and off of supplemental nutritional support), greater than 200 cm in total length and more than 600 pounds in weight. There should be no concerns regarding the animal's length of time in captivity, relative to its age. On occasion, smaller suckling calves are released with their dam to ensure that the dam's wild experience is passed on to her calf. Based on observations of cow/calf bonding behavior, this will help to improve the calf's wild skills and ability to survive in the wild.

"Conditionally Releasable" manatees should demonstrate nutritional independence, especially in the case of older calves planned for release. Recently weaned juveniles are also considered as release candidates. In both instances, animals should meet "Releasable" criteria for length and weight. Manatees that have spent lengthy periods of time in captivity (relative to their age) also fall into this category. Concern has been expressed that older, long-term captives may have a diminished ability to thrive in the wild (at the extreme are animals that have been in captivity for more than 50 years). While concern for these older animals may be well-placed, it is difficult to know at what age (if any) these animals' condition and lack of wild skills will compromise the success of their release. As such, older animals are considered on a case-by-case basis for release. The release of older manatees is being conducted in the context of a research program that will yield data to help ensure success for subsequently released individuals meeting similar criteria.

"Conditionally Non-releasable" manatees include animals that are not nutritionally independent, do not meet the length and weight criteria for "Releasable" animals, and/or lack the wild skills that are essential for a successful release.

"Non-releasable" manatees will be reviewed by the FWS on a case-by-case basis.

5.5 Behavioral Assessment of Manatees

"Releasable" manatees must exhibit normal behaviors while in captivity and are, therefore, expected to be able to meet behavioral challenges when in the wild. Normal behaviors include typical breathing, swimming, diving, and foraging/drinking patterns. Foraging behaviors include the ability to feed in salt, brackish, and fresh water environments without becoming dehydrated. Manatees must

also demonstrate an ability to feed on natural vegetation located at various levels in the water column. Historically, captive manatees have been fed at the water surface. Naïve animals fed in this fashion have had difficulties finding food on the bottom after release. Current feeding practices include feeding at the bottom and top of the water column.

While abnormal behaviors in manatees have not been defined, animals that exhibit atypical behaviors (as determined by FWS and its advisors) while in captivity will be considered for release on a case-by-case basis. Behaviors that elicit concerns include stereotypic behavioral displays, adaptability or sensitivity to change (including going off feed, shutting down, etc.), and perceived affinities for humans and human activities while in captivity. These affinities should not be confused with the manatee's innate ability to explore their captive environment, including humans, especially in the absence of other engaging stimuli. Efforts should be made to de-condition or extinguish these behaviors before release.

5.6 Medical Assessment of Manatees

Prior to release, release candidates must be examined by a veterinarian experienced in manatee medicine. Examinations should include a review of the animal's complete history, a hands-on physical examination, and diagnostic testing. The exam should include blood work, including CBC and serum chemistries. Serological and bacteriological assessments should be conducted when deemed necessary by the attending veterinarian. Results of analyses should be consistent with known values for animals of similar age, size, and sex and consistent with historical values for that specific animal. A "medically cleared" manatee will be free of medical problems, not limited in its ability to thrive in the wild, and will not pose a threat to wild populations.

Manatees that have unresolved injuries, compromising physical conditions (malnutrition, dehydration, etc.), active/infectious disease processes, injuries that significantly affect mobility and range of motion (e.g., the loss of a paddle, failure to adapt appropriate buoyancy control, etc.) and other debilitating conditions are considered to be "Conditionally Non-releasable". In the event that these concerns are resolved, these animals may be categorized as "Releasable" or "Conditionally Releasable".

5.7 Decision Tree for Release Categories - Manatees

The following is a list of criteria used to help determine the release status of captive manatees. Please note that an animal's status may change as various criteria are met. (These criteria generally apply to all species/subspecies of manatees unless otherwise indicated.)

5.7.1 RELEASABLE

Developmental Stage/Life History

a) Nutritionally independent.
b) For Florida manatees, length must be >200 cm and weight >600 lbs (unless released with dam).
c) No concerns about length of time in captivity relative to age.

Behavioral Assessment

a) Must exhibit normal behaviors, including typical breathing, swimming, and diving patterns while in captivity.
b) Must be able to eat natural vegetation and adapt to salt, brackish, and fresh water regimes.
c) Must demonstrate ability to feed on natural vegetation at various levels in water column.

Medical Assessment

a) No active, demonstrable medical problems.
b) Medically cleared based on examination by a veterinarian experienced in manatee medicine.
c) Poses no threat to wild populations.

Pre-release Requirements

a) The animal must be individually recognizable.
    i. All identifiable markings should be completely documented with sketches and photographs.
    ii. In the absence of individually identifiable markings, the animal should be freeze branded. The brands should be sketched and photographed.
    iii. All released manatees should be PIT-tagged and information recorded and logged.
b) Blood and/or tissue samples must be taken for serum banking and genetics.

c) Ultrasound measurements of blubber layers must be taken as an initial indicator of health status.

Release Logistics (a release plan should be prepared for each released animal)

a) Telemetry should be considered when appropriate, subject to approval by FWS.
b) Animals should be released in close proximity to their point of origin, when appropriate (in the case of previously known animals, suitable sites may be selected within the animal's home range).
c) Release sites should be free of harmful algal blooms and other compromising factors.
d) For captive-reared, naïve animals in Florida, release sites should include natural warm water sites within the animal's home range or that of the parent. Such releases should occur during the winter, thereby improving possibilities for bonding to the site and building associations with cohorts.

5.7.2 CONDITIONALLY RELEASABLE

Developmental Stage/Life History - Developmental considerations include animals that may be characterized by one or more of the following conditions:

a) Partial nutritional independence.
b) For Florida manatees, less than 200 cm in length and/or 600 lbs in weight.
c) Social dependence.
d) Recent weaning (stranded as a neonate, captive weaned, etc.).
e) Extended period of time (relative to age) in captivity.

Behavioral Assessment

a) Exhibits abnormal behavior(s) in captivity.
b) Unable to eat natural vegetation and adapt to salt, brackish, and fresh water regimes.
c) Unable to feed on natural vegetation at various levels in water column.

Medical Assessment: Animals with the following conditions may be considered for release:

a) Physical impairment (may include animals with damage to or loss of appendages, animals with impaired range of motion, etc.)
b) Reproductive condition (may include pregnant females, lactating females with calves, etc.)

Pre-release Requirements

a) The animal must be individually recognizable.
    i. All identifiable markings should be completely documented with sketches and photographs.
    ii. In the absence of individually identifiable markings, the animal should be freeze branded. The brands should be sketched and photographed.
    iii. All released manatees should be PIT-tagged and information recorded and logged.
b) Blood and/or tissue samples must be taken for serum banking and genetics.
c) Ultrasound measurements of blubber layers must be taken as an initial indicator of health status.

Release Logistics

a) Requires radio-tagging and intensive monitoring efforts following guidelines developed by FWS and its advisors (including veterinarians, animal behavior specialists, and researchers).

5.7.3 CONDITIONALLY NON-RELEASABLE

Developmental Stage/Life History - Developmental considerations include animals that may be characterized by one or more of the following conditions:

a) Nutritionally dependent.
b) For Florida manatees, less than 200 cm in length and/or 600 lbs in weight.
c) Extreme concerns about length of time in captivity relative to age.

Behavioral Assessment

a) Exhibits abnormal behavior(s).
b) Unable to eat natural vegetation and adapt to salt, brackish, and fresh water regimes.
c) Unable to feed on natural vegetation at various levels in water column.

Medical Assessment

a) Not medically cleared (animals with active/infectious diseases, permanent, demonstrable physically debilitating injuries, and/or other concerns).
b) Poses a threat to wild populations.

5.7.4 NON-RELEASEABLE

a) Animals deemed permanently non-releasable will be:
   i. Permanently captive
   ii. Euthanized, as deemed necessary, to prevent pain and suffering or in cases with an inevitable outcome.

   If FWS has determined that a manatee is permanently non-releasable, the holding facility may request a permit for permanent placement of the animal as long as the facility meets the requirements under section 104(c)(3) or (c)(4) of the MMPA and section 10 of the ESA.

b) Inbred animals: There are currently two inbred manatees in the U.S. captive manatee population. At the present time, these animals are considered to be conditionally non-releasable due to concerns regarding immunological compromise. Other concerns include observed problems with inbreeding, as seen in the European captive manatee population, which includes high infant mortality and breeding suppression. Given these concerns and questions about the effects of the release of inbred animals into the wild population, these two animals can not be released at this time and are presently considered conditionally non-releasable.

c) Pre-Act animals: The U.S. captive manatee population currently includes four Florida manatees brought into captivity prior to the adoption of Federal prohibitions preventing the display of endangered marine mammals. The care and disposition of these "Pre-Act" animals are the responsibility of their respective owners.

5.8 Pre-release Requirements for Manatees

Prior to release, all animals must be individually recognizable. While many animals are either naturally marked or have scars from encounters with boat propellers, other animals have no markings and should be freeze branded with a unique number/letter combination (the selection of the sequential number/letter combination must be made beforehand in consultation with FWS). All markings (including freeze brands) should be done well in advance of release, if possible, and all markings should be sketched and photographed. PIT tags (one on either side of the shoulders, cranial to each scapula) should also be implanted. Ultrasound measurements of blubber layers must be taken prior to release as a baseline indicator of the animal's body condition. Blood and/or tissue samples should also be taken prior to release for serum banking and genetics.

5.9 Release and Post-release Logistics for Manatees

If at all possible, animals should be released in close proximity to the site where originally rescued. For captive-reared, Florida manatees with no wild experience, these animals should generally be released within their region of genetic origin and into natural warm-water areas during the winter to encourage winter site fidelity and familiarity with local conditions and association with wild manatees. When appropriate, telemetry may occur, pursuant to approval from FWS. (Current tagging methodologies make it difficult to radio tag and belt manatees less than 220 cm in total length.) In the case of rehabilitated, wild born adults, many of these animals can be released back into areas where researchers actively track wild manatees and can be monitored as part of these projects.

Post-release monitoring is required for all conditionally releasable animals. Such monitoring includes equipping animals with transmitters (satellite, VHF, and/or sonic, as appropriate) for both remote and on-site monitoring, On-site monitoring should include visual observations of the animal once or twice a week; protocols vary between higher and lower risk candidates. At a minimum, biomedical assessments should be conducted within the first three months after release, six months after release, and twelve months after release. If there is any question about the animal's health based on field or remote observations, assessments should occur more frequently. If the animal's well-being has been compromised as determined by these assessments, the animal should be returned to captivity. Biomedical monitoring includes an examination of overall body condition, length and other morphometrics that include girths, weight, blubber thickness, collection of blood, fecal, urine, milk, semen, and tissues samples when possible. Results of analyses should be consistent with known values for animals of similar age, size, and sex and consistent with historical values for that specific animal. While there is no agreed upon definition of success, program participants generally agree that if an animal has thrived in the wild (and met foraging and fresh water needs) for at least a year, if it has demonstrated an ability to successfully winter at a warm water site (Florida manatees), and if it has contributed to the production of offspring, then it is considered a successful release.

Pre-release conditioning may be required for conditionally releasable animals. Such conditioning may include exposing manatees to natural forage positioned at the surface and on the bottom of their tank. Natural forage includes a variety of vegetative types found within the animal's range and may also include palatable exotics such as *Hydrilla*. If an animal is to be released into water that differs from the type of water in their tank of origin, the animal should be acclimated to the type of water best suited to the release environment to minimize post-release stress, especially in the case of naïve

animals. Conditioning may also include minimizing exposure to humans to reduce or eliminate any affinity the animal may have or may potentially develop toward humans and human activity. Trained/learned behaviors must be extinguished to the greatest extent possible prior to release.

In special cases, "soft release" methodologies should be considered as a means to enhance survivorship in the wild. "Soft releases" typically rely upon temporary holding facilities established within the release area. Manatee(s) are kept in these facilities where they are maintained and observed for a period of at least several weeks. This temporary adaptation period allows for acclimation to waters at the release site, introduction to in situ forage, close observation of behaviors, and ease in capture/handling for biomedical assessments prior to release. Supplemented forage can be reduced during the containment period. At release, the "soft release" concept initially encourages brief forays away from the enclosure and allows for the individual to return to the now familiar holding facility. Further reduction in supplemental feeding will promote greater use and exploration of surrounding habitats. Use of this methodology is to be considered where individual cases warrant additional release scrutiny and release locations allow for its implementation.

5.10 Manatee Rescue, Rehabilitation, and Rescue Program Reporting/Requesting Requirements

The FWS uses an electronic database that requires program participants to report events within 24 hours of occurrence. Release requests should be received and requested electronically 30 days prior to the release. The Reporting Requirements are listed in Appendix C.

6. Guidelines for Release of Rehabilitated Sea Otters

6.1 Introduction

Sea otters are found in near shore waters of the North Pacific. Several subspecies and stocks have been identified in California, Washington, Alaska, Canada, and Russia. Sea otters may strand for a variety of reasons including trauma, disease, and the inability to forage. Guidelines for the release of rehabilitated sea otters are intended to address the welfare of these animals and any impacts the rehabilitated animals may have on wild otter populations.

Like many other marine mammals, stranded sea otters are often reported on beaches frequented by humans. In some cases, humans intercede and otherwise healthy pups are removed from the wild. The sea otter's small size makes it relatively easy to transport. However, there are currently few facilities capable of meeting the requirements for successful rehabilitation. These guidelines are intended to be used by facilities authorized to rehabilitate marine mammals under the MMPA and ESA, if applicable, and that are actively involved in the rehabilitation of sea otters for subsequent return to the wild. Questions regarding disposition and release approval of stranded sea otters must be directed to the appropriate FWS specialist as identified in Appendix H.

6.2 Developmental Assessment of Sea Otter Pups

Sea otter pups are generally dependent on their mothers for the first 6 to 12 months of life. Newborn pups are readily distinguished by their natal pelage, small size (generally less than 6 lbs), and inability to care for themselves. Pups prematurely separated from their mothers or found stranded on a beach shortly after weaning are generally less than 20 lbs in weight and typically lack foraging skills necessary for survival.

Successful rehabilitation of stranded sea otter pups for release to the wild requires a significant commitment of time and resources. Facilities that receive a stranded pup and are unable to rear the pup for possible release to the wild must immediately contact the FWS (as identified in Appendix H) to determine the disposition of the animal.

Rehabilitated sea otter pups that are at least 6 months of age, weigh at least 20 lbs, demonstrate adequate foraging, grooming, and social skills may be released to the wild. Rehabilitated sea otter pups must be monitored closely post-release to determine if their transition to the wild is successful (see post-release monitoring below).

6.3 Behavioral Assessment of Sea Otters

Certain behaviors are necessary for survival of rehabilitated sea otters. In addition, aberrant behaviors may preclude release to the wild. Rehabilitated sea otters may be released to the wild if the following behavioral criteria are met in the opinion of rehabilitation personnel familiar with normal sea otter behavior:

1. The rehabilitated sea otter must demonstrate the ability and willingness to forage and capture live prey. This includes the use of tools such as rocks used to pound shelled prey;
2. The rehabilitated sea otter must demonstrate basic survival skills and activities including active foraging, pelage management, diving, and resting;
3. The rehabilitated sea otter must demonstrate "normal" social skills including interest in other sea otters and should exhibit a wariness of humans and anthropogenic activities; and
4. The rehabilitated sea otter must not exhibit any aberrant behavior including behavior that may pose an unusual threat to human health and safety, wild sea otter populations, or other marine mammal populations.

6.4 Medical Assessment of Sea Otters

All rehabilitated sea otters must have a comprehensive, hands-on physical examination by a veterinarian experienced in sea otter medicine prior to release. The attending veterinarian must determine that the sea otter is likely to survive in the wild and must certify that:

1. Blood sampling performed within two weeks of the proposed release date, including a CBC and serum chemistry profile, falls within normal ranges for the species;
2. Medical diagnostic tests performed within two weeks of the proposed release date (e.g., cultures, biopsies, urinalysis, serology, virology, parasitology, immunology, etc) fall within normal parameters for the species or indicate a satisfactory state of health (reference CRC Handbook of Marine Mammal Medicine, 2nd Edition, Dierauf and Gulland 2001);
3. The rehabilitated sea otter should be free of drug residues (excluding sedatives used for transport or to facilitate physical examinations) and maintain good clinical health for two weeks prior to release or for a period that satisfies the attending veterinarian that the animal is healthy;

4. The rehabilitated sea otter must have functional vision and hearing, reasonable dental health, and good control and function of all appendages, at least to the degree that its survival in the wild is not compromised; and
5. The rehabilitated sea otter does not pose a known threat (e.g., transmission of pathogens, congenital defects) to the wild sea otter populations or human health and safety.

6.5 Release Categories for Sea Otters

Despite the best efforts to rehabilitate stranded sea otters, many animals die or can never be released to the wild. The following categories have been identified to help determine the status of sea otters being held for rehabilitation:

1. **"RELEASABLE":** All rehabilitated sea otters meeting the medical and behavioral criteria listed above shall be considered releasable. Every effort should be made to release these animals to the wild as soon as they are deemed fit for release.

2. **"CONDITIONALLY RELEASABLE":** All live-stranded sea otters admitted to a rehabilitation program shall be considered conditionally releasable pending the outcome of rehabilitative treatments and a full medical examination and behavioral evaluation.

3. **"NON-RELEASABLE":** Sea otters that fail to meet one or more of the required criteria for release may be considered non-releasable. Rehabilitation facilities that believe that they may have an animal that is non-releasable must contact FWS (as identified in Appendix H) for concurrence on this finding and eventual disposition of the animal. Once FWS has determined that a sea otter is non-releasable, the holding facility may request a permit for permanent placement of the animal as long as the facility meets the requirements under section 104(c)(7) of the MMPA for non-depleted species, or section 104(c)(3) or (c)(4) and section 10 of the ESA for depleted species.

6.6 Identification of Sea Otters Prior to Release

Rehabilitation facilities must affix colored and numbered "Temple" tags to the rear flippers of each sea otter prior to release. In addition, a PIT tag must be implanted in the right inguinal area of each otter. With an appropriate scientific research permit issued by FWS, the rehabilitation facility may implant an abdominal VHF transmitter to facilitate post-release tracking and monitoring of the animals. In all cases, the selection of identification numbers, tag colors/positions, and VHF

frequencies must be coordinated with other facilities and researchers in the area that sea otters are released.

6.7 Release Site Selection for Sea Otters

All rehabilitated sea otters should be released at or near the site where they originally stranded. In cases where this is not feasible, other release sites may be considered under existing Federal permits, letters of authorization, or through consultation with personnel from the FWS (as identified in Appendix H). In all cases, rehabilitated sea otters must be released into the same stock or population from which they originated.

6.8 Post-Release Monitoring of Sea Otters

All facilities releasing rehabilitated sea otters must establish a post-release monitoring program appropriate for each sea otter. The purpose of post-release monitoring is to determine the success of rehabilitation efforts and provide an opportunity for rescue of animals not able to make the transition back to the wild. Sea otters brought into rehabilitation as young pups must be tracked intensively immediately after release. Juveniles or sub-adults may require a focused effort while adult animals may be tracked opportunistically. Sea otters implanted with VHF transmitters should be tracked and monitored periodically for the duration of the battery life of the transmitters (i.e., 1-3 years).

7. Policies Regarding Release of Rehabilitated Polar Bears

Polar bears occur in most ice-covered seas of the Northern Hemisphere and are circumpolar in distribution, although not continuously. Off the Alaskan coast, they normally occur as far south as the Bering Strait. In the Beaufort and Chukchi seas, polar bears make extensive migrations between the United States and Canada or Russian territories, respectively. These movements are thought to be related to seasonal and annual changes in ice position and condition.

Polar bears normally found stranded in Alaska and subsequently recovered are generally orphaned cubs-of-the-year that are either incapable of fending for themselves or have not yet developed the skills to adequately survive in the wild. While these animals are temporarily placed in facilities for the purposes of rehabilitation and release, in the long term, it is highly unlikely that such cubs would be suitable for release back into the wild. Hunting and survival skills are learned during the 2 ½ year dependence on the mother, are not innate to polar bear cubs, and will not be developed in captivity.

For the reasons noted above, the FWS considers polar bear cubs to be poor candidates for release into the wild. If releases were to occur the predicted likely outcomes would be death by starvation or death caused by a predacious attack of another polar bear. Further, adoption by another family group is unlikely or impractical due to the low probability of encountering a receptive family group. Adoption of cubs into family groups has been attempted in Canada with very poor success and Canada is re-evaluating the feasibility of adoption as a management technique. The process of adoption requires substantial investment in searching out a family group in the wild, capture of the group (assisted by helicopter), and placement and follow-up on the fate of the adoptee. In Alaska, holding facilities co-located near release sites are not available. Therefore, FWS does not consider adoption to be a viable alternative and generally consider polar bear cubs to be non-releasable and more suitable for permanent placement in public display facilities. In these cases, the holding facility may request a permit for permanent placement of the animal as long as the facility meets the requirements under section 104(c)(7) of the MMPA. However, FWS will continue to evaluate potential release into the wild or permanent placement in public display facilities on a case-by-case basis. Questions regarding disposition of stranded polar bears must be directed to the FWS as identified in Appendix H.

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APPENDIX A

Chronology of Development of the Release Criteria

1977 1st Workshop on Marine Mammal Strandings; sponsored by the Marine Mammal Commission - Geraci, J.R. and D. J. St Aubin (eds.) 1979. Biology of marine mammals: Insights through strandings. Marine Mammal Commission. Report. No. MMC-77/13. U.S. Department of Commerce, NTIS Doc. PB 293 890, 343 p. (August 1977- Athens, GA).

One of the workshop objectives was to provide recommendations regarding the handling, care, and disposition of live-stranded animals. A relevant finding that came from this workshop and was published in the proceedings included that if live-stranded animals are rescued and rehabilitated, decisions whether these animals should be released or maintained in captivity must take into account the possibility that the animals may have lost their natural capacity to locate and capture appropriate prey species, avoid predators, and interact normally with other members of the species.

1987 2nd Workshop on Marine Mammal Strandings; sponsored by the Marine Mammal Commission and the National Marine Fisheries Service - Reynolds, J.E. and D.K. Odell (eds.) 1991. Marine mammal strandings in the United States: proceedings of the second marine mammal stranding workshop; 3-5 December 1987, Miami, FL. U.S. Department of Commerce., NOAA Technical Report. NMFS 1998.

A recommendation that came from this workshop and was published in the proceedings was a call to establish guidelines and procedures for determining whether and how live-stranded animals should be marked and returned to the sea, transported to a holding facility, rehabilitated, and subsequently released or maintained in captivity, or euthanized to avoid further pain and suffering.

1991 Workshop on rescue, rehabilitation, and release of marine mammals; sponsored by the Marine Mammal Commission and the National Marine Fisheries Service - St. Aubin, D.J., J.R. Geraci, and V.J. Lounsbury (eds.) 1996. Rescue, rehabilitation, and release of marine mammals: an analysis of current views and practices. Proceedings of a workshop December 3-5, 1991, Des Plaines, IL. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-OPR-8, 65 p.

The participants were charged to address five critical questions as well as discuss other outstanding and relative issues. They made several recommendations to include the assembly a panel of medical and behavioral specialists to recommend criteria for assuring that released animals will prosper humanely and pose no undesirable risk to the wild population. The guidelines should include a recommended set of medical determinations by species, with appropriate reference ranges for blood constituents and other clinical measures, morphometric limits (weight at length and age), a checklist for physical examination, and a means of scoring behavioral attributes that would influence survival in the wild. Minimum values should be set for each of these criteria, such that no animal failing any measure would be released. The panel

would incorporate the recommendations of the group considering the risks associated with specific pathogens, particularly for "carriers" that are otherwise normal and healthy. The participants also made recommendations on disease transmission and monitoring.

1992 Amendment of MMPA Title IV - 16 U.S.C. 1421a, Sec. 402. (a) DETERMINATION FOR RELEASE. The Secretary shall, in consultation with the Secretary of the Interior, the Marine Mammal Commission, and individuals with knowledge and experience in marine science, marine mammal science, marine mammal veterinary and husbandry practices, and marine conservation, including stranding network participants, develop objective criteria, after an opportunity for public review and comment, to provide guidance for determining at what point a rehabilitated marine mammal is releasable to the wild. Sec 402 (b) COLLECTION - The Secretary shall, in consultation with the Secretary of the Interior, collect and update, periodically, existing information on – (1) procedures and practices for – (A) rescuing and rehabilitating stranded marine mammals, including criteria used by stranding network participants, on a species-by-species basis, for determining at what point a marine mammal undergoing rescue and rehabilitation is returnable to the wild.

1994 Expert Panel on Behavior, Life History, and Natural History Criteria for Release of Rehabilitated Marine Mammals

Acting on the findings of the 1991 workshop entitled "Workshop on rescue, rehabilitation, and release of marine mammal," NMFS consulted with the Working Group on Unusual Marine Mammal Mortality Events to develop draft criteria. An expert panel of 12 biologists, veterinarians, and animal care professionals was queried by Dr. Randall Wells of the Chicago Zoological Society in August 1994 to address 12 specific questions on marine mammal behavior, life history, and natural history relative to release. Dr. Wells submitted a report summarizing the panel's responses to NMFS in November 1994, and reported the findings at the annual meeting of the Marine Mammal Commission in November 1994. This report included recommendations for release criteria, preparations for release, release, follow-up monitoring, and dissemination of findings. These recommendations were included in the draft document.

1994 Model for Marine Mammal Medical Criteria for Introduction to the Wild

In 1994, Dr. Gregory Bossart of the University of Miami, School of Medicine established a committee of seven nationally-recognized marine mammal veterinarians to formulate a draft of medical criteria that would act as guidelines for the re-introduction of wild marine mammal species. Marine mammal species included in this draft were cetaceans, pinnipeds, sea otters, and manatees. This draft was submitted to NMFS and became the working template for the present NMFS draft release medical guidelines.

1996 Final Rule NMFS 50 CFR Sec. 216.27(a) require release of a marine mammal held for rehabilitation within six months of capture unless "…the attending veterinarian determines that: (i) The marine mammal might adversely affect marine mammals in the wild (ii) Release of the marine mammal to the wild will not likely be successful given the physical condition and behavior of the marine mammal; or (iii) More time is needed to determine whether the release of the marine mammal in the wild will likely be successful…"

<u>1991-1997</u> Working Group of Marine Mammal Unusual Mortality Events – This group established under Title IV of the Marine Mammal Protection Act closely guided the development of the first draft that was published in 1998.

<u>1998</u> FR Notice Draft NOAA Technical Memorandum - NMFS and FWS Release for Stranded Marine Mammals to the Wild: Background, Preparation, and Release Criteria Vol.63, No. 67/ Wed, April 8, 1998

A notice of availability and request for comments was published in the Federal Register.

<u>2001</u> April 24, 2001 Summary of Public Comments on Draft NOAA Technical Memorandum - NMFS and FWS Release for Stranded Marine Mammals to the Wild: Background, Preparation, and Release Criteria

NMFS received official responses from 20 individuals or organizations. There were several outstanding issues that required more development and clarification. NMFS decided to convene special working groups to address the comments.

<u>2001</u> Working groups on pinnipeds and cetaceans

Three working groups were assembled by NMFS and FWS to address outstanding issues noted during the public comment period. Their recommendations have been incorporated into the current document.

APPENDIX B

Key Legislation: Marine Mammal Rescue, Rehabilitation, and Release to the Wild

- **Marine Mammal Protection Act (MMPA) of 1972**
  - Title I. - Conservation and Protection of Marine Mammals
    - Section 109 (h) - Taking of Marine Mammals as Part of Official Duties
    - Section 112 (c) - Contracts, Leases, and Cooperative Agreements
  - Title IV. - Marine Mammal Health and Stranding Response
    - Sec. 402 (a) - Determination for Release
      (b) (1) – Procedures and Practices

- **Endangered Species Act of 1973, as amended**

- **Code of Federal Regulations, Title 50, part 216 – Regulations governing the taking and importing of marine mammals**
  - Section 22 – Taking by the State or Local Government Officials
  - Section 27 - Release, Non- Releasability, and Disposition Under Special Exception Permits for Rehabilitated Marine Mammals
    - (a) Release Requirements, (b) Non-releasability and postponed determinations, (c) Disposition for special exceptions purposes, (d) Reporting
  - Subpart D – Special Exceptions for Threatened and Endangered Marine Mammals
    - Marine Mammal Health and Stranding Response Program Enhancement Permit

- **Code of Federal Regulations, Title 50, part 18 – Marine Mammals**
  - Section 22 – Taking by Federal, State, and Local Government Officials
  - Section 31 – Scientific Research Permits and Public Display Permits

- **Code of Federal Regulations, Title 50, part 17 – Endangered and Threatened Wildlife and Plants**

  - Section 21 (c)(3) – Endangered Wildlife Prohibitions – Take
  - Section 31 (b) – Threatened Wildlife Prohibitions
  - Section 22 – Endangered Wildlife Permits for Scientific Purposes, Enhancement of Propagation of Survival, or for Incidental Taking
  - Section 32 – Threatened Wildlife Permits - General

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APPENDIX C

REQUIRED REPORTING AND DOCUMENTATION

Marine Mammal Stranding Report - Level A Data (NOAA 89-864, OMB #0648-0178)

Marine Mammal Rehabilitation Disposition Report (NOAA 89-878, OMB #0648-0178)

Manatee Rescue, Rehabilitation and Release Report

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Manatee Rescue, Rehabilitation, and Release Report Fields

Rescue: Reporting Requirements	**Release: Request Information**	**Transfer: Request Information**	**Death: Reporting Requirements**	**Captive Birth: Reporting Requirements**
Name of Reporting Organization Date Report Filed Date Event Occurred Type of Rescue Identification ▪ Name (if any) ▪ Studbook Number ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) PIT Tag ▪ Right (identifying number) ▪ Left (identifying number) Freeze Brand (yes/no) ▪ Number Sex Weight (lbs/kg) ▪ Actual/estimated Length (cm/inches) ▪ Actual/estimated Ultrasound (yes/no) County Nearest Town/Community Waterbody Latitude/Longitude Probable Cause for Rescue ▪ (Drop down list includes various common causes; additional information is required for entangled animals) Health Status at Time of Report Rehabilitation Facility (if any) Veterinarian Facility Supervisor Rescue Participants Name of Reporter Telephone Number	Name of Requesting Organization Date Request Filed Date Event Proposed Identification ▪ Name (if any) ▪ Studbook Number ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) PIT Tag ▪ Right (identifying number) ▪ Left (identifying number) Freeze Brand (yes/no) ▪ Number Other Tags Name of Tracker/Affiliation Tracker Telephone Number Sex Weight (lbs/kg) ▪ Actual ▪ Date Taken Length (cm/inches) ▪ Actual ▪ Date Taken Peduncle Girth (cm) ▪ Date Taken Ultrasound (yes/no) County Where Rescued Nearest Town/Community Waterbody Latitude/Longitude Date of Rescue Weight at Time of Rescue Length at Time of Rescue Proposed Date of Release Actual Date of Release County Where Released Nearest Town/Community Where Released Waterbody Where Released Veterinarian Facility Supervisor Release Participants Name of Reporter Telephone Number	Name of Requesting Organization Date Request Filed Date Event Proposed Identification ▪ Name (if any) ▪ Studbook Number ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) Sex Weight (lbs/kg) ▪ Actual ▪ Date Taken Length (cm/inches) ▪ Actual ▪ Date Taken Date Brought Into Captivity Date of Proposed Transfer Actual Date of Transfer Veterinarian Facility Supervisor Release Participants Name of Reporter Telephone Number	Name of Reporting Organization Date Report Filed Date Died Identification ▪ Name (if any) ▪ Studbook Number ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) Sex Date Rescued Probable Cause of Death (or Euthanized) Disposition of Carcass Veterinarian Facility Supervisor Name of Reporter Telephone Number	Name of Reporting Organization Date Report Filed Date Born Identification ▪ Name (if any) ▪ Studbook Number ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) Sex Weight (lbs/kg) ▪ Actual ▪ Date Taken Length (cm/inches) ▪ Actual ▪ Date Taken Present Health Status Origin of Dam Circumstances of Birth Dam Identification ▪ Name (if any) ▪ Studbook Number (if any) ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered) Sire Identification ▪ Name (if any) ▪ Studbook Number (if any) ▪ Identification Numbers (in the case of multiple numbers, all numbers should be entered)

APPENDIX D

DISEASES OF CURRENT CONCERN FOR CETACEANS

The diseases listed below are of current concern for cetaceans. Numerous additional diseases exist among cetaceans and should also be considered during diagnostic work-ups. Testing for specific diseases of cetaceans is not required at this time. However, thorough diagnostic testing of rehabilitated cetaceans is strongly recommended as warranted by their history and clinical signs of illness. Clinicians are particularly encouraged to test cetaceans for brucellosis and morbillivirus. NMFS may require disease testing for specific individuals prior to release if concern for the health of wild marine mammals exists or concern exists regarding the animal's likelihood of survival in the wild. Contact the NMFS coordinator for information regarding the appropriate diagnostic laboratories.

A good resource to obtain updated literature on diseases of marine mammals is through the Animal Welfare Information Center (http://awic.nal.usda.gov), part of the United States Department of Agriculture National Agriculture Library.

BACTERIAL DISEASES	COMMENTS
Brucellosis	Serologic evidence or isolation of this bacterium has been made several species of cetaceans as well as those in captivity. Different serovar than terrestrial species. Current limited understanding of pathophysiology and significance. May cause reproductive illness, isolated from an aborted captive bottlenose dolphin fetus. Zoonotic. Human case followed handling of marine mammal tissues. (Dunn et.al., 2001; Brew et al., 1999; Clavareau, 1998; Miller, et.al., 1999).
Erysipelothrix	Has caused acute septicemia or generalized dermatitis in several cetacean species including wild orca. Believed to be acquired from ingestion of fish contaminated with the organism. Zoonotic, causes dermatitis, arthritis, pneumonia, or septicemia in humans. (Dunn et.al., 2001; Young et.al., 1997; Cowan et.al., 2001.)
Respiratory Illness	Respiratory illness is common among both captive and wild cetaceans. Such disease often involves bacterial pathogens and is frequently fatal. *Staphylococcus areus* and *Pseudomonas aeruginosa* as well as Gram negative bacterial organisms are often involved. Pulmonary parasitism may contribute to development of bacterial respiratory disease. (Dunn et.al., 2001; Howard et.al.1983; Kinoshita et al. 1994).

VIRAL DISEASES

Morbillivirus	Has caused major epizootics with high mortalities in bottlenose dolphins, common dolphins, and striped dolphins. Has also infected other cetacean species. Testing for cetacean morbillivirus is strongly recommended for all cetaceans in rehabilitation centers. (Kennedy-Stoskopf, 2001; Kennedy, 1998; Duigan, 1999).
Poxvirus	Common infection of captive and wild cetaceans characterized by skin lesions. Not known to cause systemic infection. Appearance of lesions may correlate with weaning, poor general health, and/or compromised environmental conditions. (Kennedy-Stoskopf, 2001; Van Bressem and Van Waerebeek ,1996; Geraci et.al. 1979).
Papillomavirus	Has caused lesions of the skin, genital area, stomach ,and tongue of several cetacean species. Sometimes referred to as benign tumors. Genital lesions may be transmitted venereally and may interfere with copulation. (Kennedy-Stoskopf, 2001; Deguise et.al., 1994; Van Bressem et al., 1996).

PARASITIC DISEASES

Toxoplasmosis gondii	Protozoan parasite which has caused serious disease and death in cetacean species. Source of infection not clearly defined. (Dailey, 2001; Migaki, 1990.)
Anasakid nematodes	Family of nematodes which parasitize the cetacean gastrointestinal tract. Infections may cause gastritis and ulceration. (Dailey, 2001; Smith, 1989).
Hepatic trematodes	Heavy infection may cause serious liver disease associated with weight loss, increased susceptibility to bacterial infection. May result in death. (Dailey, 2001; Zam et.al, 1971.)
Nasitrema sp.	Nematode parasite which infects nervous systems of cetaceans. May be a significant cause of stranding in odontocetes. Causes eighth cranial neuropathy, encephalitis, and cerebral necrosis. (Dailey, 2001).
Lungworms	Includes nematode genera such as *Halocercus* which may cause severe respiratory disease and may cause death, depending on severity of infection. (Dailey,2001; Measures, 2001; Moser and Rhinehart, 1993).

NONINFECTIOUS DISEASES

Anthropogenic trauma	Entanglement in debris such as fishing nets and lines, collisions with boats, and underwater detonation of explosives may injure or kill cetaceans. The number of animals affected relative to total population may cause particular concern for some species (i.e. right whales and boat collisions, small odontocetes and fisheries by-catch). (Gulland et al. 2001, Kraus, 1990, Perrin et.al., 1994).
Biotoxins	Toxins naturally produced from dinoflagellates and diatoms have been associated with illness and death in cetaceans. Brevetoxin was a possible cause of bottlenose dolphin mortality in 1946-47 and 1987-1988. Humpback whale mortality was associated with consumption of mackerel containing saxitoxin. (Gunter et.al., 1948; Geraci, et.al., 1989).
Neoplasia	Belugas of the St. Lawrence River have had a concerning rate of neoplasia. Other cases of neoplasia have been reported in several species. Etiology of cetacean tumors is not known. Interplay of physical, chemical, and/or infectious agents with host factors such as age, sex, and genetic make-up likely involved with tumorigenesis. (Gulland et.al., 2001; De Guise et.al., 1994).

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APPENDIX E

DISEASES OF CURRENT CONCERN FOR PINNIPEDS

The diseases listed below are of current concern for pinnipeds. Numerous additional diseases exist among pinnipeds and should also be considered during diagnostic work-ups. Testing for specific diseases of pinnipeds is not required at this time. However, thorough diagnostic testing is strongly recommended for pinnipeds as warranted by their history and clinical signs of illness. NMFS, or in the case of walrus the FWS, may require disease testing for specific individuals prior to release if concern for the health of wild marine mammals exists or if there is significant concern regarding the animal's likelihood of survival in the wild. Contact the NMFS coordinator, or the FWS in the case of walrus, for information regarding appropriate diagnostic laboratories.

A good resource to obtain updated literature on marine mammal diseases is through the Animal Welfare Information Center (http://awic.nal.usda.gov), part of the United States Department of Agriculture, National Agriculture Library.

BACTERIAL DISEASES	COMMENTS
Brucellosis	Serologic evidence or isolation of this organism has been obtained for phocids and walrus. Different serovar than terrestrial species. Current limited understanding of pathophysiology and significance. May cause reproductive illness. Zoonotic. Human case followed handling of marine mammal tissues. (Dunn et.al., 2001; Garner et. al., 1997).
Leptospirosis	Severe systemic illness that frequently affects California sea lions and northern fur seals. Infection may be obtained at sea, in rookeries, or via contact with fresh water sources contaminated by infected terrestrial mammals via contamination of water sources. May be treated with antibiotics. Zoonotic. (Dunn et.al., 2001; Schoenwald et. al., 1971; Gulland et.al., 1996, Stamper et al., 1998).
Mycobacterial Disease	Illness characterized primarily by skin or pulmonary lesions diagnosed in several pinniped species. Caused by organisms which include those responsible for tuberculosis. Recently diagnosed in wild subantarctic fur seals. Zoonotic. (Dunn et. al., 2001, Cousins et.al., 1993, Bastida et.al., 1999).

VIRAL DISEASES

Adenovirus	Caused fatal hepatitis in California sea lions. Source of virus unknown, but may be related to canine adenovirus. (Kennedy-Stoskopf, 2001; Dierauf et.al., 1981).
Calicivirus	Several pinniped species susceptible. Causes skin lesions in California sea lions. Numerous animal species may be infected by calicivirus including fish, reptiles, mammals. Transmission from marine mammals to terrestrial animals and vice versa possible. Unconfirmed as zoonotic but possibility exists. (Kennedy-Stoskopf, 2001; Smith and Boyt, 1990; Gage, et.al., 1990; Barlough et.al., 1998).
Herpes Virus	May infect several pinniped species including walrus. Causes fatal disease in neonatal Pacific harbor seals characterized by severe adrenal gland and liver pathology. (Kennedy-Stoskopf, 2001; Gulland et.al., 1997).
Influenza	Caused high mortality among Atlantic harbor seals. Endemic among this population. Changes in virulence may cause disease outbreaks. Related to avian influenza. Zoonotic. Has caused severe conjunctivitis among humans. (Kennedy-Stoskopf, 2001; Webster et.al., 1981).
Morbillivirus	Endemic in several phocid species. May cause high morbidity and mortality. Seals have been infected by the canine morbillivirus as well as a morbillivirus specific for phocids. (Kennedy-Stoskopf, 2001; Kennedy, 1998; Duignan, 1999).
Pox	Causes skin lesions in several pinniped species. Outbreaks may be associated with stress as with postweanling animals recently introduced to captivity. Zoonotic. May cause skin lesions on humans. (Kennedy-Stoskopf, 2001; Hicks and Worthy, 1987).

PARASITIC DISEASES

Helminths	A variety of nematode, trematode, and cestode parasites infect pinnipeds, causing varying degrees of clinical disease. For instance, the nematode *Contracaecum corderoi* has caused gastrointestinal perforations and fatal peritonitis in California sea lions. (Dailey, 2001; Fletcher, 1998.)

Cryptosporidiosis	Protozoan gastrointestinal parasite recently isolated from several pinniped species. Limited current knowledge of pathophysiology in pinnipeds. Zoonotic. (Miller, et.al., 2001; Deng, et.al., 2000).
Giardia	Protozoan gastrointestinal parasite identified in phocids and the California sea lion. Incidence and severity of clinical illness not fully understood. Zoonotic. (Miller, et.al., 2001; Measures and Olson, 1999.)
Sarcocystis	Protozoan parasite that may cause severe neurologic disease and death. Important cause of mortality among Pacific harbor seals. Organism may be found in waste from humans or their activities. (Miller, et. al., 2001; LaPointe, et.al., 1998).

NONINFECTIOUS DISEASES

Anthropogenic trauma	Gunshot, underwater detonation of explosives, and entanglement in debris such as fishing nets and lines cause morbidity and mortality among pinnipeds. (Gulland, et.al., 2001).
Biotoxins	Harmful algal blooms producing domoic acid have caused significant sea lion mortality. (Gulland, 2000; Schoelin, et.al. 2000).
Neoplasia	Carcinoma, an aggressive tumor often associated with the urogenital system is common in California sea lions. May be linked to viral infections and/or exposure to environmental contaminants. (Buckles, et.al., 1996, Gulland, et.al., 1996, Lipscomb, et.al., 2000).

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APPENDIX F

DISEASES AND ISSUES OF CURRENT CONCERN FOR MANATEES

The diseases and issues listed below are of current concern for manatees. Other diseases exist among manatees and should also be considered during diagnostic work-ups. Testing for specific diseases of manatees is not required at this time. However, thorough diagnostic testing of rehabilitated manatees is strongly recommended as warranted by their history and clinical signs of illness. FWS may require disease testing for specific individuals prior to release if concern for the health of wild marine mammals exists or concern exists regarding the animal's likelihood of survival in the wild. Contact the FWS stranding support staff for information regarding the appropriate diagnostic laboratories.

A good resource to obtain updated literature on marine mammal diseases is through the Animal Welfare Information Center (http://awic.nal.usda.gov), part of the United States Department of Agriculture National Agriculture Library.

BACTERIAL DISEASES	**COMMENTS**
Brucellosis	Antibodies to *Brucella* spp. have been reported in Florida manatees, although lesions consistent with brucellosis have not been observed (Geraci et al., 1999).
Other	Systemic mycobacteriosis due to *Mycobacterium marinum* and *M. chelonei (Boever et al., 1976),* and mycotic dermatitis (Dilbone, 1965; Tabuchi et al., 1974), have been reported in adult manatees.
VIRAL DISEASES	
Cutaneous papillomatosis	Recently described in a captive population of manatees. PCR analyses has demonstrated a virus consistent with Type I bovine papilloma virus. (Bossart et al., 1998a)
Morbillivirus	Serologic evidence of morbillivirus has been demonstrated in manatees, although signs of clinical disease or active infection has not been observed (Duignan et al., 1995).
Other	Pseudorabies, San Miguel sea lion virus Type I, and eastern, western, and Venezuelan equine encephalitis have been reported in Florida manatees (Geraci et al., 1999). While these are serologically evident, no signs of clinical disease or active infection have been observed.

PARASITIC DISEASES

Meningoencephalitis — *Toxoplasma gondii* has caused the death(s) of Florida manatees (Buerguelt and Bonde, 1983).

Other — Endoparasites are commonly found in manatees; however, pathological signs or clinical disease are rare (Bossart 2001).

NONINFECTIOUS DISEASES

Anthropogenic trauma — Collisions with boats, entanglement in fishing gear (monofilament fishing line, crab float lines, etc.), crushing in water control structures, etc., are sources of injury and mortality

Biotoxins — Brevetoxins associated with *Kerenia brevi* and possibly other dinoflagellates have killed dozens of Florida manatees. Suspected vectors include ingestion of toxin-containing ascidians and sea grasses and inhalation of aerosolized toxicants (Bossart 2001).

Cold stress syndrome — Exposure to cold for extended periods of time initiates clinical signs and disease processes that characterize manatee cold stress syndrome. Effects include lethargy, anorexia, and terminal hypothermia. Numerous significant cold fronts extending the length of the Florida peninsula have caused deaths and cold stress in dozens of manatees aver the past few decades (Bossart 2001).

APPENDIX G

DISEASES OF CURRENT CONCERN FOR SEA OTTERS

The diseases listed below are of current concern for sea otters. Numerous additional diseases exist among sea otters and should also be considered during diagnostic work-ups. Testing for specific diseases of sea otters is not required at this time. However, thorough diagnostic testing is strongly recommended for sea otters as warranted by their history and clinical signs of illness. FWS may require disease testing for specific individuals prior to release if concern for the health of wild marine mammals exists or if there is significant concern regarding the animal's likelihood of survival in the wild. Contact the FWS coordinator for information regarding appropriate diagnostic laboratories.

A good resource to obtain updated literature on marine mammal diseases is through the Animal Welfare Information Center (http://awic.nal.usda.gov), part of the United States Department of Agriculture, National Agriculture Library.

BACTERIAL DISEASES	COMMENTS
Septicemias	Overwhelming bacterial infections, sometimes from infected wounds, dental problems, and intestinal infections, are a common cause of mortality in southern sea otters, often secondary to infectional perforation by acanthocephalans (California Department of Fish and Game (CDFG) unpublished data), and a significant cause of mortality in northern sea otters in Alaska (FWS unpublished data). Connections with sewage or animal wastes are suspected in some infections; however, for northern sea otters, the source of this infection is often unknown.
Valvular endocarditis	This a sporadic disease secondary to chronic bacterial seeding from a primary source of infection such as a bite wound or tooth abscess. However, northern sea otters in Alaska have been diagnosed with VE without a primary source (FWS unpublished data). These animals have tested positive for the *Streptococcus bovis/equinus* complex. In human cases, there is an association between *S.bovis* endocarditis cases and a malignancy of the GI tract.
Brucellosis	One culture and PCR-confirmed case in a California sea otter with a chronic toe joint infection and low-level systemic disease (CDFG unpublished data). Fastidious in culture and easily missed. Marine Brucellae have demonstrated zoonotic potential, so caution is advised when handling fetal tissues, or live or dead animals with infected joints and wounds.

Dental disease	Dental disease is common, particularly in older animals and can lead to systemic bacterial infections.
Leptospirosis	Problem common in sea lions (see above pinniped section). Positive serologic titers in southern sea otters (Hanni *et al*. 2003). Cases reported in northern sea otters in Washington State. No clinical case identified in southern sea otters to date, although seropositive animals are observed. No cases reported for northern sea otters in Alaska.

FUNGAL DISEASES

Coccidiomycosis	Low levels of infections (less than 1 percent) in southern sea otters, mostly off the San Luis Obispo county coast around the mouth of the Santa Maria River. Cases always fatal. Not reported in northern sea otters. Biohazard for people handling dead sea otters.

VIRAL DISEASES

Morbillivirus	Conflicting evidence on whether exposure is relatively common or not in southern sea otters. Canine distemper has been diagnosed in a river otter in coastal British Columbia (Mos *et al*. 2003) and positive serologic titers have been noted in northern sea otters in Washington State. Care must be taken in moving otters if this virus is present in some populations and not others. Seropositivity to both canine and phocine distemper has been identified in northern sea otters in Washington and Alaska (FWS unpublished data).
Papillomavirus	Some evidence of this type of viral infection occurs, significance probably not great. Typically presents as small, raised variably pigmented plaques on the lips, tongue, or buccal mucosa. Occurrence often episodic and invariably incidental in southern sea otters (CDFG unpublished data).
Herpesvirus	Associated with corneal, oral, and esophageal ulcers, often in debilitated animals in California and Alaska.

PARASITIC DISEASES

Toxoplasma gondii	Protozoan parasite which can cause serious disease and death in southern sea otters (Miller *et al*. 2004) and northern sea otters in Washington State. High prevalence of exposure in California with moderate mortality rate. There is evidence of wide exposure in California and Washington State (Lindsay *et al*. 2001; Miller *et al*. 2002; Dubey *et al*. 2003; Conrad *et al.* 2005). Northern sea otters in Alaska rarely test positive (FWS unpublished data). Source of infection not clearly defined but hypothesized to be associated with freshwater inputs to the ocean in California (Miller *et al*. 2002; Dailey 2001; Migaki 1990).
Sarcocystis neurona	Protozoan parasite that may cause severe neurologic disease and death. Important cause of mortality among southern sea otters and northern sea otters in Washington State. Infections appear to progress more quickly than *T. gondii* (Miller *et al*. 2001; Miller 2006). No evidence of this in northern sea otters in Alaska.
Helminths	A variety of nematode, trematode, and cestode parasites infect sea otters, causing varying degrees of clinical disease. Acanthocephalan thorny headed worms, particularly the *Profilicollis* spp. may be pathogenic when overwhelming infestations occur, particularly in young animals (Mayer *et al.* 2003).
Mites	Nasal mite infestations are uncommon in wild animals, but heavy infections may occur in captive and rehabilitated animals. Heavy infections can result in secondary bacterial nasopharyngitis and pneumonia.
Giardia	Some live, captive northern sea otters in Alaska have tested positive (FWS unpublished data).

NONINFECTIOUS DISEASES

Anthropogenic trauma	Gunshot, boatstrike, oil spills, and entanglement in debris such as fishing nets, fishing lines, and hooks cause morbidity and mortality among sea otters. Alaskan otters have died from impactions with fish bones when feeding at cannery outfalls (FWS unpublished data).
Biotoxins	Harmful algal blooms particularly those producing domoic acid have caused some morbidity and mortality of sea otters in California (Gulland 2000; Jessup *et al.* 2004).

Persistent Organic Pollutants	Levels in southern sea otters and northern sea otters in Alaska adjacent to known military dump sites are high (50-100 times control populations). Potential effects on endocrine and immune functions are a cause for concern, but evidence for this or for acute toxicity are lacking.
Predation	White shark predation on southern sea otters is well documented. Some cases may be secondary to brain infections or intoxications that render otters helpless. Killer whale predation is hypothesized to be very significant in the decline of certain northern sea otter populations in Alaska.
Neoplasia	A number of types of neoplasia have been documented in northern sea otters (FWS unpublished data).
Intestinal Disease	Sea otters have been known to suffer from intestinal intussusceptions, torsions, and impactions not caused by human related causes.
Conspecific Trauma	Territorial males will often attack other male or pups. Males may also injure females during mating.

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APPENDIX H

Contact Information for NMFS and FWS National and Regional Stranding Support Staff

National Marine Fisheries Service

OFFICE	ADDRESS	PHONE
Headquarters	Office of Protected Resources Marine Mammal Health and Stranding Response Program 1315 East-West Highway Silver Spring, MD 20910	Phone: (301) 713-2322 Fax: (301) 427-2522
Northeast Region	Administrator, Northeast Region One Blackburn Drive Gloucester, MA 01930-2298	Phone: (978) 281-9250 Fax: (978) 281-9207
Southeast Region	Administrator, Southeast Region 263 13th Ave. South St. Petersburg, FL 33701	Phone: (727) 824-5301 Fax: (727) 824-5320
Northwest Region	Administrator, Northwest Region 7600 Sand Point Way, NE Bin C 15700, Bldg. 1 Seattle, WA 98115-0070	Phone: (206) 526-6150 Fax: (206) 526-6426
Southwest Region	Administrator, Southwest Region 501 West Ocean Blvd. Suite 4200 Long Beach, CA 90802-4213	Phone: (562) 980-4001 Fax: (562) 980-4018
Alaska Region	Administrator, Alaska Region P.O. Box 21668 Juneau, AK 99802-1668	Phone: (907) 586-7221 Fax: (907) 586-7249
Pacific Islands Region	Administrator, Pacific Islands Region 1601 Kapiolani Blvd., Suite 1110 Honolulu, HI 96814	Phone: (808) 944-2280 Fax: (808) 973-2941

U.S. Fish and Wildlife Service

OFFICE	ADDRESS	PHONE
Headquarters	Division of Habitat and Resource Conservation 4401 N. Fairfax Drive, Room 400 Arlington, VA 22203	Phone: (703) 358-2161 Fax: (703) 258-1869
LOAs and Permits	Division of Management Authority 4401 N. Fairfax Drive, Room 700 Arlington, VA 22203	Phone: (703) 358-2104 Fax: (703) 358-2281
Manatees	Jacksonville Field Office 6620 Southpoint Drive South, Suite 310 Jacksonville, FL 32216	Phone: (904) 232-2580 Fax: (904) 232-2404
Southern Sea Otters in California	Ventura Field Office 2493 Portola Road, Suite B Ventura, CA 93004	Phone: (805) 644-1766 Fax: (805) 644-3958
Northern Sea Otters in Washington	Washington Field Office 510 Desmond Drive SE, Suite 102 Lacey, WA	Phone: (360) 753-9440 Fax: (360) 753-9518
Polar Bears, Pacific Walrus, and Northern Sea Otters in Alaska	Marine Mammals Management Office 1011 E. Tudor Road Anchorage, AK 99503	Phone: (907) 786-3800 Fax: (907) 786-3816

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APPENDIX I

Cetacean – Species Specific Developmental Stages (Age-Length) and Social Dynamics

Scientific Name	Common Name	Approx Length at Birth (cm)	Approx "NEONATE" length (cm)	Approx Length at 1 Year of Age (cm)	Approx Length at 2 Years of Age (cm)	Approx. Age at Weaning (yrs)	Approx Length at Weaning (cm)	Approx. Adult Length (cm)	Typical Group Size	Freq. of Occur. Single Individuals
Delphinapterus leucas	Beluga Whale	160	130-160	216	250	2	250	300-400 F 400-450 M	up to hundreds	uncommon
Delphinus capensis	Long-beaked Saddleback Dolphin	< 100							up to thousands	uncommon
Delphinus delphis	Common Dolphin	80-90	80-100				110-120	230-250	up to thousands	uncommon
Feresa attenuata	Pygmy Killer Whale	80						240-270	1-70	occasional
Globicephala macrorhynchus	Short-finned Pilot Whale	140-185	150			2-3		400-500 F 500-600 M	up to several hundred	rare
Globicephala melas	Long-finned Pilot Whale	177	160-200			2-3	240	450-500 F 450-600 M	up to several hundred	rare
Grampus griseus	Risso's Dolphin	110-150	120-160					300-400	single to several hundred	occasional
Kogia breviceps	Pygmy Sperm Whale	120	100-120			1		300 - 370	1-6	not uncommon
Kogia sima	Dwarf Sperm Whale	95	100			1		210-270	1-10	not uncommon
Lagenodelphis hosei	Fraser's Dolphins	100	100					240	100-1000	uncommon
Lagenorhynchus acutus	Atlantic White-sided Dolphin	108-122	100-130	142-156	176-190	1.5	180	240-270	2-500	uncommon
Lagenorhynchus albirostris	White Beaked Dolphin	110-120	110-130					300-320	1-100 (to 1500)	occasional
Lagenorhynhchus obliquidens	Pacific White-sided Dolphin	92	80-100					220-230	tens to thousands	uncommon
Lissodelphis borealis	Northern Right Whale Dolphin	80-100	80-100					220-230 F 260-300 M	100-200	occasional
Mesoplodon densirostris	Blainville's Beaked Whale	200						450-470	1-7	occasional
Mesoplodon europaeus	Gervais' Beaked Whale	210	210					450-520	small groups	uncommon
Orcinus orca	Killer Whale	183-228	210-250			1.5-2.0	400	700-800 F 800-950 M	2-100	infrequent - adult males
Peponocephala electra	Melon-Headed Whale	100						270	150-1500	uncommon
Phocoena phocoena	Harbor Porpoise	70	70-90	110-135	115-155	0.3 - 1.0	100 - 110	140-170	small groups	not uncommon

Scientific Name	Common Name	Approx Length at Birth (cm)	Approx "NEONATE" length (cm)	Approx Length at 1 Year of Age (cm)	Approx Length at 2 Years of Age (cm)	Approx. Age at Weaning (yrs)	Approx Length at Weaning (cm)	Aprox. Adult Length (cm)	Typical Group Size	Freq. of Occur. Single Individuals
Phocoenoides dalli	Dall's Porpoise	100	100			0.3-2.0		180-220	2-12	uncommon
Physeter macrocephalus	Sperm Whale	400	350-500		670	2+	670	1100-1300 F 1500-1800 M	20-40 (50)	adult males
Pseudorca crassidens	False Killer Whale	160	170-200			1.5-2.0		500 F 550-600 M	10-20+	rare
Stenella attenuata	Pantropical Spotted Dolphin	85	80-100	129-142		1-2	140	120	<100 to thousands	uncommon
Stenella clymene	Clymene Dolphin							180-200	1-50	occasional
Stenella coeruleoalba	Striped Dolphin	93-100	100	166	180		170	220-260	10-100s	uncommon
Stenella frontalis	Atlantic Spotted Dolphin	100	80-120				140	200-230	1-15	uncommon
Stenella longirostris	Spinner Dolphin	76-77	70-80	133-137		1-2		180-220	up to thousands	uncommon
Steno bredanensis	Rough-toothed Dolphin	100						240-270	10-20	uncommon
Tursiops truncatus	Bottlenose Dolphin	117	100-130	170-200	170-225	1.5-2.0	225	220-300 (coastal) 250-650 (offshore)	2-15	occasional
Ziphius cavirostris	Cuvier's Beaked Whale	270	200-300					670 - 700	1-7	not uncommon

Pinniped – Species Specific Developmental Stages (Age-Length) and Pupping Information

Scientific Name	Common Name	Approx Length at Birth (cm)	Approx "NEONATE" length (cm)	Approx. Age at Weaning	Approx Length at Weaning (cm)	Approx. Adult Length (cm)	Pups Born	Peak of Pupping
Arctocephalus townsendi	Guadalupe Fur Seal	60	60	9-11 months		140-170 F 180-240 M	June	June
Callorhinus ursinus	Northern Fur Seal	60-65	60	3-4 months		100-150 F 190-230 M	June-July	June-July
Cystophora cristata	Hooded Seal	90-100	90-110	4-12 days		200-230 F 230-290 M	Late March	Late March
Erignathus barbatus	Bearded Seal	130	130	12-18 days	150	210-250	Mid-October to Mid-November	End of October
Eumetopias jubatus	Steller Sea Lion	100	100	Within 1 yr	180	220-290 F 240-330 M	Mid-May to Mid-June	Mid-June
Halichoerus grypus	Gray Seal	90-110	80-110	16-21 days	110	180-210 F 220-250 M	January-February	January
Histriophoca fasciata	Ribbon Seal	80-90	80-90	3-4 weeks	90-110	150-180	April-May	Early April
Mirounga angustirostris	Northern Elephant Seal	125	120-140	28 days	150	200-320 F 380-410 M	January	End of January
Monachus schauinslandi	Hawaiian Monk Seal	100	100	3-7 weeks	100	230-240 F 210-220 M	December-August	March- May
Odobenus rosmarus	Walrus	100-120	100-140	2+ years	200	230-260 F 270-320 M	April-June	May
Pagophilus groenlandicus	Harp Seal	85	80-110	12 days	100	160-190	February-March	March
Phoca larga	Spotted Seal	77-92	80-90	4-6 weeks	110	160-170	Early April-Early May	Early April
Phoca vitulina	Harbor Seal	70-100	70-90	3-6 weeks	90	150-190	May-June	May
Pusa hispida	Ringed Seal	60-65	60-70	6-8 weeks	80	120-150	Mid-March to Mid-April	Early April
Zalophus californianus	California Sea Lion	75	70	10-12 months		150-200 F 200-240 M	June	June

References:

Marine Mammals Ashore: A Field Guide for Strandings second edition, J.R.Geraci and V.J.ounsbury, ©National Aquarium in Baltimore, 2005.

Marine Mammals Ashore : A field guide for strandings J.R. Geraci and V.J. Lounsbury ©SeaGrant College Program, Texas A&M University, 1993. ISBN: 1883550017

Guide to Marine Mammals of the World. R.R. Reeves, B.S. Stewart, P.J. Clapham, and J.A. Powell. Chanticleer Press, Inc., New York, 2002.

Seals of the World. Judith E. King Comstock Publishing Association, Cornell Press, Ithaca, New York, 1983

Handbook of Marine Mammals Volume 4 *River dolphins and the larger toothed whales.* Edited by Sam H. Ridgway and Richard Harrison. Academic Press, London, New York, 1989. ISBN: 0125885040

Handbook of Marine Mammals Volume 5 *The first book of dolphins*. Edited by Sam H. Ridgway and Richard Harrison. Academic Press, London, New York, 1994. ISBN: 0125885059

Handbook of Marine Mammals Volume 6 *The Second book of dolphins and the porpoises*. Edited by Sam H. Ridgway and Richard Harrison. Academic Press, San Diego, 1999. ISBN: 0125885067

APPENDIX J

"Recommended" Standard Checklist to Determine Release Category of all Rehabilitated Cetaceans

Yes = true statement, No= untrue statement (shaded areas may not be applicable)

	Release Determination Assessment (within 2 weeks of release)		Pre-Release Assessment (within 72 hours of release)	
History	**Yes**	**No**	**Yes**	**No**
1. The release candidate has NOT previously stranded				
2. Stranding was NOT associated with a Marine Mammal Unusual Mortality Event or ongoing epidemic				
3. Stranding was NOT associated with anthropogenic environmental accident (e.g., hazardous waste spill, acoustic insult)				
4. Stranding was NOT associated with an environmental event of NMFS concern (e.g., harmful algal bloom, fish kill, etc.)				
5. Stranding was NOT associated with an El Niño event				
6. The animal is NOT evidence or part of a human interaction or criminal case				
7. Stranding was NOT associated with a mass stranding				
8. The animal was NOT part of a "permitted" research project				
Developmental Stage				
9. The release candidate is of sufficient size and age to be nutritionally dependent				
10. The release candidate is NOT a female with calf				
11. The release candidate is NOT a geriatric animal and is NOT compromised due to age related conditions.				
12. There is NO evidence that the release candidate was exposed to terrestrial wild or domestic animals prior to and during rehabilitation				
Behavioral Clearance				
13. The release candidate demonstrates appropriate breathing, swimming, and diving				
14. The release candidate does NOT exhibit aberrant behavior including attraction to or desensitization to the presence of humans				
15. The release candidate does NOT exhibit auditory or visual dysfunction				
16. The release candidate demonstrates appropriate foraging ability				
17. The release candidate did NOT strand as a direct result of a failure to avoid predators				

	Release Determination Assessment (within 2 weeks of release)		Pre-Release Assessment (within 72 hours of release)	
Behavioral Clearance (continued)	**Yes**	**No**	**Yes**	**No**
18. The release candidate did NOT strand as a result of taking food from humans in the wild				
19. The release candidate did NOT strand as a direct result of a demonstrated inability to obtain sufficient food in the wild				
20. The release candidate did NOT strand as a direct result of a conspecifics injury				
Medical Clearance				
21. The attending veterinarian has reviewed the release candidate's history and medical records, including records from other facilities that have previously held the animal.				
22. The attending veterinarian has examined the release candidate within two weeks of release				
23. The required health screen and assessments were conducted with good results				
24. Hands-on physical exam to be performed by attending veterinarian within 72 hours of release				
25. NO congenital defects				
26. CBC compatible with good health				
27. Chemistry profile compatible with good health				
28. Serum banked upon admission and prior to release (3 ml)				
29. Additional testing requested and reviewed by NMFS and no apparent concerns				
30. Free of drugs (exclusive of sedatives used for transport) minimum of 2 weeks prior to release				
31. Veterinarian's signature on health statement				

Health Statement

I have examined the cetacean (Species and ID#)_____ on (Date) _____ and have determined that the animal is medically and behaviorally suitable for release in accordance with the release criteria in that the animal will not pose a risk to the wild population and is likely to survive upon reintroduction to the wild.

_____ _____

Signature of the Attending Veterinarian *Printed Name of the Attending Veterinarian*

_____ _____

Signature of the Authorized Representative *Printed Name of the Authorized Representative*

"Recommended" Standard Checklist to Determine Release Category of all Rehabilitated Pinnipeds (except walrus)

Yes = true statement, No= untrue statement (shaded areas may not be applicable)

	Release Determination Assessment (within 2 weeks of release)		Pre-Release Assessment (within 72 hours of release)	
History	**Yes**	**No**	**Yes**	**No**
1. The release candidate has NOT previously stranded				
2. Stranding was NOT associated with a Marine Mammal Unusual Mortality Event or ongoing epidemic				
3. Stranding was NOT associated with anthropogenic environmental accident (e.g., hazardous waste spill, acoustic insult)				
4. Stranding was NOT associated with an environmental event of NMFS concern (e.g., harmful algal bloom, fish kill, etc.)				
5. Stranding was NOT associated with an El Niño event				
6. There is NO evidence that the release candidate was exposed to terrestrial wild or domestic animals prior to and during rehabilitation				
7. The release candidate is NOT known to have inflicted a bite on human(s)				
8. The animal is NOT evidence or part of a human interaction or criminal case				
9. The animal was NOT part of a "permitted" research project				
Developmental Stage				
10. The release candidate is weaned, and has a proven ability to feed itself				
11. The release candidate is sufficiently robust, having adequate reserves to survive readjustment in the wild				
12. The release candidate shows no sign of molt				
Behavioral Clearance				
13. The release candidate demonstrates appropriate breathing, swimming, diving, and locomotion on land				
14. The release candidate demonstrates an absence of aberrant behavior including attraction to or desensitization to the presence of humans				
15. The release candidate does NOT exhibit auditory or visual dysfunction				

	Release Determination Assessment (within 2 weeks of release)		Pre-Release Assessment (within 72 hours of release)	
Behavioral Clearance (continued)	**Yes**	**No**	**Yes**	**No**
16. The release candidate demonstrates a capacity to chase and capture live prey				
Medical Clearance				
17. The attending veterinarian has reviewed the release candidate's history and medical records, including records from other facilities that have previously held the animal.				
18. The attending veterinarian has examined the release candidate within two weeks of release				
19. The required health screen and assessments were conducted with good results				
20. Hands-on physical exam to be performed by attending veterinarian within 72 hours of release				
21. NO congenital defects				
22. NO nonfunctional or damaged appendages				
23. NO defects in vision				
24. CBC compatible with good health				
25. Chemistry profile compatible with good health				
26. Serum banked upon admission and prior to release (3 ml)				
27. Additional testing requested and reviewed by NMFS and no apparent concerns				
28. Free of drugs (exclusive of sedatives used for transport) minimum of 2 weeks prior to release				
29. Veterinarian's signature on health statement				

Health Statement

I have examined the pinniped (Species and ID#)_____ on (Date) _____ and have determined that the animal is medically and behaviorally suitable for release in accordance with the release criteria in that the animal will not pose a risk to the wild population and is likely to survive upon reintroduction to the wild.

_____ _____

Signature of the Attending Veterinarian *Printed Name of the Attending Veterinarian*

_____ _____

Signature of the Authorized Representative *Printed Name of the Authorized Representative*

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 9:59 am
To: [redacted]
Subject: RE: rehabilitation and release guidelines

Follow Up Flag: Follow up
Flag Status: Flagged

Hi [redacted]

NOAA are not on the list of people contacted yet as far as I am aware – If you were happy to do so that would be great. Advice I received overnight was still coming from the Sea World/Vancouver Aquarium vets (summary below)

Summary of advice provided by overseas experts with regards to reintroduction to the wild

- It would take approximately 30 days for the cow to completely dry up. In addition, many cetacean species (in captive environments) have spontaneously lactated if a calf was introduced. With that being said, the milk is typically, initially (and maybe always) of lower quality and the calf would need to be robust enough to withstand the transition
- In our area, the animal would be deemed non-releasable and a suitable long term home would be found. If no home can be found and the animal cannot be reintroduced then your options are quite limited. Folks do release dependent calves on their own but, again, most people think this is a bit cruel most likely. Some animals like that may become nuisance animals but I suspect this calf is too young for that. If that is the choice offered then I would at the very least try to attached a tracking tag so some kind of objective outcome can be determined to help collect evidence for future decision making.
- If a suitable long term home is not available in NZ or Australia then you and your Team will need to make a decision on how long to continue the supportive management of the calf … I agree, that with each day the outlook for a successful reintroduction wanes and the overall welfare of the calf will weigh heavy into the decision-making …
- This calf appears to have about zero chances of survival in the wild. Finding its pod would be an interesting experiment, but do you really want to put the animal through this experiment knowing that the pod left it once already (I don't know the circumstances behind this stranding so I am making a large assumption) and would probably not welcome the animal back into the group for the same reason it left it the first time. Experience with dependent calves would indicate that it is non-releasable. In my opinion, If you can't care for the calf long term and the government is unwilling to move it to a facility that can, you should humanly euthanize it sooner than later.

Ah yes – I don't have a work phone and can't seem to get my personal number added – it is [redacted]. I am just about to jump into another meeting should be free again in about half an hour.

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 9:55 AM
To: [redacted]
Subject: FW: rehabilitation and release guidelines

Hi [redacted]
Are you the best one to make contact with these NOAA folk, or me? Or are they among the ones you're already talking to?
Do you have a mobile number? There's none on your profile.

Cheers
[redacted]

From: [redacted]>
Sent: Wednesday, 14 July 2021 5:06 pm
To: [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; HUHA Helping You Help Animals <[redacted] @wellingtonzoo.com>
Cc: [redacted]
Subject: RE: rehabilitation and release guidelines

Hi all-
The medical assessment discussion begins on page 36 of the standards for release linked below. It looks light on specifics, so it would be appreciated if you could read this and coordinate with overseas folks to flesh out any detail required beyond what you're already doing.

It is also worth noting that this calf would be deemed "Non-releasable" under US standards due to its young age. According to their documents, orca are not fully weaned until 2-3 years and 4 m in length, which is a long way away for this animal. Whale Rescue has mentioned weaning as early as 9 months, which might be plausible under some circumstances (i.e. an animal in a facility) but seems optimistic in this case. Any discussion of plans to hold the calf until it's weaned need to be grounded in the reality of how long this would take, in addition to all of the other caveats around behavioural conditioning, costs, etc.

I'm on leave the next two days, but look forward to seeing what progress you've made upon my return. Thanks for your continued efforts everyone, and best of luck.

Cheers,
[redacted]

[redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 4:06 pm
[redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>
Cc: [redacted] Ian Angus <iangus@doc.govt.nz>
Subject: FW: rehabilitation and release guidelines

Hi all-
Just following up from our conversation this afternoon, below is an email from NOAA colleagues back in 2016. I assume some of them may still be in relevant positions and able to assist if advice is needed. The links in the original email no longer work, but here the relevant documents are attached, with links below.

Standards for release: Final polices and best practices : marine mammal stranding response, rehabilitation, and release : standards for release (noaa.gov)
Standards for rehab facilities: Final polices and best practices : marine mammal stranding response, rehabilitation, and release : standards for rehabilitation facilities (noaa.gov)
Glossary for response, rehabilitation, and release: Glossary for Best Practices for Marine Mammal Response, Rehabilitation, and Release (noaa.gov)

I will have a look through these now and flag anything which seems relevant for health assessment.

Cheers,
[redacted]

[redacted]

From: [redacted]@noaa.gov>
Sent: Saturday, 6 August 2016 5:11 am
To: [redacted]@noaa.gov>; [redacted]
- [redacted]@noaa.gov>
Subject: rehabilitation and release guidelines

[redacted]
I want to introduce you to our national response coordinator [redacted] cc'd here. She is another resource contact for you.

Here's the weblink to our release criteria:
http://www.nmfs.noaa.gov/pr/pdfs/health/release_criteria.pdf

Page 41 has the decision tree for cetaceans in text form. The checklist is on page 110.

The Rehabiliation Facilities criteria is here:
http://www.nmfs.noaa.gov/pr/pdfs/health/rehab_standards.pdf

Although we were pretty clear that these are for long term holding facilities and we don't necessarily apply them to temporary situations (pop-up pools). In fact, that's part of the revision of the guidelines we're working on. But there might be something in there that is useful. Cetaceans are Section 1.

We don't have many situations in which rehabilitation occurs in open water pens (net pens) but have had some (A73 is an example). The group in the US that has the most experience with net pens is the National Marine Mammal Foundation. I know that [redacted] has contacted them about veterinary care working with [redacted]. We work very closely with them on veterinary assessments, they have assisted us with live captures, they have assisted us with long transport and release back to the wild. In these types of veterinary consultations it is often critically important to incoming veterinarians to understand their legal status for consulting and connection or request from the national or regional government. It might help things move faster for them if the request for consultation would come from the management team or [redacted] and the Department of Conservation. That ensures there are no legal issues or confusion on expectations for the consulting veterinarians. That may have occurred overnight while we slept on the east coast and clarification may have happened. Again good luck and contact us when you need.

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 2:58 pm
To: [redacted] NOAA Federal; [redacted]
Cc: [redacted]@noaa.gov; [redacted]s@noaa.gov; [redacted]
Subject: RE: rehabilitation and release guidelines

Hi [redacted]

If you were able to share any of the planning information particularly with regards to determination of suitability to release that would be very much appreciated. My understanding is that our situation is quite different to A73 as the individual - we have here is a neonate who is currently estimated to be 4-6 months of age and does not even have erupted teeth yet. Would be very interested in any of your thoughts with regards to a comparison between that type of individual and the situation with A73.

Thank you so very much,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

From: [redacted]@noaa.gov>
Sent: Thursday, 15 July 2021 12:14 PM
To: [redacted]@doc.govt.nz>
Cc: s[redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]
Subject: Re: rehabilitation and release guidelines

Hi [redacted]
Thanks for reaching out. [redacted] and I are all still with NOAA. I'm in Seattle and worked on the A73 case and am happy to share any information. We have a timeline and some basic background information on our web

page https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/orphan-killer-whale-a73-springer
We also have much more detailed medical and planning information as well if helpful.
Please don't hesitate to reach out with any questions.
Good luck with this challenging situation,
[redacted]

On Wed, Jul 14, 2021 at 4:08 PM [redacted] > wrote:

Also adding [redacted] into this email train, apologies for missing you out!

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 11:03 am
To: [redacted]@noaa.gov; [redacted]@noaa.gov
Cc: [redacted]
Subject: FW: rehabilitation and release guidelines

Hello [redacted]

We have a situation with an infant orca that became isolated from its natal pod on Sunday and is currently being held and monitored in a semi-enclosed boatramp area. I am making initial contact with you to see if you're still working for NOAA in the event that we might like to call on you for further advice about managing this situation. There is a high level of public interest in the event. Myself and [redacted] are presently part of the Technical advice team, while [redacted] is on leave for a couple of days.

Looking forward to hearing from you.

Kā mihi

[redacted]
Technical Advisor Marine | Mātanga Mātai Ahu Moana
Hokitika Office
Phone: [redacted]

www.doc.govt.nz

Department of Conservation
Te Papa Atawhai

From: [redacted].nz>
Sent: Wednesday, 14 July 2021 5:06 pm
To: [redacted]
<[redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>; [redacted]
[redacted]@wellingtonzoo.com>; HUHA Helping You Help Animals <[redacted]
[redacted]@wellingtonzoo.com>
Cc: [redacted]
Subject: RE: rehabilitation and release guidelines

Hi all-

The medical assessment discussion begins on page 36 of the standards for release linked below. It looks light on specifics, so it would be appreciated if you could read this and coordinate with overseas folks to flesh out any detail required beyond what you're already doing.

It is also worth noting that this calf would be deemed "Non-releasable" under US standards due to its young age. According to their documents, orca are not fully weaned until 2-3 years and 4 m in length, which is a long way away for this animal. Whale Rescue has mentioned weaning as early as 9 months, which might be plausible under some circumstances (i.e. an animal in a facility) but seems optimistic in this case. Any discussion of plans to hold the calf until it's weaned need to be grounded in the reality of how long this would take, in addition to all of the other caveats around behavioural conditioning, costs, etc.

I'm on leave the next two days, but look forward to seeing what progress you've made upon my return. Thanks for your continued efforts everyone, and best of luck.

Cheers,

[redacted]

[redacted]

DDI: [redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 4:06 pm
To: [redacted]
[redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>; [redacted]
[redacted]@wellingtonzoo.com>
Cc: [redacted] Ian Angus <iangus@doc.govt.nz>
Subject: FW: rehabilitation and release guidelines

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Standards for rehab facilities: Final polices and best practices : marine mammal stranding response, rehabilitation, and release : standards for rehabilitation facilities (noaa.gov)

Glossary for response, rehabilitation, and release: Glossary for Best Practices for Marine Mammal Response, Rehabilitation, and Release (noaa.gov)

I will have a look through these now and flag anything which seems relevant for health assessment.

Cheers,

[redacted]

[redacted]

[redacted]

From: [redacted]@noaa.gov>
Sent: Saturday, 6 August 2016 5:11 am
To: [redacted] - NOAA Federal [redacted]@noaa.gov>; [redacted] noaa.gov>
Subject: rehabilitation and release guidelines

[redacted],

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--
[redacted]
Branch Chief, Protected Resources Division, West Coast Region
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]

https://www.fisheries.noaa.gov/region/west-coast

[redacted]

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Friday, 16 July 2021 9:08 am
To: [redacted]
Cc: [redacted] - NOAA Federal; [redacted]@noaa.gov
Subject: Re: rehabilitation and release guidelines

You can reach me at [redacted]. [redacted] and I are both based in the DC area and are in the eastern daylight time zone. The IWC has a global stranding network Expert Panel that you might also want to contact. Dr. [redacted]@unipd.it is the lead for that effort. He is in Italy.

On Thu, Jul 15, 2021 at 4:43 PM [redacted] > wrote:

> Hello [redacted]
>
> Thanks very much for the information you've sent [redacted]
>
> In addition to [redacted]s reply email, are you all able to provide your phone contact details in case the need arises to give one of you a call.
>
> And [redacted] also let me know your locations/ time zones, to avoid any midnight calls!
>
> Many thanks
>
> [redacted]

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Thursday, 15 July 2021 12:14 pm
To: [redacted]
Cc: [redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]
Subject: Re: rehabilitation and release guidelines

H[redacted]

Thanks for reaching out. [redacted] and I are all still with NOAA. I'm in Seattle and worked on the A73 case and am happy to share any information. We have a timeline and some basic background information on our web page https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/orphan-killer-whale-a73-springer

We also have much more detailed medical and planning information as well if helpful.

Please don't hesitate to reach out with any questions.

Good luck with this challenging situation,

[redacted]

On Wed, Jul 14, 2021 at 4:08 PM [redacted] wrote:

Also adding [redacted] into this email train, apologies for missing you out!

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 11:03 am
To: [redacted]@noaa.gov; [redacted]@noaa.gov
Cc: [redacted]
Subject: FW: rehabilitation and release guidelines

Hello [redacted]

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Looking forward to hearing from you.

Kā mihi

[redacted]
Technical Advisor Marine | Mātanga Mātai Ahu Moana
Hokitika Office
Phone: [redacted]

www.doc.govt.nz

Department of Conservation
Te Papa Atawhai

From: [redacted]>
Sent: Wednesday, 14 July 2021 5:06 pm
To: [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>; HUHA Helping You Help Animals [redacted]@wellingtonzoo.com>
Cc: [redacted]
Subject: RE: rehabilitation and release guidelines

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I'm on leave the next two days, but look forward to seeing what progress you've made upon my return. Thanks for your continued efforts everyone, and best of luck.

Cheers,

[redacted]

[redacted]

DDI: [redacted]

From: [redacted]
Sent: Wednesday, 14 July 2021 4:06 pm
To: [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>; [redacted]i@wellingtonzoo.com>
Cc: [redacted] Ian Angus <iangus@doc.govt.nz>
Subject: FW: rehabilitation and release guidelines

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Glossary for response, rehabilitation, and release: Glossary for Best Practices for Marine Mammal Response, Rehabilitation, and Release (noaa.gov)

I will have a look through these now and flag anything which seems relevant for health assessment.

Cheers,

[redacted]

[redacted]

DDI: [redacted]

From: [redacted]@noaa.gov>
Sent: Saturday, 6 August 2016 5:11 am
To: [redacted] - NOAA Federa [redacted]@noaa.gov>; [redacted] - NOAA Federal [redacted]@noaa.gov>
Subject: rehabilitation and release guidelines

[redacted]

I want to introduce you to our national response coordinator [redacted] cc'd here. She is another resource contact for you.

Here's the weblink to our release criteria:

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--

[redacted]
Branch Chief, Protected Resources Division, West Coast Region
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]

https://www.fisheries.noaa.gov/region/west-coast

[redacted]

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Friday, 16 July 2021 9:26 am
To: [redacted]
Cc: [redacted]@noaa.gov; [redacted]@noaa.gov
Subject: Re: rehabilitation and release guidelines

Hi [redacted],
I'm in Seattle (Pacific Time Zone) and my cell number is [redacted]. [redacted] and [redacted] are both on the east coast (Eastern Time Zone).

I'll also give you [redacted] phone number. He works at our Northwest Fisheries Science Center as the lead for our killer whale research team. He is very knowledgeable, was involved with captures for public display in the 1970's, was instrumental in our efforts for A73, and also went to NZ to assist with the last killer whale calf case. His cell phone number is [redacted].

[redacted]

On Thu, Jul 15, 2021 at 1:43 PM Don Neale <dneale@doc.govt.nz> wrote:

> Hello [redacted]
>
> Thanks very much for the information you've sent [redacted].
>
> In addition to [redacted]s reply email, are you all able to provide your phone contact details in case the need arises to give one of you a call.
>
> And [redacted] also let me know your locations/ time zones, to avoid any midnight calls!
>
> Many thanks
>
> [redacted]

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Thursday, 15 July 2021 12:14 pm
To: [redacted]>
Cc: [redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]>
Subject: Re: rehabilitation and release guidelines

Hi [redacted]

Thanks for reaching out. [redacted] and I are all still with NOAA. I'm in Seattle and worked on the A73 case and am happy to share any information. We have a timeline and some basic background information on our web page https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/orphan-killer-whale-a73-springer

We also have much more detailed medical and planning information as well if helpful.

Please don't hesitate to reach out with any questions.

Good luck with this challenging situation,

[redacted]

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Also adding [redacted] into this email train, apologies for missing you out!

[redacted]

From: [redacted]
Sent: Thursday, 15 July 2021 11:03 am
To: [redacted]@noaa.gov; [redacted]@noaa.gov
Cc: [redacted]
Subject: FW: rehabilitation and release guidelines

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Looking forward to hearing from you.

Kā mihi

[redacted])
Technical Advisor Marine | Mātanga Mātai Ahu Moana
Hokitika Office
Phone: [redacted]

www.doc.govt.nz

Department of Conservation
Te Papa Atawbai

From: [redacted]
Sent: Wednesday, 14 July 2021 5:06 pm
To: [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; HUHA Helping You Help Animals [redacted] @wellingtonzoo.com>
Cc: [redacted]
Subject: RE: rehabilitation and release guidelines

Hi all-

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It is also worth noting that this calf would be deemed "Non-releasable" under US standards due to its young age. According to their documents, orca are not fully weaned until 2-3 years and 4 m in length, which is a long way away for this animal. Whale Rescue has mentioned weaning as early as 9 months, which might be plausible under some circumstances (i.e. an animal in a facility) but seems optimistic in this case. Any discussion of plans to hold the calf until it's weaned need to be grounded in the reality of how long this would take, in addition to all of the other caveats around behavioural conditioning, costs, etc.

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Cheers,

[redacted]

[redacted]

DDI: +[redacted]

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Sent: Wednesday, 14 July 2021 4:06 pm
To: [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>; [redacted] @wellingtonzoo.com>
Cc: [redacted] Ian Angus <iangus@doc.govt.nz>
Subject: FW: rehabilitation and release guidelines

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I will have a look through these now and flag anything which seems relevant for health assessment.

Cheers,

[redacted]

[redacted]

DDI: [redacted]

From: [redacted] NOAA Federal [redacted] @noaa.gov>
Sent: Saturday, 6 August 2016 5:11 am
To: [redacted] - NOAA Federal [redacted] @noaa.gov>; [redacted] - NOAA Federal [redacted] @noaa.gov>
Subject: rehabilitation and release guidelines

[redacted]

I want to introduce you to our national response coordinator [redacted] cc'd here. She is another resource contact for you.

Here's the weblink to our release criteria:

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[redacted]
Branch Chief, Protected Resources Division, West Coast Region
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]

https://www.fisheries.noaa.gov/region/west-coast

[redacted]

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Friday, 16 July 2021 12:46 pm
To: [redacted]
Cc: [redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]
Subject: Re: rehabilitation and release guidelines
Attachments: A73 Case Study Final 07-12-16.docx

Hi [redacted],
I think we may have previously provided a copy of [redacted] I'm working remotely due to COVID. I'll keep looking, but hopefully this will be informative in the meantime.
Please note that some of the links below to our policies for rehabilitation and release are more recent than our work with [redacted].
Sorry you couldn't get through to my phone. Not sure what the problem may be.
[redacted]

On Thu, Jul 15, 2021 at 5:34 PM [redacted] > wrote:

> Hello [redacted]
>
> I just tried to phone you but the number said you were unavailable.
>
> Is it possible to get planning information from you that [redacted] noted below, with regards to determination of suitability to release? I realise it's just approaching your weekend, so anything you can send would be great for now.
>
> Kā mihi

[redacted] [redacted]
Technical Advisor Marine | Mātanga Mātai Ahu Moana
Hokitika Office
Phone: +[redacted]

www.doc.govt.nz

Department of Conservation
Te Papa Atawhai

From: [redacted]
Sent: Thursday, 15 July 2021 2:58 pm
To: [redacted] - NOAA Federal [redacted]@noaa.gov>; [redacted]
Cc: [redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]
Subject: RE: rehabilitation and release guidelines

Hi [redacted],

If you were able to share any of the planning information particularly with regards to determination of suitability to release that would be very much appreciated. My understanding is that our situation is quite different to A73 as the individual - we have here is a neonate who is currently estimated to be 4-6 months of age and does not even have erupted teeth yet. Would be very interested in any of your thoughts with regards to a comparison between that type of individual and the situation with A73.

Thank you so very much,

[redacted]

[redacted]

Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*

Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand

Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

From: [redacted] - NOAA Federal [redacted]@noaa.gov>
Sent: Thursday, 15 July 2021 12:14 PM
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Cc: [redacted]@noaa.gov; [redacted]@noaa.gov; [redacted]
Subject: Re: rehabilitation and release guidelines

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>
> [redacted]
>
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> **Cc:** [redacted]
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Phone: [redacted]

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Department of Conservation
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[redacted]
Branch Chief, Protected Resources Division, West Coast Region
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]

https://www.fisheries.noaa.gov/region/west-coast

--

[redacted]
Branch Chief, Protected Resources Division, West Coast Region
NOAA Fisheries | U.S. Department of Commerce
Office: [redacted]

https://www.fisheries.noaa.gov/region/west-coast

From: [redacted]
To: [redacted]
Cc: [redacted]
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand
Date: Thursday, 15 July 2021 1:26:35 pm
Attachments: [redacted]

Hi there,

Yes that sounds good on the meds. As for antifungals, yes they may be indicated with long term antibiotic therapy especially when more than one antibiotic has been used and of course the concurrent steroid is also a factor to consider. Kinda like in any species. But I would not automatically start it for this case. You have been pretty conservative with both Ab and steroid use. If there is an indication I would not hesitate but I see none for now.

Great work with this calf everyone.

Best wishes,

[redacted]

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

P 604 659 3468
E [redacted]@vanaqua.org

vanaqua.org

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

On Jul 14, 2021, at 6:16 PM, [redacted]@wellingtonzoo.com> wrote:

Thank you [redacted], and thank you everyone so much for your help and support so far, it's been just an incredible help and we're so grateful.

He's had three doses of dex at 0 05mg/kg IM SID, so we'll give him a half dose tomorrow (0.025mg/kg IM) and then stop entirely, if you're happy with that as well?

At this stage we're planning on continuing the enrofloxacin 5mg/kg IM BID for a total of 7 days and then stopping, unless you recommend continuing on with this for longer (or shorter)?

I've had it mentioned to me by one of our biologists that antibiotic use in cetaceans often results in fungal infections, and that some people like to administer antifungals concurrently. I can't find any references to support this, so I was wondering if I could please run this (possibly silly) question past you as well please?

I've just had a quick look over the CBC and blood smear examination result that has come through from the lab and I can't see any abnormalities (will have a closer look soon). The blowhole cytology is also normal and shows no signs of inflammation.

Thanks again for all your support.
Kind regards,
[redacted]

[redacted] BVSc, MVSc (Zoo Animal and Wildlife Health), MANZCVS (Avian Health)
Senior Veterinarian | Animal Care and Science | Wellington Zoo Trust
200 Daniell Street | Newtown | Wellington 6021
Ph [redacted]
E [redacted]@wellingtonzoo.com | W www.wellingtonzoo.com |

From: [redacted]@massey ac.nz>
Sent: 15 July 2021 12:36
To: [redacted]@SeaWorld.com>
Cc: [redacted]@vanaqua org>; [redacted]@wellingtonzoo.com>; [redacted]@SeaWorld.com> [redacted]@wellingtonzoo com>; [redacted]@wellingtonzoo com>; [redacted]
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Thank you [redacted]; that all makes sense. Will work on going slowly and see how he does.

From: [redacted]@SeaWorld.com>
Date: Wednesday, 14 July 2021 at 5:39 PM
To: [redacted]@massey.ac.nz>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com> [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hi [redacted]

The 100% formula should provide all caloric requirements and hydration, so I think you can phase out the electrolyte if the calf is receiving the full amount of formula. A lot is dependent on how the calf is processing the formula, input=output, in fecal consistency(ie. Formula Pooh) and weight gain.

Changes to phase out electrolytes or volume are best done incrementally by 25-50%. Sounds like he should be able to handle more volume, based on the initial tubing, but as formula is thicker it will take more to metabolize the formula. It seems that he should be able to tolerate more volume based on initial tubing volumes.

The formula sent is a species guideline, and adjustments can be made to meet each individual's needs based on environmental differences. Please feel free to share with the local team and make necessary adjustments to ensure adequate hydration, which can be observed with changes in fecal consistently and general behavior. We will often monitor weight gain with neonates that are being fed formula to ensure adequate growth…I know this will be difficult in your scenario, however you could get consistent girth and length measurements to estimate growth rate.

I would probably phase out the steroid with decreasing doses…it is probably no longer needed.

Hope that makes sense? Let me know if I left anything out or you have addition questions,
[redacted]

> On Jul 13, 2021, at 10:00 PM, [redacted]@massey.ac.nz> wrote:
>
> Sorry—lastly the blood glucose taken on site this morning was 6.5 mmol/L.
>
> ---
>
> **From:** [redacted]@massey.ac.nz>
> **Date:** Wednesday, 14 July 2021 at 4:56 PM
> **To:** [redacted]@SeaWorld.com>
> **Cc:** [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]@gmail.com> [redacted]@doc.govt.nz [redacted]
> **Subject:** Re: Stranded orca calf in New Zealand
>
> Blood results from today attached!
>
> ---
>
> **From:** [redacted]@massey.ac.nz>
> **Date:** Wednesday, 14 July 2021 at 4:55 PM
> **To:** [redacted]@SeaWorld.com>
> **Cc:** [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, [redacted]@gmail.com> [redacted]
> **Subject:** Re: Stranded orca calf in New Zealand
>
> Thank you so much for your quick response and advice!
>
> We ran a second biochem on the calf today which I've attached the results of. The biggest changes were a slight increase in PCV suspected to be secondary to dehydration and a decrease in TP. For the most part everything looks ok still. We have extra whole blood and serum saved as well. On the photo, the numbers written in parentheses were from his first blood test on the 12th.
>
> We also started tube feeding formula this morning. We have started with introducing very small amounts of slurried formula so he only received 500 ml at each feeding today (with four total feedings or 1 6 L slurry). The initial feeding was diluted to 50% strength and each subsequent feeding has been increased by 25% strength each time so he is now getting 100% strength feeds (although these are being given with 2 5 liters of vytrate at the same time at the moment).
>
> I've done a rough nutritional calculation for the version of the formula that we are making which gave a calorie content of approximately 5881 cal/4 L (which is one batch of recipe). Meaning he has only received ~2352 calories of feed today. This is obviously well under the recommended amount of 120 kcal/kg/day. We are wondering how quickly we should be increasing the volume of formula fed to safely meet his metabolic requirements. In the orca formula document you sent previously you mentioned not feeding greater than 13.5 L/day. Based on our formula and an estimated weight of ~200 kg he would need 16 L/day to meet his requirements. A related question is whether you have any advice around phasing out vytrate and replacing it

with just formula. The formula itself is quite high water content so we were wondering if we should only be relying upon it for hydration.

Our intended feed roster for tomorrow was using 500 ml full strength formula with 2.5 liters of vytrate 4 times during the day. I know it was recommended that we feed every 2 hours and with a vet on site all day that is something we can start doing to help ramp up his caloric intake. The team on-site is closely monitoring faecal output as well.

In regards to the formula recipe that you sent, we are considering starting to get help making it from some of the on-site vet team we have been collaborating with. Obviously we have diverged from your original recipe based on what is available to us, but we wanted to check to see if you are comfortable with us sharing the recipe for our version of your formula with that team.

For medications, the calf is receiving 5 mg/kg enrofloxacin BID and 0.05 mg/kg dexamethasone SID. We are not administering any other meds at this time.

Apologies for the lengthy email—I hope all that made sense!

Thank you so much once again and we look forward to hearing back!

[redacted]

From: [redacted]@SeaWorld.com>
Date: Wednesday, 14 July 2021 at 4:17 PM
To: [redacted]@massey.ac.nz>
Cc: [redacted]@vanaqua.org>, [redacted]@wellingtonzoo.com>, [redacted]@SeaWorld.com>, [redacted]@wellingtonzoo.com>, [redacted]@wellingtonzoo.com>, Justin Rosenberg <rosenbergdvm@gmail.com>
Subject: Re: Stranded orca calf in New Zealand

[redacted]

Actually [redacted] commented that for this guy you could probably start lower on a midazolam dose since it is really just for an anxiolytic, recommend go with 0.1-0.15 mg/kg IM…should be plenty.

[redacted]

> On Jul 13, 2021, at 6:02 PM, [redacted]@seaworld.com> wrote:
>
> Hi [redacted]
>
> While transport in stretcher suspended in water transport unit is recommended, transport out-of-water can be done but recognize it will cause more cardiopulmonary stress to the animal. I would look into getting a 2-3" memory foam mattress for additional comfort on the mattress, provide pectoral fin cut-outs as you have done for the mattress.
>
> We and others have transported dolphins for advanced diagnostics (i.e. CT) for up to 4 hrs out-of-water on padded stretchers with "wetting" methods to keep skin moist. We've had adult killer whales out-of-water during procedures for up to 2 hours without significant compromise.
> I would have hand sprayers or water pump sprayers (found at hardware store), towels, additional foam padding or pieces of closed-cell foam/foam mattress, waterproof sunscreen (zinc can trap heat at skin surface and lead to sloughing), in case of sun exposure or provide adequate shade during transport.
> Monitor respirations, respiratory effort, heart rate (sometimes easier to see or palpate then listen too), vocals or lack thereof. Keep skin moist at all times, check pressure points if on mattress or areas that may rub.
> Depending on air temp and wind, he should be able to maintain body temp, however, if you have a cable thermistor for rectal temperature that may be useful to determine if he needs thermal support (emergency space blankets are handy).
> Emergency medical kit – standard ER meds, injectable midazolam (can cause respiratory depression, dose 0.5 mg/kg IM), flumazenil 0 02 mg/kg IV/IM, butorphanol (0.1 mg/kg IM, can cause respiratory depression), naltrexone 0.1 mg/kg IM, doxopram
> I can send you more specifics on dosage, if you need it…
>
> Others may have additional suggestions, that's what's on the top of my head at moment.
>
> How are the feedings going?
>
> [redacted]
>
> ---
>
> **From:** [redacted]@massey.ac.nz>
> **Sent:** Tuesday, July 13, 2021 4:27 PM
> **To:** [redacted]@gmail.com>

Cc: [redacted]@vanaqua org>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo com>; [redacted]@SeaWorld.com>; [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

Hello everyone,

We completed our morning treatments and got a second blood sample. At the moment we are working on developing plans to attempt a possible relocation with all the parties involved here and have been asked to provide input on the veterinary aspect of welfare of the calf during transport and relocation.

There are a number of aspects of this scenario that are concerning (and certainly something we have no experience with ourselves) so are wondering if you have any advice to give regarding monitoring the health and welfare of this animal during the process (for example time he can safely be kept out of the water and what support is needed ie wet towels, zinc oxide if transported during day?) We can monitor basic vitals such as respiratory rate during this process but are hoping for any additional advice or recommendations.

In terms of a setup for transport we are still waiting on a sling so at the moment what we have is mattresses with areas cut out for his pectoral fins to slot into. He would be transported on this on the back of a boat out to the area of attempted release. There would be designated people to keep him wet as well. This setup would only be used if there was an attempted release prior to the arrival of a sling.

I realize this is quite a difficult attempt to coordinate and we sincerely appreciate any and all input you may have.

[redacted]

On 13/07/2021, at 8:40 PM, [redacted]> wrote:

> Not sure how often you will be getting blood, but can add in a sed rate (erythrocyte sedimentation rate) to have a very crude assessment of inflammation while all other diagnostics are pending. In a pinch, I have used capillary tubes and then kept them undisturbed as vertical as possible for an hour - after which you measure the “drop” in RBC (or the “volume” of plasma). You won’t be able to compare to any reference value, but it can be very helpful at tracking trends over time - an increasing rate of sedimentation is suggestive of worsening inflammatory disease somewhere.
>
> As [redacted] said, keep going! Nice work so far.
>
> [redacted]
>
> Sent from my iPhone

> On Jul 13, 2021, at 12:14 AM, [redacted]@vanaqua org> wrote:
>
> My mistake. 41 was your reference to a normal. Not your corrected number for this animal. Agreed with [redacted] Not unusual. But a recheck is warranted. It should not be going lower. Going down and a BUN going up with no other obvious cause could be some GI bleeding. Also not unusual but needs addressing.
>
> <VanAqua-300px_aa92c88f-1f67-47e7-95c0-296dd768713a.png>
> [redacted], DVM, MSc, DACZM
> Head Veterinarian & Director, Animal Health
> P [redacted]
>
> This email and any files transmitted with it are confidential and intended solely for the use of the individual
> or entity to whom they were addressed. If you have received this email in error, please notify us immediately.
>
> > On Jul 12, 2021, at 8:40 PM, Schmitt, Todd
> > [redacted]@seaworld.com> wrote:
> >
> > Hi [redacted]
> >
> > Anemia is typical for neonates, not concerned.
> >
> > I wasn’t impressed with tilt as I think it’s related to him looking at people in the water, because it’s not consistent and his respiration’s appear normal otherwise.
> > His swim behavior appears playful and tolerant of the people in the water, seeing him stall at surface and be redirected.
> >
> > Regarding formula, yes you can refrigerate and use for duration of 24 hrs.

Keep going, hang in there, it will be worth it.

[redacted]

On Jul 12, 2021, at 8:24 PM, [redacted] @wellingtonzoo.com> wrote:

We have a few calf nipples on hand so will try them. He does have a suckle reflex so we are cautiously optimistic about getting feeds into him that way. A few more questions--

Did you have any thoughts about the PCV of 29% or the videos I sent through earlier? It looked to me today that his tilt was less consistent since he was able to right himself so possibly more behavioral as you suggested earlier.

And with the formula that you sent, do you recommend refrigerating and keeping for 24 hours? Our plan for the formula (since we are obviously limited in terms of ingredients) is: 6 cups AnLamb milk replacer, 3000 mg dicalcium phosphate, 1000 mg Taurine, 1100 ml water, 1100 ml 0.9% NaCl injection, 120 ml 50% Dextrose, 200 ml salmon oil with 0.7 kg filleted anchovies and viscera. We are hoping to feed five times/day as you recommended and starting with 500 ml at a feed initially and increasing as described. We will start out with the 50% diluted mixture tomorrow morning and increase the strength by 25% at each feed tomorrow until he is at 100% strength if he tolerates well and continues passing faeces.

I forgot to mention this yesterday but he has been seen to be defecating regularly (5 times noted yesterday).

[redacted] BA DVM
Resident Veterinarian | Animal Care and Science | Wellington Zoo Trust
200 Daniell Street | Newtown | Wellington 6021
E [redacted] @wellingtonzoo.com

From: [redacted] @SeaWorld.com>
Sent: Tuesday, 13 July 2021 3 06 pm
To: [redacted] @vanaqua.org>; [redacted] @wellingtonzoo.com>
Cc: [redacted] @massey.ac.nz>; [redacted] @SeaWorld.com>; [redacted] @wellingtonzoo.com>
Subject: Re: [EXTERNAL] Re: Stranded orca calf in New Zealand

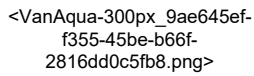
Agree, if you can get a calf nipple (that is what has been used in US and Spain) and see if he has a suckle reflex that will make feeding a lot easier!

People have used calf bottle cut in half, with milk formula in bag attached to nipple, so that milk can be pushed/squeezed with increase intake during nursing bouts.

[redacted]

On Jul 12, 2021, at 7:00 PM, [redacted] @vanaqua.org> wrote:

Nothing to shake a stick at yet



[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

P [redacted]
E [redacted]@vanaqua org

vanaqua.org

[redacted]

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

> On Jul 12, 2021, at 6:28 PM, Ashley Whitehead
> <[redacted]@wellingtonzoo com> wrote:
>
> Thank you [redacted]; we appreciate your input! Will keep that in mind An in house blood smear exam gave a WCC of 4 06x10^9/L (we used a PCV of 41% as a normal in our correction) Of the WBC present: 79% were neutrophils (3 2 x10^9/L), 3% monocytes (0 12 x10^9/L) And 18% lymphocytes (0 73 x10^9/L) There were both anisocytosis and spherocytes noted in the sample as well as a few possible RBC intracytoplasmic inclusions (although these could just have been an artefact) See attached photo
>
> [redacted] BA DVM
> Resident Veterinarian | Animal Care and Science | Wellington Zoo Trust
> 200 Daniell Street | Newtown | Wellington 6021
> E
[redacted]@wellingtonzoo com<mailto:Ashley whitehead@wellingtonzoo com>
>
> From [redacted]
> <[redacted]a@vanaqua org>
> Sent: Tuesday, 13 July 2021 12:58 pm
> To [redacted]@seaworld com>
> Cc: [redacted]
[redacted]@massey ac nz>; [redacted]
[redacted]@seaworld com>; [redacted]
[redacted]@wellingtonzoo com>; [redacted]
[redacted]@gmail com>; [redacted]
[redacted]@wellingtonzoo com>
> Subject: Re: Stranded orca calf in New Zealand
>
> We did bottle feed our false killer whale calf but the tubing was more reliable with less salt water intake We did not get our nipple perfect
>
> [cid:image001 png@01D777EA EF0AE440]
>
> [redacted], DVM, MSc, DACZM
> Head Veterinarian & Director, Animal Health
>
> P[redacted]
>
> This email and any files transmitted with it are confidential and intended solely for the use of the individual
> or entity to whom they were addressed If you have received this email in error, please notify us immediately
> On Jul 12, 2021, at 5:34 PM, [redacted]
[redacted]@seaworld com<mailto:Todd Schmitt@seaworld com>>
wrote:
>
> Were you able to tube more electrolytes or begin formula supplement?
> Can you share other blood results?
>
> I d plan tubings every 2-3 hrs during day minimum of 5-6 feeds/day…aim to support him 1-2 weeks at least to give time for pod to show up or be located
>
[redacted]
>

> From [redacted]
[redacted] @massey ac nz [redacted] @massey ac nz>>
> Sent: Monday, July 12, 2021 5:13 PM
> To [redacted]
<[redacted] @SeaWorld com<m[redacted] @SeaWorld com>>
> Cc: [redacted]
[redacted] @SeaWorld com<mailto [redacted] t@SeaWorld com>>;
[redacted]
[redacted] @vanagua org<mailto [redacted] @vanagua org>>;
[redacted]
[redacted] @wellingtonzoo com<mailto [redacted] @wellingtonzoo com>>;
[redacted]
[redacted]
[redacted]
[redacted] @wellingtonzoo com<m [redacted] g@wellingtonzoo com>>
> Subject: [EXTERNAL] Re: Stranded orca calf in New
Zealand
>
>
>
> <Orca calf blood smear jpeg>

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Thursday, 15 July 2021 8:31 am
To: [redacted]
Cc: [redacted]; [redacted]@vanaqua.org; [redacted]
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted]

We have not received any measurements, a length and girth measurement would help tremendously!

[redacted]

On Jul 14, 2021, at 1:22 PM, [redacted]> wrote:

Good morning (afternoon?) to you all,

Thanks you very much for this information you are echoing all our concerns and the advice that we have been providing to the decision makers since day one. The biology space with regards to orca in NZ is challenging as there is one person who holds this information and therefore no way to independently verify the accuracy. The information given on day one was that the pod this calf was from is known but it is one that is occasionally seen then disappears for months on end.

I was also wondering if I could seek clarification as to an age estimate on this individual – I have requested the length measurements (or you may already have them) but in discussions with the Zoo team yesterday they indicated that the calf does not yet have erupted teeth. From the information I can find that would indicate this animal is less than 3 months old (current estimates being provided by the biologist are that it is 4-6 months old). Would appreciated any thoughts you have on verifying the age.

Just reiterating there is no facility in New Zealand that can take this animal and at this stage the possibility of sending off-shore for permanent care is not considered an option. The only only long term option (which I don't feel is a real option) would be to fully hand-raise then attempt to re-wild. Would love any thoughts on have on that as well.

Thanks again for your support,

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Thursday, 15 July 2021 4:07 AM
To: [redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Cc: [redacted]@SeaWorld.com>; [redacted]@seaworldabudhabi.com>; [redacted]@SeaWorld.com>; [redacted]@vanaqua.org; [redacted]
Subject: RE: Stranded orca calf in New Zealand

Good day [redacted] and all,

We appreciate all your efforts for trying to support this calf and I echo [redacted] comments about disposition of a dependent calf. If a suitable long term home is not available in NZ or Australia then you and your Team will need to make a decision on how long to continue the supportive management of the calf … I agree, that with each day the outlook for a successful reintroduction wanes and the overall welfare of the calf will weigh heavy into the decision-making …
do the biologists have an idea of how often the pod travels by the site location?

We will continue to help, as much as possible,
Regards,
[redacted]

From: [redacted]
Sent: Wednesday, July 14, 2021 2:32 AM
To: [redacted]@SeaWorld.com>; [redacted]
[redacted]@wellingtonzoo.com>; [redacted]@wellingtonzoo.com>
Cc: [redacted]@SeaWorld.com>;
[redacted]@seaworldabudhabi.com>; [redacted]@SeaWorld.com>;
[redacted]@vanaqua.org; [redacted]
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted]

Thank you so much and thank you again all for your support thus far! [redacted] (senior vet at Wellington Zoo) has looped me in on your direct clinical advice email thread which is fabulous and much appreciated. Very keen for you to continue to liaise directly with the Wellington Zoo team with regards to direct day to day medical care though I would very much appreciate staying in the loop.

My role is to help collate and provide technical advice to the Department of Conservation team with regards to ongoing plans for this calf and to help with interpretation of the veterinary advice so that the decision makers can make decisions based on the best advice available. As such I am keen to start having conversations around medium to longer term health monitoring in an attempt to get some objective measure in place to help assess how this individual is doing.

We are also keen to have input into long term prognosis for return to the wild. As you are no doubt aware there are no facilities in New Zealand that can provide long-term care for a cetacean neonate. We are very concerned about the level of habituation to humans that is already occurring in such a young animal and are interested in any thought on realistic ability to return this individual to the pod (sssuming it can be found). We note that everything we have read indicates that a neonate of this age in any other location would be deemed non-releasable and placed in permanent human care. I am not saying it is impossible that a return to the pod might happen but it feels more unlikely with every day that passes.

I am not sure if this is the right forum for these kinds of conversations or if you would rather focus on providing advice on the medical stabilisation and nutritional support side of things. If the latter is the case have you any suggestions as to the right people we should be talking to about longer term prognosis?

Once again thank you all so very much for your support and help from afar – it is appreciated more than you will ever know as we will not be able to properly express our thanks.

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

<image001.png>

<image002.png>

<image003.png>

<image004.jpg>

From: [redacted]@SeaWorld.com>
Sent: Wednesday, 14 July 2021 5:38 AM
To: [redacted]
[redacted]@wellingtonzoo.com>
Cc: [redacted]@SeaWorld.com>; [redacted]
[redacted]@seaworldabudhabi.com>; [redacted]@SeaWorld.com>;
[redacted]@vanaqua.org; [redacted]
Subject: RE: Stranded orca calf in New Zealand

Hi [redacted]

We are interested in helping from afar, but obviously understand the challenges with the situation. One thing that would help, would be to have one spokesperson from NZ, as there appears to be 2 email strings about this calf…so I'm looking to consolidate information about calf coming to us at SeaWorld and [redacted] at Vancouver and [redacted]

Who should be the main contact from NZ?
I will be the main contact for SeaWorld and will share information with my colleagues.

What is the short-term plan and is there a long term contingency plan?
I understand that a more scheduled feeding regimen was to begin, in the past 12 hrs, how is that going?
Do you plan to get another blood sample?

With regards,
[redacted]

[redacted] **DVM** | Sr. Veterinarian
SEA An mal Health and Rescue Hospital
500 SeaWorld Drive | San Diego | CA 92109
Direct: [redacted]
Cell: [redacted]

<image005.jpg>

From: [redacted]
Sent: Tuesday, July 13, 2021 5:01 AM
To: [redacted]@seaworldabudhabi.com>; [redacted]@vanaqua.org; [redacted]SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

H[redacted],

Thank you so very much for your message and the support of the team already. We are all so very appreciative of all the advice and help in ensuring this little calf gets the best possible chance at being stable and in a condition it could be returned if the pod were found.

Time Zones could be a little challenging but if there was a possibility to talk to some or all of you via teams tomorrow that would be very much appreciated and I would be keen to make any meeting work that would suit you all (I will be asleep for the next 8 ish hours but back on line from about 7:30 NZ time tomorrow). We cast a very wide net in the initial messages as we know you are all incredibly busy and weren't sure if people would be able to respond to us – the response has been overwhelming in the level of support which has been incredible heart-warming – that said definitely keen to streamline comms with the most appropriate people.

Let me know if you are indeed available for a talk via teams,

Thank you again so much for the support you have all provided,

Kindest Regards,

[redacted]

From: [redacted]@seaworldabudhabi.com>
Sent: Tuesday, 13 July 2021 6:55 PM
To: [redacted]@vanaqua.org; [redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: RE: Stranded orca calf in New Zealand

Hello [redacted],
Pleasure "e" meeting you and thanks for reaching out! I believe our Drs. [redacted] (SeaWorld) and [redacted] (Vancouver Aquarium) have already been in contact with Dr. [redacted] there and have shared our feeding and nutrition recommendations. I think they are waiting on bloodwork results to help direct further medical recommendations. I have included them on here so they can share with you what they shared with Dr. [redacted] already and also shorten the communication chain. No need for to many cooks in the kitchen 😉 Will be happy to setup a conference or Microsoft teams call if you would like. I can be available any time that works for everybody. I watched some of this on the news, great job on the monumental effort your team has put in thus far. Hopefully we can get this little guy back on track!

Please do not hesitate to reach out for anything, always happy to help.
[redacted]

<image006.png>

[redacted]
Animal Health and Welfare Director
Zoological
[redacted]
[redacted]@seaworldabudhabi.com
W www.seaworldabudhabi.com

PO BOX 128717, ABU DHABI, UAE
Operated by Farah Experiences LLC

From: [redacted]@doc.govt.nz>
Sent: Monday, July 12, 2021 11:16 PM
To: [redacted]@seaworldabudhabi.com>
Subject: Stranded orca calf in New Zealand

Kia ora (hello) from New Zealand,

My name is [redacted] and I am a wildlife veterinarian working for the Department of Conservation in New Zealand. I received your contact from [redacted] as a veterinarian who may be able to help provide advice with regards to an orca calf that stranded here just under 48 hours ago. I am on the technical advisory group for the response to this situation and am hoping to provide a strong veterinary voice to the recommendations.

A bit of history on the calf - Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded – report is that it was swept up into a rock pool and stranded there. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependent on the mother. Unfortunately despite extensive searching yesterday both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. From videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night. Last night the calf was kept in the water and the mobility appears to be slowly improving but is still not great.

A Zoo veterinarian attended the site yesterday afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended following advice from Sarah. I have not heard as to what the assessment was or how the procedure went at this stage.

We know the chances of a dependant calf being reunited with a pod are slim but the technical advisory group has been requested to investigate options for supporting the calf to allow time for an attempt to be made.

I was particularly reaching out to you all to seek advice on the what are the **feeding recommendations for an orca calf** if the decision was made to persist with attempts to relocate the pod. Given being located in NZ we have a lot of milk replacers for domestic animals but certainly nothing specific for cetaceans so I am not sure if there is anything in the country that would even work as a milk replacer.

Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

Thank you so much for your time and any thoughts,

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

<image001.png>

<image002.png>

<image003.png>

<image007.jpg>

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Caution - This message and accompanying data may contain information that is confidential or subject to legal privilege. If you are not the intended recipient you are notified that any use, dissemination, distribution or copying of this message or data is prohibited. If you received this email in error, please notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Thursday, 15 July 2021 4:09 am
To: [redacted]
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted],

I don't know if it has been confirmed in wild populations. Alloparenting appears to be common in wild cetaceans, but I don't know if it includes induction of lactation. My guess is that enough lactating females would be present in a pod to potentially be a source if needed.

However, [redacted] is right, this calf appears to have about zero chances of survival in the wild. Finding its pod would be an interesting experiment, but do you really want to put the animal through this experiment knowing that the pod left it once already (I don't know the circumstances behind this stranding so I am making a large assumption) and would probably not welcome the animal back into the group for the same reason it left it the first time.

Experience with dependent calves would indicate that it is non-releasable. In my opinion, If you can't care for the calf long term and the government is unwilling to move it to a facility that can, you should humanly euthanize it sooner than later.

You are in a tough situation. We of course will help with whatever decision you decide. [redacted] was contacted first, and he can be a source for our collective experience. You of course are still welcome to email whomever you want including myself.

Take care and good luck!

[redacted]

[redacted], DVM, PhD
Vice President of Conservation Research and Animal Health
SeaWorld Parks and Entertainment
Corporate Zoological Operations

7007 SeaWorld Drive
Orlando, FL 21821
V [redacted]
M: [redacted]

From: [redacted]>
Sent: Wednesday, July 14, 2021 5:38 AM
To: [redacted]@SeaWorld.com>
Subject: RE: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hi [redacted]

Just wanted to send a direct message and say thank you so very much for this reply – very informative and helpful! A question re spontaneous lactation in cetaceans – is this in a captive situation or has it also been documented in wild populations?

I believe you are also in the email chain I have just started with [redacted] with regards to longer term plans so feel free to just jump in over there if that is easiest.

One again thank you so very much,

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Wednesday, 14 July 2021 12:25 AM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@seawold.com
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hello [redacted]

It would take approximately 30 days for the cow to completely dry up. In addition, many cetacean species have spontaneously lactated if a calf was introduced. With that being said, the milk is typically, initially (and maybe always) of lower quality and the calf would need to be robust enough to withstand the transition. I look forward to the blood results.

Cheers,

[redacted]

[redacted], DVM, PhD
Vice President of Conservation Research and Animal Health
SeaWorld Parks and Entertainment
Corporate Zoological Operations

7007 SeaWorld Drive
Orlando, FL 21821
V [redacted]

From: [redacted]
Sent: Tuesday, July 13, 2021 12:32 AM
To: [redacted]@SeaWorld.com>
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted], [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com [redacted]@seawold.com>
Subject: RE: [EXTERNAL] RE: Stranded orca calf in New Zealand

H[redacted]

Yes indeed – silly COVID I am sure we would have loved your support on site!

Hopefully not an insensitive question but does any one have any thoughts on how long a female continues to produce milk if she looses a calf? Trying to get an idea on how long we have to find the pod (assuming we can keep the little one medically and nutritionally stable).

Thanks all!

[redacted]

From: [redacted]@SeaWorld.com>
Sent: Tuesday, 13 July 2021 3:47 PM
To: [redacted]@doc.govt.nz>
Cc: [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: Re: [EXTERNAL] RE: Stranded orca calf in New Zealand

Happy to help , hard not jumping on a plane ;-)

I've been corresponding with [redacted] frequently and tailoring the plan to help this little one...hope they can sustain him for the pod to come back or to be sighted.

Regards,
[redacted]

> On Jul 12, 2021, at 7:25 PM, [redacted]@doc.govt.nz> wrote:
>
> Hello [redacted],
>
> Thank you so very much for the replies (I love the wildlife/veterinary communities so much) – awesome to know a vet has been in touch with you directly already [redacted] Thank you for the support there, so very appreciated of you all taking time to reply and help with getting contacts in the right places.
>
> Depending on how the next few days go I may be back in touch or others may be in touch to lean on your expertise as the situation continues to develop.
>
> Thank you all,
>
> Kindest regards,
>
> [redacted]
>
> ---
>
> **From:** [redacted]@SeaWorld.com>
> **Sent:** Tuesday, 13 July 2021 9:29 AM
> **To:** [redacted]@sdzwa.org>
> **Cc:** [redacted]@sdzwa.org>; [redacted]@doc.govt.nz>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]

[redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: RE: Stranded orca calf in New Zealand

Thanks [redacted]

Been communicating with zoo vet, [redacted] since last evening.

Regards,
[redacted]

From: [redacted]@sdzwa.org>
Sent: Monday, July 12, 2021 2:25 PM
To: [redacted]@sdzwa.org>; [redacted]@doc.govt.nz>; [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted] <[redacted]@sdzwa.org>; [redacted]@seaworld.com>; [redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>; [redacted]@seawold.com
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

Hello [redacted],
I am responding and including Dr. [redacted]. Hopefully they can be of assistance. I am also including [redacted] who can assist with sharing nutritional informational on milk replacements or put in you touch. Good luck.
[redacted]

From: [redacted]@sdzwa.org>
Sent: Monday, July 12, 2021 2:17 PM
To: [redacted]@sdzwa.org>; [redacted]@ucdavis.edu>; [redacted]@sdzwa.org>; [redacted]@sdzwa.org>
Subject: RE: Stranded orca calf in New Zealand

Dear [redacted]
So sorry to hear about the stranded orca calf. I have no experience with orcas and have cc:ed 3 folks who may be able to help [redacted] and [redacted]). Both [redacted] and [redacted] and on vacation and may not be monitoring email. I hope [redacted] will be able to help or put you in touch with someone who can.
Best of luck,
[redacted]

[redacted], **DVM, DACZM, DECZM (ZHM)**
Chief Conservation and Wildlife Health Officer

<image001.jpg>

15600 San Pasqual Valley Road
Escondido, CA 92027-7000
[redacted] mobile
[redacted]@sdzwa.org
sdzwa.org

From: [redacted]
Sent: Monday, July 12, 2021 12:19 PM
To: [redacted] sdzwa.org>; [redacted] @sdzwa.org>
Subject: Stranded orca calf in New Zealand

Kia ora (hello) from New Zealand,

My name is [redacted] and I am a wildlife veterinarian working for the Department of Conservation in New Zealand. I received your contact details via [redacted] as veterinarians who may be able to help provide advice with regards to an orca calf that stranded here just under 48 hours ago. I am on the technical advisory group for the response to this situation and am hoping to provide a strong veterinary voice to the recommendations.

A bit of history on the calf - Pod was seen Sunday morning free swimming – calf was with adult female. At lunch time the calf was found stranded – report is that it was swept up into a rock pool and stranded there. An attempt was made to refloat it at the stranding site but wasn't successful. Advice was given to trailer it to a better location and retry a refloat with hopes the pod was still near enough to hear. Unfortunately no joy so the decision was made to keep the calf on mattresses on a trailer overnight.

Calf is estimated to be 2.5-3m long and believed to still be dependent on the mother. Unfortunately despite extensive searching yesterday both aerial and on the water failed to locate the pod. The calf was kept in the water for the day. From videos I have seen it appears to be suffering buoyancy/stability issues and lists heavily to one side. There is a suggestion that this is due to compression of a pectoral fin from its positioning the first night. Last night the calf was kept in the water and the mobility appears to be slowly improving but is still not great.

A Zoo veterinarian attended the site yesterday afternoon to assess the calf and attempt to give it electrolytes via an orogastric tube as we recommended following advice from Sarah. I have not heard as to what the assessment was or how the procedure went at this stage.

We know the chances of a dependant calf being reunited with a pod are slim but the technical advisory group has been requested to investigate options for supporting the calf to allow time for an attempt to be made.

I was particularly reaching out to you all to seek advice on the what are the **feeding recommendations for an orca calf** if the decision was made to persist with attempts to relocate the pod. Given being located in NZ we have a lot of milk replacers for domestic animals but certainly nothing specific for cetaceans so I am not sure if there is anything in the country that would even work as a milk replacer.

Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

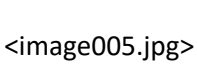
Thank you so much for your time and any thoughts,

Kindest Regards,

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand

Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand
http://kakaporecovery.org.nz/



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[redacted]

From: [redacted]@vanaqua.org>
Sent: Thursday, 15 July 2021 2:29 am
To: [redacted]
Cc: [redacted];
Subject: Re: Stranded orca calf in New Zealand

Hi [redacted]

I think most people would agree that the choices for a dependent calf are quite limited. The calf will need it's own mother or to be successfully adopted by another female or females. The chances of that are unknown but your own experts in this particular group of whales are probably the best resource on where the pod might be and what the logistics of getting a calf to them might be. How long you have to locate and reintroduce the animal is unknown. Otherwise, in our area, the animal would be deemed non-releasable and a suitable long term home would be found. If no home can be found and the animal cannot be reintroduced then your options are quite limited.

Folks do release dependent calves on their own but, again, most people think this is a bit cruel most likely. Some animals like that may become nuisance animals but I suspect this calf is too young for that. If that is the choice offered then I would at the very least try to attached a tracking tag so some kind of objective outcome can be determined to help collect evidence for future decision making.

For monitoring this animal, blood work, weight gain, swimming and diving ability are among the parameters to be monitored. I would also recommend ultrasound of respiratory system and major abdominal organs.

We are all very happy to help in any way.

Best wishes,

[redacted]

vancouver aquarium.

[redacted], DVM, MSc, DACZM
Head Veterinarian & Director, Animal Health

P [redacted]
E [redacted]@vanaqua.org

vanaqua.org

Vancouver Aquarium
845 Avison Way, Vancouver, BC, Canada V6G 3E2

On Jul 14, 2021, at 2:32 AM, [redacted]@doc.govt.nz> wrote:

Hi [redacted]

Thank you so much and thank you again all for your support thus far! [redacted] (senior vet at Wellington Zoo) has looped me in on your direct clinical advice email thread which is fabulous and much appreciated. Very keen for you to continue to liaise directly with the Wellington Zoo team with regards to direct day to day medical care though I would very much appreciate staying in the loop.

My role is to help collate and provide technical advice to the Department of Conservation team with regards to ongoing plans for this calf and to help with interpretation of the veterinary advice so that the decision makers can make decisions based on the best advice available. As such I am keen to start having conversations around medium to longer term health monitoring in an attempt to get some objective measure in place to help assess how this individual is doing.

We are also keen to have input into long term prognosis for return to the wild. As you are no doubt aware there are no facilities in New Zealand that can provide long-term care for a cetacean neonate. We are very concerned about the level of habituation to humans that is already occurring in such a young animal and are interested in any thought on realistic ability to return this individual to the pod (sssuming it can be found). We note that everything we have read indicates that a neonate of this age in any other location would be deemed non-releasable and placed in permanent human care. I am not saying it is impossible that a return to the pod might happen but it feels more unlikely with every day that passes.

I am not sure if this is the right forum for these kinds of conversations or if you would rather focus on providing advice on the medical stabilisation and nutritional support side of things. If the latter is the case have you any suggestions as to the right people we should be talking to about longer term prognosis?

Once again thank you all so very much for your support and help from afar – it is appreciated more than you will ever know as we will not be able to properly express our thanks.

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

<image002.png>

<image003.png>

<image004.png>

<image007.jpg>

From: [redacted]@SeaWorld.com>
Sent: Wednesday, 14 July 2021 5:38 AM

To: [redacted]
[redacted]@wellingtonzoo.com>
Cc: [redacted]@SeaWorld.com>; [redacted]
[redacted]@seaworldabudhabi.com>; [redacted]@SeaWorld.com>;
[redacted]@vanaqua.org; [redacted]@gmail.com>
Subject: RE: Stranded orca calf in New Zealand

Hi [redacted],

We are interested in helping from afar, but obviously understand the challenges with the situation. One thing that would help, would be to have one spokesperson from NZ, as there appears to be 2 email strings about this calf…so I'm looking to consolidate information about calf coming to us at SeaWorld and [redacted] at Vancouver and [redacted]

Who should be the main contact from NZ?
I will be the main contact for SeaWorld and will share information with my colleagues.

What is the short-term plan and is there a long term contingency plan?
I understand that a more scheduled feeding regimen was to begin, in the past 12 hrs, how is that going?
Do you plan to get another blood sample?

With regards,
[redacted]

[redacted] | Sr. Veterinarian
SEA An mal Health and Rescue Hospital
500 SeaWorld Drive | San Diego | CA 92109
Direct: [redacted]
Cell: [redacted]

<image008.jpg>

From: [redacted]
Sent: Tuesday, July 13, 2021 5:01 AM
To: [redacted]@seaworldabudhabi.com>; [redacted]@vanaqua.org;
[redacted]@SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: [EXTERNAL] RE: Stranded orca calf in New Zealand

H [redacted],

Thank you so very much for your message and the support of the team already. We are all so very appreciative of all the advice and help in ensuring this little calf gets the best possible chance at being stable and in a condition it could be returned if the pod were found.

Time Zones could be a little challenging but if there was a possibility to talk to some or all of you via teams tomorrow that would be very much appreciated and I would be keen to make any meeting work that would suit you all (I will be asleep for the next 8 ish hours but back on line from about 7:30 NZ time tomorrow). We cast a very wide net in the initial messages as we know you are all incredibly busy and weren't sure if people would be able to respond to us – the response has been overwhelming in the level of support which has been incredible heart-warming – that said definitely keen to streamline comms with the most appropriate people.

Let me know if you are indeed available for a talk via teams,

Thank you again so much for the support you have all provided,

Kindest Regards,

[redacted]

From: [redacted]@seaworldabudhabi.com>
Sent: Tuesday, 13 July 2021 6:55 PM
To: [redacted]@vanaqua.org; [redacted] @SeaWorld.com>; [redacted]@SeaWorld.com>
Subject: RE: Stranded orca calf in New Zealand

Hello [redacted],
Pleasure "e" meeting you and thanks for reaching out! I believe our Drs. [redacted] (SeaWorld) and [redacted] (Vancouver Aquarium) have already been in contact with Dr. [redacted] and have shared our feeding and nutrition recommendations. I think they are waiting on bloodwork results to help direct further medical recommendations. I have included them on here so they can share with you what they shared with Dr. [redacted] already and also shorten the communication chain. No need for to many cooks in the kitchen 😉 Will be happy to setup a conference or Microsoft teams call if you would like. I can be available any time that works for everybody. I watched some of this on the news, great job on the monumental effort your team has put in thus far. Hopefully we can get this little guy back on track!
Please do not hesitate to reach out for anything, always happy to help.
[redacted]

<image009.png>

[redacted]
Animal Health and Welfare Director
Zoological
M [redacted]
D [redacted]
E [redacted]@seaworldabudhabi.com
W www.seaworldabudhabi.com

PO BOX 128717, ABU DHABI, UAE
Operated by Farah Experiences LLC

From: [redacted]@doc.govt.nz>
Sent: Monday, July 12, 2021 11:16 PM
To: [redacted]@seaworldabudhabi.com>
Subject: Stranded orca calf in New Zealand

Kia ora (hello) from New Zealand,

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Very keen to have any thoughts or advice you have on this case. [redacted] has been fabulous and provided wonderful initial advice it just both our knowledge is very limited in the nutrition of neonatal cetaceans hence reaching out to you all.

Thank you so much for your time and any thoughts,

Kindest Regards,

[redacted]

[redacted]
Veterinary Advisor Kākāpō - *Kaitohutohu Rata Kararahe Kākāpō*

Department of Conservation - *Te Papa Atawhai*
Postal address: Department of Conservation, PO Box 743, Invercargill 9840, New Zealand
Physical address: Department of Conservation, Level 7, 33 Don Street, Invercargill 9480, New Zealand

http://kakaporecovery.org.nz/

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