Orca Technical Paper

Best Available Information
23 July 2021

APPENDIX I – Scenarios

*** Success** = orca calf successfully reintegrated into a pod of wild orca and no longer dependent on human care and not seeking out human interactions.

Option	Scenario	Timing	Risks/Concerns	Physical Health Risks	Mental Health Risks	Welfare/ ethics risks	Dependencies	Difficulty of implementation	Likelihood of success*	Ngāti toa Rangatira advice	Orca Research Trust Advice
1	**Release calf (no pod)**	Could happen at any time	• Significant welfare concerns about releasing an unweaned calf without a lactating female present, as it will almost certainly die slowly from starvation. • TAG considered this was not an option for cultural/ethical/animal welfare reasons.	HIGH The calf is going to rapidly become physically unwell due to lack of food. This will make it weak, immunocompromised, hypoglycaemic and a range of other physical health concerns.	HIGH Extreme stress of isolation and lack of food	VERY HIGH Calf not yet weaned and will almost certainly die slowly from starvation.	See sub-options	LOW Easiest scenario operationally	**NIL - NOT RECOMMENDED** Option should not be considered except as part of scenario 1A or 1B below		
1A	**Reunite with natal pod**	Whenever natal pod is located	• Might take a significant length of time to locate the natal pod • May be difficult to transport to the pod, if identified • Requires post-release monitoring to confirm whether reunification has been successful. Failure may occur for a range of reasons: ○Reuniting might fail if mother is not able to feed the calf upon return. Female likely to stop lactating after 30 days, however could be shorter. Some spontaneous lactation has been recorded in 2 different Beluga whales. Chance of this happening in such a young wild orca is unknown. ○Photos of natal pod include two adult females and not sure which is the mother. ○Pod may not accept calf for social reasons	*MODERATE* Injury risk sustained during transport. Requires satellite tag to be applied, which is physically invasive. Starvation risk if mother has stopped lactating or the mother/ pod rejects the calf. Direct injuries from the pod if the calf is not accepted (ramming, raking etc)	*MODERATE* Stress of handling/ transportation. While calf may benefit from being with natal pod, rejection would cause significant stress. If the calf has habituated to humans putting it back into a pod environment is also likely to be stressful.	HIGH Stress during transportation and possible rejection/lack of food availability. No historical evidence of a case where such an activity demonstrated an outcome that was in the best interest of the calf. Survival for a longer duration of time is not in and of itself an acceptable animal welfare outcome. The quality of life during that time, and prevention of significant DIS-stress rather than stress or eustress is required. Lack of ability to monitor the stress	*Scenario 2 – Extended holding time* *Scenario 3 – Transport* *Scenario 4 – Tagging and monitoring* *Scenario 6 – Recapture (if calf rejected)*	HIGH Locating, confirming, and tracking the natal pod. Applying tag and ensuring health is appropriate for release. Appropriate boat to transfer calf to water. Safe and effective means of transferring calf to water. Staff H&S during operation. Needs contingencies in place for if the calf is rejected and required recapturing	**LOW** Relies upon a long chain of successes, but is considered the best chance for survival of the calf.		

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			○Calf may be in poor health for reasons not already diagnosed due to diagnostic restraints in cetaceans and the small area in which the animal is currently kept. Reuniting will not fix this.			level of the animal upon release, only life/death/location and limited ability to determine if feeding versus slow emaciation.					
1B	**Release into a different pod with lactating female**	Whenever a pod with a female and calf present is found	• As above, with potentially lower likelihood that pod will accept calf. • TAG agreed this was less desirable option.	HIGH Injury risk sustained during transport. Requires satellite tag to be applied, which is physically invasive. Starvation risk if presumed lactating female rejects the calf or isn't lactating. Risk to other calf if lactating female attempts to provide for two calves simultaneously. Direct injuries from the pod if the calf is not accepted (ramming, raking etc)	HIGH Stress of handling/ transportation. While calf may benefit from being with a pod, there is a higher chance of rejection than the natal pod, which would cause significant stress. Extreme stress of isolation and lack of food If the calf has habituated to humans putting it back into a pod environment is also likely to be stressful	VERY HIGH Welfare risks are significant. All of the above apply, AND In comparable examples with other species where this sort of reintroduction attempt has been made, it has been made with the provisions that human intervention can quickly recover the individual animal and create a new plan for its welfare before any failure to integrate can result in serious injury, trauma, starvation, or disease. Stress during transportation and likelihood of rejection/lack of food availability. Taking such risk with a wild animal, even assuming that wild animals face significant stress in their	*Scenario 2 – Extended holding time* *Scenario 3 – Transport* *Scenario 4 – Tagging and monitoring* *Scenario 6 – Recapture (if calf rejected)*	VERY HIGH Locating, confirming, and tracking a pod with a potential lactating female. Applying tag and ensuring health is appropriate for release. Appropriate boat to transfer calf to water. Safe and effective means of transferring calf to water. Staff H&S during operation. Needs contingencies in place for if the calf is rejected and required recapturing	**VERY LOW - NOT RECOMMENDED**		

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						lifetimes, decisions in the calf's best interest while under DOC control should be made when the preponderance of evidence of a positive outcome outweighs the negative. There is no such evidence for a positive welfare outcome. Additionally, the stress to the other pod members should be considered as well, including the impact this may have on successful release.					
1C	**Release into a different pod with no lactating female**	Whenever a pod with a female is found	• As above, with much lower likelihood that pod will accept calf. • TAG did not discuss this option	HIGH Injury risk sustained during transport. Starvation risk unless female spontaneously lactates. Requires satellite tag to be applied, which is physically invasive. Direct injuries from the pod if the calf is not accepted (ramming, raking etc)	VERY HIGH Stress of handling/ transportation. While calf may benefit from being with a pod, there is unknown chance of a female lactating, which would cause significant stress. Extreme stress of isolation and lack of food If the calf has habituated to	VERY HIGH Welfare risks are significant. All of the above apply. Stress during transportation and likelihood of rejection/lack of food availability. Additionally, the stress to the other pod members should be considered as well, including the impact this may have on successful release.	*Scenario 2 – Extended holding time* *Scenario 3 – Transport* *Scenario 4 – Tagging and monitoring* *Scenario 6 – Recapture (if calf rejected)*	VERY HIGH Locating and confirming a pod with a female, plus tracking pod. Applying tag and ensuring health is appropriate for release. Appropriate boat to transfer calf to water. Safe and effective means of transferring calf to water. Staff H&S during operation	**VERY LOW - NOT RECOMMENDED**		

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					humans putting it back into a pod environment is also likely to be stressful.			Needs contingencies in place for if the calf is rejected and required recapturing.			
2	**Extended holding time**	Status quo, but questions about how long this can be maintained.	• Dependent upon success of veterinary interventions. • Likelihood of calf health issues increases with longer duration of separation from mother. • Increased likelihood that mother will stop lactating as time goes on, meaning successful reintroduction to natal pod is less likely. • Likelihood of habituation to humans increases as interactions continue, which may inhibit ability to successfully integrate back into a wild pod. • There are no care facilities in NZ appropriate to hold an orca. • Significant issues with any attempt to hold the animal long enough for it to be weaned and independent • Ethical and Legal risks around holding a calf in captivity	HIGH Dependent upon success of veterinary interventions. Likely to have increased health risks with time. Current level of veterinary oversight is not possible in its current form long-term - but is required to ensure this individual stays healthy	HIGH Additional stress of further handling and habituation to humans. Ongoing social isolation from other orca will cause distress.	VERY HIGH Lack of appropriate care facilities in NZ. Habituation will increase, especially with current recall training taking place under Ingrid's instruction. Holding calf in captivity. There is little reason to believe that other than life support the animal is in a positive behavioural welfare state in this scenario and current timeline is already stretching beyond expert advice recommendations. Negative welfare states are being eliminated by quality veterinary care but this is not sufficient for positive animal welfare of a highly social, highly intelligent	*Scenario 5 – Training and weaning*	HIGH Permit to hold calf in captivity Safe and effective means of retaining calf in captivity. Staff H&S risks	**LOW, decreasing over time** Not supported by AEC members		

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						creature to be across the 5 welfare domains					
2A	**Hold calf in existing Plimmerton sea pen and/or pool**	Status quo, but questions about how long this can be maintained	• Current sea pen at Plimmerton is very small. 3.5m depth at high tide and only 1.5m at low tide. • Current site cannot be used indefinitely as it is not well-sheltered and requires moving the calf between pen and pool.	HIGH As above	HIGH As above	VERY HIGH As above	*Scenario 5 – Training and weaning*	HIGH As above	**LOW, decreasing over time**		
2B	**Relocate calf to alternative sea pen**	Dependent upon locating a suitable sea pen and other logistics	• Iwi may not approve of moving calf out of their rohe • There are no alternative purpose-built facilities in New Zealand. • Site investigation would be required by experts in orca care in order to determine suitability of alternatives • Significant logistics associated with moving calf, plus unknown cost implications • Potential health/welfare issues for calf during moving • Needs clear expectations of how care, etc. will be handled at new site.	HIGH As above	HIGH As above	VERY HIGH As above Extends stress and health risks to end up in similar risks under recapture considerations.	*Scenario 3 – Transport* *Scenario 5 – Training and weaning*	VERY HIGH Would require substantial commitment of resources to investigate suitable alternatives and arrange transfer of the calf.	**LOW, decreasing over time** **- NOT RECOMMENDED**		
3	**Transport**	Dependent on scenario above	• Transport of the calf requires significant logistical and veterinary support • Clear instructions needed on what to do in a variety of circumstances • Welfare and health concerns for calf as transport likely to be distressing	*MODERATE* Injury risk associated with removing the calf from the water, loading in transport vessel, moving to new location, and unloading.	*MODERATE* Being restrained while out of water is likely to increase distress. Unfamiliar noise, locations, vibrations may	*MODERATE* Unnecessary or repeated movements of the calf carried increased risks and are difficult to justify. Transport of animals can negatively impact an animal's		*MODERATE* Need appropriate equipment to restrain and hold calf without injury, vehicles/vessels suitable for transport. More difficult the further the	**N/A** This is a factor which will affect likelihood of other options		

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					increase distress.	welfare, especially if they are already compromised. Moving the calf, even according to the best of plans will be stressful.		calf is moved and the older (larger) it becomes.			
3A	**Transport to pod**	Dependent on scenario above	• Finding a pod and staying with them will be difficult, especially if the health of the calf must be assessed, tags applied, and so forth prior to release. • Requires vessel and other equipment suitable to carry the calf • Needs clear protocol on how to reintroduce the calf and whether (and how) to recapture calf if initial introduction is unsuccessful.	*MODERATE* As above	*MODERATE* As above	*MODERATE* As above Potential that pod cannot be relocated and calf subjected to unnecessary risks of transport. Risk of rejection, necessitating recapture. Additionally, the stress to the other pod members should be considered as well, including the impact this may have on successful release.	*Scenario 4 – Tagging and monitoring* *Scenario 6 - Recapture*	*MODERATE* As above	**N/A** This is a factor which will affect likelihood of success of other options		
3B	**Transport to alternative holding site**	Dependent on scenario above	• Potential for increased health/welfare impacts on calf if greater distance of transport requires holding and restraining it for longer	*MODERATE* As above	*MODERATE* As above	*MODERATE* As above Risk that new location is not appreciably better than the existing location and movement is unnecessary. No, as above longer duration of captivity decreases quality of life, eustress, or positive		*MODERATE* As above	**N/A** **- NOT RECOMMENDED** as per scenario 2B		

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						behavioural elements. Longer duration in isolation with conspecifics is not recommended.					
3C	**Transporting to another country**	N/A	• TAG considered this was not an option for cultural/ethical/animal welfare reasons. • Many welfare, legal and political issues.	VERY HIGH	VERY HIGH	VERY HIGH		VERY HIGH	**NIL - NOT RECOMMENDED** Option should not be considered		
4	**Tagging and monitoring**	Dependent on scenario above	• Will allow tracking of animals remotely and ability to locate the tagged animal on the water to assess well-being. • Tags are invasive and require a surgical procedure to bolt them through the dorsal fin. • Animal ethics approval will be required, with appropriate procedures to ensure the safety of the tagged animal • A satellite tag appropriate for this purpose is on its way to DOC from IFAW in the US • This is a well-recognised method for monitoring stranded animals post release and has been done on a wide range of species in other countries. • A secondary VHF tag to allow fine-scale locating at sea is still being sought	*MODERATE* Requires drilling a hole through the dorsal fin, use of drugs, risk of infection, and may experience some physical discomfort as it heals. Tagged animal will have additional drag associated with the tag while swimming, however this could be minimised by using the cetacean tag designed to minimise drag.	*MODERATE* Some mental distress may result from the actual procedure, but this is of limited duration.	*MODERATE* Capture and restraint is only justifiable to potentially save the life of the animal being tagged. Mandatory for any release. However, this does not guarantee a positive outcome once released. Ability to locate animal is not the same as ability to monitor its health and social acceptance regularly enough to ensure animal is not suffering.	*Scenario 6 – Recapture* *Scenario 7 – Euthanasia*	*MODERATE* Requires suitably trained personnel, medical and veterinary equipment, drugs, and logistics associated with removing the calf from the water and restraining during the procedure	**N/A** This is a factor which will affect likelihood of success of other options and will help us meet welfare obligations		
4A	**Tagging calf**	Associated with release of calf	• Tagging creates some additional risk to the calf, both via the surgical procedure and	*MODERATE* As above	LOW As above, noting that this is likely to be not	*MODERATE* As above Recapture plans should also be	*Scenario 6 – Recapture* *Scenario 7 – Euthanasia*	*MODERATE* As above	**N/A** This is a factor which will affect likelihood of success of other		

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			via effects of wearing the device. • However, this is offset by the ability to find the calf repeatedly to assess welfare • Would facilitate confirmation that release was successful and the option for recapture if unsuccessful and calf in declining health • Clear rules needed for recapture, likely as specified in a permit issued under the MMPA. • An unsuccessful attempt, particularly with the natal pod, will almost certainly require recapture and euthanasia; protocols for decision-making should be specified in advance		substantially more distressing than tube feeding which has already occurred.	mandatory before release.			options and will help us meet welfare obligations		
4B	**Tagging natal pod member**	Only if natal pod sighted	• Tagging a member of the natal pod would allow us to track the pod without constantly following it in a vessel and/or keeping a lookout on land • Would require animal ethics approval and MMPA permit to capture an adult and apply the tag, as this cannot be done remotely except with short-duration suction-cup tags • Significant welfare concerns associated with such a capture make this option impractical.	VERY HIGH Whales and dolphins are prone to experiencing capture myopathy, an often fatal reaction to capture and removal from the water. Capture of a wild adult at sea has a very high likelihood of injuring the animal. Other risks as noted above.	VERY HIGH Unlike the calf which is already under care and partially habituated to handling, an adult wild orca would likely experience significant mental stress associated with capture and tagging.	VERY HIGH Puts an otherwise healthy adult from a Nationally Critical population at risk.		VERY HIGH Do not currently have a tag to apply. No people in NZ experienced with capturing an adult orca in the wild. Health and safety risks associated with at-sea capture of a large animal. No permit given for this, and does not assure welfare of calf.	**N/A** but **NOT RECOMMENDED** This is a factor which will affect likelihood of success of other options, but puts an otherwise healthy adult orca at substantial risk		

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			• Also would require an additional satellite tag, not currently in NZ								
5	**Training and weaning**	If calf is held for an extended time	• Weaning the animal would increase options for release • Age of calf is uncertain (2-6 months), but weaning is generally not advised before 9 months at the earliest. Natural weaning usually occurs at 1-2years of age. • Open water training could be needed, i.e. gradually remove calf from pen as weaned with aim to reunite into a pod. • Some training to be able to recall the calf on command is already occurring, per comments from Ingrid Visser • Any training significantly increases the likelihood of this animal becoming a public nuisance after release. • Ethics, logistics, media and public backlash, precedent. • Legal risks	*MODERATE* As the calf is already interacting with people and (according to Ingrid) is learning to respond to commands, it is likely this could continue with little risk to the animal. Weaning the calf would increase physical risks as he attempts to learn to forage for himself. Currently it is against the animal welfare act to feed live vertebrates to captive animals in New Zealand and as such live food currently would not be able to be fed to assess the individual's ability to hunt.	HIGH The calf will continue to be isolated from other orca and is likely to experience mental stress as a result.	VERY HIGH This will require habituation of the calf to humans and runs a very high risk of creating a public nuisance should he be released in future. This will endanger both the animal and humans. This is not an acceptable outcome for a wild animal aiming to be repatriated at sea and re-integrated successfully.		VERY HIGH There are no orca trainers in NZ, nor an appropriate facility to use for training over many months. Would require source of live fish (stingrays) to train the calf to hunt and feed itself which is illegal (only live food allowed to be fed to captive animals are invertebrates).	**VERY LOW - NOT RECOMMENDED** No calf has been successfully weaned in captivity and then returned to the wild		
6	**Recapture**		• Will be required if any release attempt is unsuccessful • Creates physical risks in recapturing a wild animal, plus ethical and legal questions about the same • If recapture fails, calf will likely starve to death over an extended time. • Pressure likely to be exerted to recapture and make another	HIGH Injury risk sustained during recapture.	HIGH Additional stress of further handling/ transportation. Extreme stress of isolation and lack of food, should recapture fail.	HIGH Stress during transportation and likelihood of rejection/lack of food availability. Failure to recapture means calf would die slowly. A recapture plan should be established as a		HIGH Requires permit to recapture calf Locating calf again will be difficult, even with a tag applied. Appropriate boat to enable recapture	**LOW** Any release attempt which necessitates recapture should be followed by euthanasia		

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			attempt (rather than euthanise) for any scenario other than 1A.			minimum BEFORE any potential release, including any potential legal challenges if recapture then includes captive housing. Likely legal challenges based on international cases of similar examples (female orca calf and Loro Parque case).		Safe and effective means of transferring calf from water Staff H&S during operation			
7	**Euthanasia**	When deemed the most appropriate option for calf welfare	• Public backlash is likely if all other options have not been exhausted • Ongoing discussion about method to be used: ○ Ballistics are the only method in the DOC SOP ○ Others are pushing for chemical methods • TAG advice is there are alternatives but that a sub-group should be convened to discuss further.	LOW Euthanasia always carries some risk of inflicting unintentional physical pain or injury, should it be undertaken incorrectly and not result in immediate death, but trained and experienced staff are available.	*MODERATE* Unfamiliar noise, location, transport, may all cause stress. Could be minimised through sedation prior to euthanasia.	LOW Euthanasia will only be undertaken after assessing other options and determining that this is the best action for the welfare of the calf.	*Scenario 3 – Recapture*	LOW Requires experienced staff and a suitable location, as well as a suitable disposal location.	**N/A** This is a factor which will help us meet welfare obligations		
7A	**Deteriorating orca leading to decision to euthanise**	Based on health protocols	• Health assessment is in place but no clear thresholds identified when this option should take place • Method used will require different personnel and different handling of carcass	LOW As above	*MODERATE* As above	VERY LOW As above, with added support of declining health This is a necessary fail safe but best practice would allow euthanasia before irreversible suffering has occurred.		LOW As above	**N/A** This is a factor which will help us meet welfare obligations		
7B	**Stable orca but**	Operational decision	• As above.	LOW As above	*MODERATE* As above	*MODERATE*		LOW As above	**N/A**		

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	euthanasia on ethical grounds		• TAG discussion was that this was an operations/animal health/welfare consideration			Euthanising a stable orca while there is still a chance (albeit very small) of a positive outcome is more difficult to justify on welfare concerns.			This is a factor which will help us meet welfare obligations **RECOMMENDED OPTION of AEC members**		