

**Seattle Multimodal Project
Year One Marine Mammal Monitoring Plan**

March 8, 2017

In accordance with the July 2016, Washington State Ferries Seattle Multimodal Project Incidental Harassment Authorization Request, marine mammal monitoring will be implemented during this project.

Qualified Protected Species Observers (PSOs) will be present on site at all times during pile removal and driving. Marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle will be recorded.

The project includes vibratory removal of 14-inch timber piles, vibratory driving and removal of 24-inch-diameter steel piles; vibratory driving of 30-inch steel piles and 36-inch steel piles; and impact driving of 30-inch and 36-inch diameter steel piles. Distances to thresholds, and exclusion zones are provided below:

Table 1 Threshold Distances

Marine Mammal Hearing Groups	Vibratory driving/removal distance (m)			Impact driving distances (m)
	14" Timber Piles	24" Steel Piles	30"/36" Steel Piles	30/36" Steel Piles
LF cetacean	7	255	285	1,845
MF cetacean	4	65	65	75
HF cetacean	65	1,365	1,455	2,835
Phocid	4	115	125	465
Otariid	0.2	10	10	35
Level B harassment				
Vibratory driving/removal (120 dB distance)			Impact driving (160 dB distance)	
All marine mammals	2,175	11,000	13,600	1,200

Table 2 Exclusion Zones

Pile type, size & pile driving method	Exclusion zone (m)				
	LF cetacean	MF cetacean	HF cetacean	Phocid	Otariid
14" timber pile, vibratory	10	10	12	10	10
24" steel pile, vibratory	255	65	160	115	10
30" & 36" steel pile, vibratory	285	65	160	125	10
30" & 36" steel pile, impact	160	75	160	160	35

In order to simplify monitoring, a smaller number of conservative distances will be used to establish Level A, Level B and shutdown (exclusion) zones. All zones (in order of increasing distance) are listed in Table 2. PSO locations are shown in the corresponding figures.

Table 3 Take/Shutdown Zones

Zone	Distance	Marine Mammal Species	Pile Activity	Take Level	Number of Monitors	Figure
1	10 m	All Species	Timber Vibratory	Shutdown	2	1
2	12 m	Sea Lion	Steel Vibratory	Shutdown	2	1
3	35 m	Sea Lion	Steel Impact	Shutdown	2	1
4	125 m	Harbor Seal	Steel Vibratory	A	2	1
5	160 m	All Species	Steel Impact	Shutdown	2	1
6	285 m	Baleen Whale	Steel Impact/Vibratory Timber Vibratory	Shutdown	2	1
7	1.5 km	All Species	Steel Impact/Vibratory	B/A	4	2
8	2.2 km	All Species	Timber Vibratory	B	4	2
9	3.0 km	All Species	Steel Impact	A	4	2
10	11.0 km	All Species	24" Steel Vibratory	B	7	3
11	13.6 km	All Species	36" Steel Vibratory	B	7	3

Underwater Acoustic Measurements

During the project, in-water noise measurements of vibratory pile removal and impact driving will be taken to determine if the distances need to be modified. Simultaneous vibratory driving of three steel piles will be measured in the far-field to determine actual vs. modeled zones.

This could result in either a larger or a smaller monitoring effort, as appropriate. If the distances are modified, the marine mammal monitoring program will be adjusted to ensure adequate monitoring.

Monitoring

WSF proposes the following Marine Mammal Monitoring Plan:

- Monitoring distances will be determined by using a range finder, hand-held global positioning system device or landmarks with known distances from the monitoring positions.
- Zones will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile activity.
- Monitoring will be continuous unless the contractor takes a significant break, in which case, monitoring will be required 30 minutes prior to restarting pile removal.
- If marine mammals are observed, their location within the zones, and their reaction (if any) to pile activities will be documented.
- If any marine mammal approaches the 160 m shutdown zone, all pile activity will be stopped.
- If any baleen whale (gray or humpback) approaches the 285 m shutdown zone, all pile activity will be stopped.

Monitoring to Prevent Southern Resident Killer Whale (SRKW) Take

WSF proposes the following measures to prevent SRKW take:

- If SRKW (as identified by Orca Network, NMFS or another qualified source) approach any of the zones during pile activity, work will be paused until the SRKW exit the zones to avoid Level A/B take.
- If killer whales approach the zones during pile activity, and it is unknown whether they are SRKW or transient, it shall be assumed they are SRKW in order to prevent SRKW Level A/B take.

WSF proposes the following Marine Mammal Monitoring Plan for Transient killer whale:

- If positively identified Transients (as identified by Orca Network, NMFS or another qualified source) approach the zones during pile activity, and it is known that SR killer whales are not in the vicinity (from the same qualified sources) work will continue. The exception is that if Transients approach the 160 m shutdown zone, work will pause to prevent take.
- If the permitted number of Transient killer whale takes have been used, and killer whale approach any of the zones during pile activity, work shall be paused to avoid take.

Minimum Qualifications for Protected Species Observers

Qualifications for PSOs include:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars may be necessary to identify the target correctly.
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in water construction activities were conducted; dates and times when marine mammals were present at or within the Level B acoustical harassment ZOI; dates and times when pile removal was paused due to the presence of marine mammals.
- All PSOs shall be equipped with internet capable electronic devices for ArcGIS online data collection and submittals.

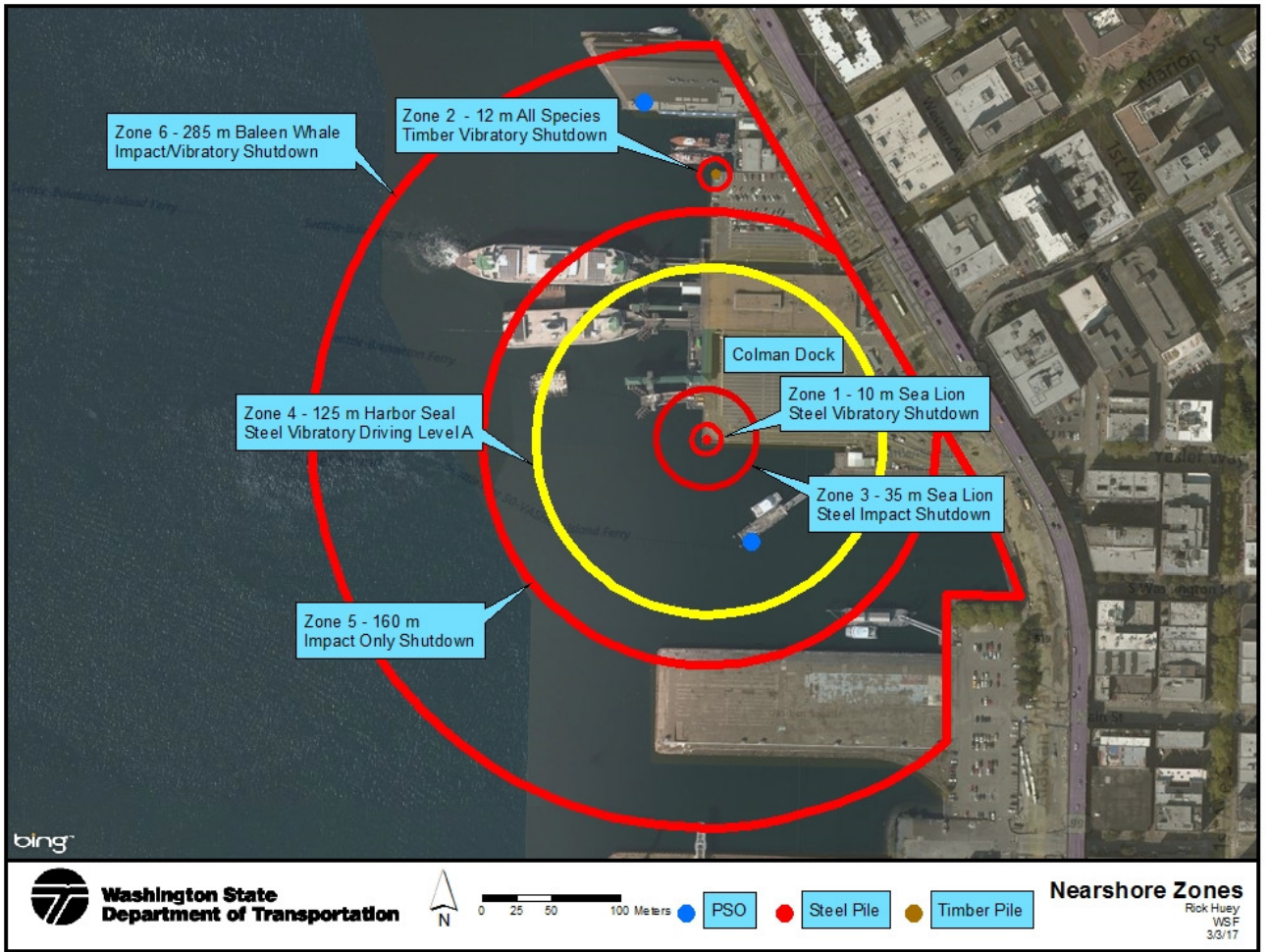


Figure 1 – Nearshore Zones

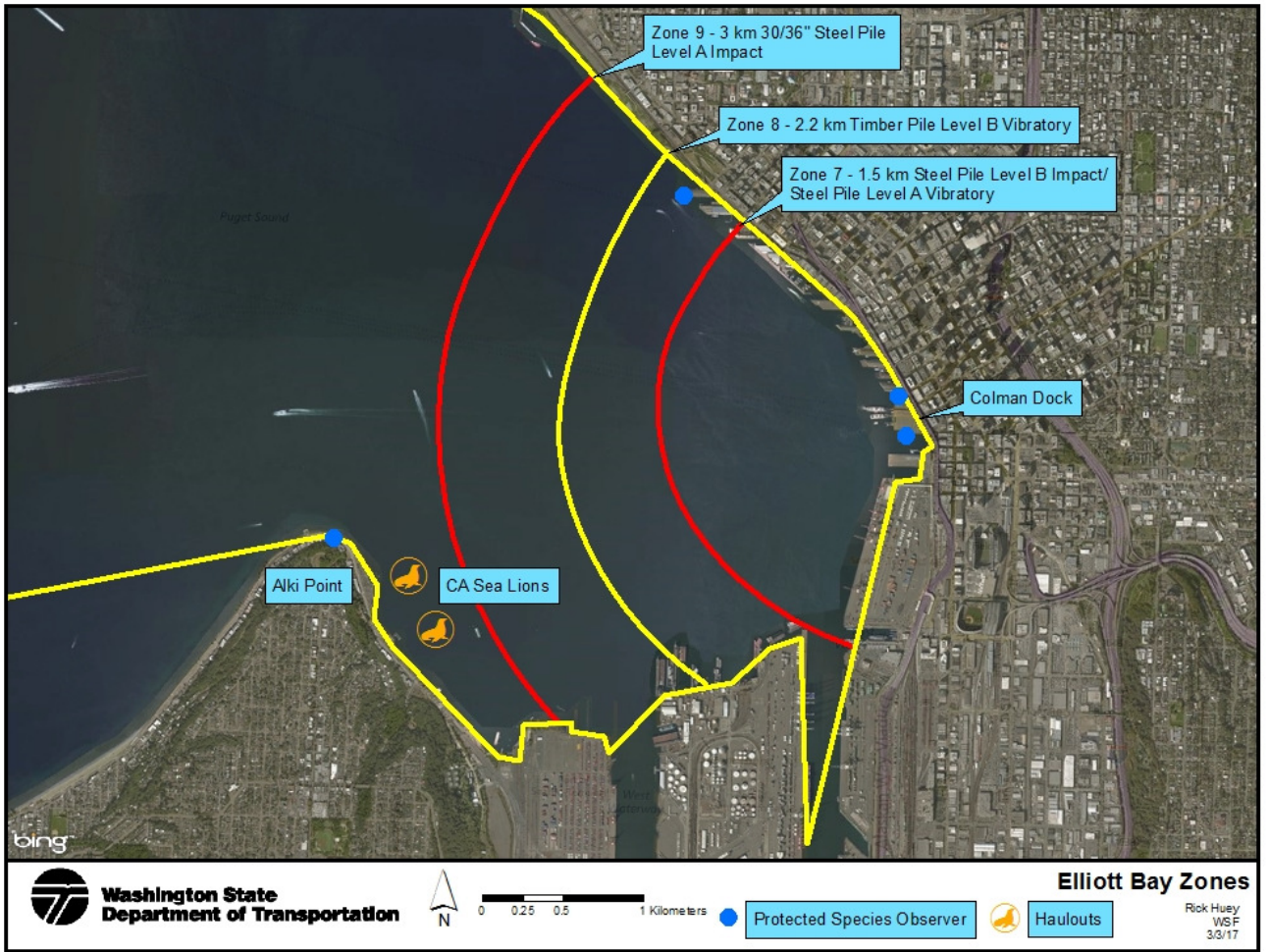


Figure 2 – Elliott Bay Zones

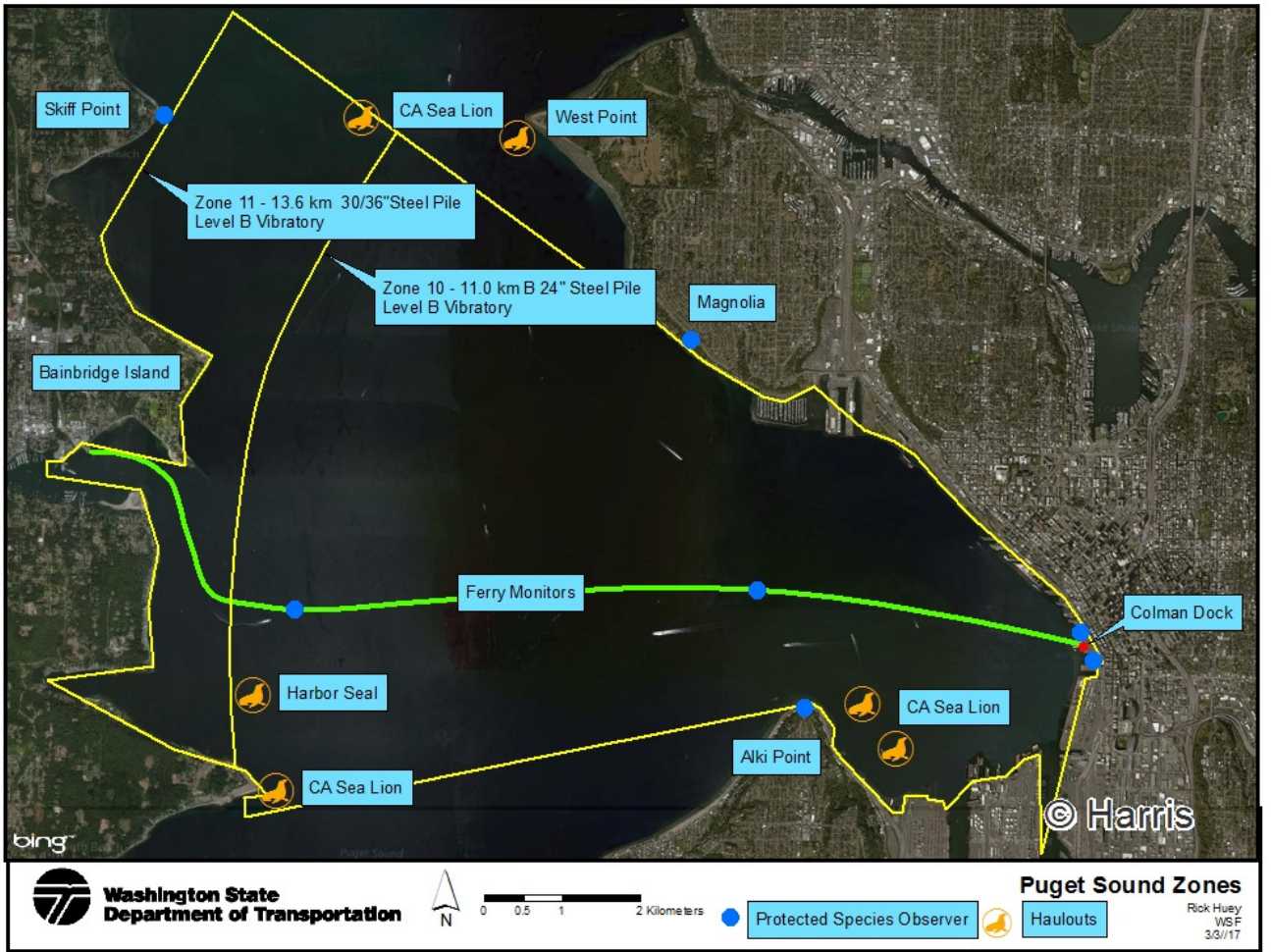


Figure 3 – Puget Sound Zones