

Protected Species Observer Report from September 3rd, 2023 Helicopter Operations
NW Seal Rock Lighthouse Project
Report drafted by: Lauren Himmelreich

Introduction

Northwest Seal Rock (NWSR) provides important haul out and breeding habitat for marine mammal species in the area. Two species in particular utilize this space: California sea lions (*Zalophus californianus*) primarily use this area for hauling out, while Steller sea lions (*Eumetopias jubatus*) use the area for both haul out and breeding purposes. Steller sea lions in this area give birth between mid-May and mid-July, and pups will stay and nurse with the mothers for at least a year (NOAA Fisheries, 2023). During this series of flights on September 3rd, observers estimated that the Steller sea lion pups on the colony to be around 3-5 months of age and dependent on the mother.

NWSR supports a dynamic population of mixed species sea lions with many individuals entering and exiting the water at any given point in time. The rock had anywhere between 150-200 individuals (henceforth known as the “herd”) on and around the rock during the time of observation. During the observation window, the St. George Reef Lighthouse Preservation Society (Society) conducted lighthouse tours in addition to minor lighthouse maintenance with the primary use of the helicopter being passenger transport for tour operations. There were a total of 21 landing and take off sequences on the lighthouse platform over an 8-hour period. Approaching, landing, unloading, and departing lasted between 4-9 minutes with a helicopter approach about every 20 minutes. With the high-interval acoustic and visual disturbance over an extended period of time occurring during nursing, breeding and socialization behaviors, the Protected Species Observers (Observers) set out to capture the effects of the acoustic and visual stimulation and disturbance in normal activity due to helicopter operation on and around the lighthouse.

Marine Mammal Observations

Marine mammal observers were on the initial helicopter flight out to NWSR. The helicopter departed Crescent City on September 3rd, 2023 at 08:08 and arrived at NWSR at 08:18. Photographs were taken of the herd before the landing approach, and the behavioral responses were recorded. Upon arrival of the initial helicopter flight, a large group of animals (approximately 110 individuals) flushed into the water, forming into smaller groups once flushed. Two groups totaling 60-70 individuals remained offshore throughout the entire observation window, while some hauled back out onto the rock after the initial flight left the platform to return to Crescent City.

Once on NWSR, Marine mammal observers were stationed on the main lighthouse platform above the major pinniped haul out site, facing south. Observations from the platform began at 08:51 when the second flight was approaching. Observers recorded level 3 disturbances only (animals flushing), due to the difficulty of monitoring the entire herd at any given time. Upon almost every subsequent helicopter approach, varying numbers of animals (mixed species and age classes) were flushed from the rock during helicopter landings, due to

apparent distress from visual and acoustic stimulation. See **Table 1** for marine mammal sightings and level 3 disturbances. Observers recorded approximately 213 level 3 disturbances during the monitoring period. There were 62 recorded level 3 disturbances of California sea lions, and approximately 151 level 3 disturbances of Steller sea lions (**Table 2**). No other species of pinnipeds (i.e. Pacific harbor seals or Northern fur seals) were seen during the observation window.

Acoustic and visual disturbance, resulting in level 3 disturbance, appeared the strongest during the helicopter approaches and landings, while the helicopter idling on the platform during loading and unloading and helicopter takeoffs did not appear to cause significant disturbance to the herd. Furthermore, Observers recorded level 3 disturbances during the entire flight sequence instead of differentiating between approaches and departures. In the future, to better understand how behavioral responses differ between landings and departures, there should be a distinction made in observations for each aircraft activity.

Observers recorded many Steller sea lion mother-pup pairings and observed pups actively nursing during the observation window. Effects on nursing behavior occurred in the form of animals being flushed into the water while nursing, however, flushing of nursing mother-pup pairs did not occur on every approach and there were cases observed in which nursing continued throughout the arrival and departure of the helicopter to and from the platform. As the day progressed, the herd appeared to have a decrease in flushing responses due to helicopter approaches. This could be due to some animals leaving the rock during flight operations or the remaining animals were becoming accustomed to the acoustic and visual effects. See attached data sheets for observations and take numbers.

Environmental Conditions

Upon arrival to NWSR, Observers recorded clear environmental conditions. At 08:30, cloud cover was 20% with slight fog along the horizon. The Beaufort sea scale was 1. There was 5% glare from the sun on the water. The distance to the horizon was 5 miles and the estimated observable distance was approximately 1 mile. The environmental conditions stayed fairly consistent throughout the day. At 10:56, the wind speed increased, clearing the fog on the horizon, and the Beaufort sea scale increased to 2. At 13:58, Observers recorded the Beaufort sea scale as 3. At the end of the monitoring period at 16:15, cloud cover was 30%, with no fog, glare was about 30%, the visibility to the horizon remained at 5 miles, and the estimated observable distance remained at 1 mile. The Beaufort sea scale was 2-3.

Mitigations Implemented

During the observation window, Observers discussed with the helicopter pilot alterations in the direction of helicopter approach. Wind and weather permitting, the pilot was able to approach NWSR from the North and descend down to the lighthouse platform on the NW side of the rock, out of sight of the herd. This tactic seemed to decrease both the acoustic and visual stimulation, whereas, a direct approach coming from the southeast appeared to be more acoustically and visually stimulating, resulting in higher numbers of takes. Observers acknowledge that an indirect approach is not always appropriate or safe in all conditions, but

this approach should be used as much as possible to help decrease the amount of disturbance to the herd.

Recommended Future Mitigations

In addition to the implementation of indirect helicopter approaches, Observers believe that limiting or halting all day tour operations until later in the summer and in the fall when the Steller sea lion pups are older and stronger swimmers in order to minimize the negative effects of interruption of nursing, resting, breeding, and socializing behaviors. Repeated disturbances that cause lactating females to abandon rookeries or use them less often could impact the health and survival of pups by reducing normal nursing cycles (NOAA Fisheries, 2023). Continual flushing can have physical costs on both adults and pups, and implementation of mitigations to achieve the least practicable adverse impact can help to decrease amount of takes during the project duration and minimize disturbance of important nursing, resting, breeding, and socializing behaviors that can affect long term survival of this population.

References

Fisheries, NOAA. "Steller Sea Lion." *Steller Sea Lion*, NOAA, 18 September 2023, www.fisheries.noaa.gov/species/steller-sea-lion.

Time (24-HR)	Event Code	PSO Initial	Activity at time of Sighting	Group Size (Max,Min, Best)	Group Composition (CSL,SSL,PHS, NFS)	# of animals by cohort (A,J,N)	PSO Confidence (1-3)	Closest Point of Approach to Activity	Initial Observed Behavior	Response to Activity	Mitigations Implemented	Level 3 Disturbances by Species (CSL, SSL)
0815	BC	LH, CE, BW	Landing	75, 50, 60	10, 40, 0, 0	unknown	1	unknown	rest	flush	N/A	CSL = 10, SSL = 40
0815	BC	LH, CE, BW	Landing	60, 40, 50	10,30, 0, 0	unknown	1	unknown	rest	flush	N/A	CSL = 10, SSL = 30
0851	BC	LH, CE, BW	Landing	5,2,3	1,2,0,0	1,2,0	2	200 ft	resting	flush	N/A	CSL = 1, SSL = 2
0922	BC	LH	Landing	12,8,10	8,2,0,0	10,0,0	2	200 ft	Swim, rest	flush	N/A	CSL = 8, SSL = 2
0937	BC	LH, CE, BW	Landing	35,25,30	7,23,0,0	22,0,8	2	200 ft	rest	flush	N/A	CSL = 7, SSL = 23
0955	BC	LH, CE, BW	Landing	8,5,6	2,4,0,0	5,0,1	2	200 ft	rest	flush	Indirect approach	CSL = 2, SSL = 4
1016	BC	LH, CE, BW	Landing	18,15,17	5,12,0,0	9,0,8	2	200 ft	rest	flush	N/A	CSL = 5, SSL = 12
1038	BC	LH, CE, BW	Landing	4,2,3	2,1,0,0	3,0,0	2	200 ft	rest	flush	N/A	CSL = 2, SSL = 1
1106	BC	LH, CE, BW	Landing	5,2,3	1,2,0,0	2,0,1	2	200 ft	rest	flush	Indirect approach	CSL = 1, SSL = 2
1125	BC	LH, CE, BW	Landing	6,4,5	3,2,0,0	4,0,1	2	200 ft	rest	flush	Indirect approach	CSL = 3, SSL = 2
1212	BC	LH, CE, BW	Landing	7,4,6	2,4,0,0	3,0,3	2	200ft	rest	flush	N/A	CSL = 2, SSL = 4
1235	BC	LH	landing	2,1,3	0,3,0,0	2,0,1	2	200 ft	rest	flush	N/A	CSL = 0, SSL = 3
1259	BC	LH	landing	5,3,4	2,2,0,0	4,0,0	2	200 ft	rest	flush	N/A	CSL = 2, SSL = 2
1319	BC	LH	landing	5,3,4	0,4,0,0	4,0,0	2	200 ft	rest	flush	N/A	CSL = 0, SSL = 4
1341	BC	LH	landing	3,2,2	1,1,0,0	1,0,1	2	200 ft	rest	flush	Indirect approach	CSL = 1, SSL = 1
1402	BC	LH	landing	4,2,3	0,3,0,0	2,0,1	2	200 ft	rest	flush	Indirect approach	CSL = 0, SSL = 3
1441	BC	LH	landing	6,4,5	2,3,0,0	4,1,0	2	200 ft	rest	flush	N/A	CSL = 2, SSL = 3
1500	BC	LH	landing	5,3,4	0,4,0,0	2,1,1	2	200 ft	rest	flush	N/A	CSL = 0, SSL = 4
1517	BC	LH	landing	6,4,5	3,2,0,0	3,2,0	2	200 ft	rest	flush	N/A	CSL = 3, SSL = 2
1533	-	LH	landing	0,0,0	0,0,0,0	0,0,0	2	200 ft	rest	none	N/A	CSL = 0, SSL = 0
1551	BC	LH	Landing	4,2,3	0,3,0,0	2,0,1	2	200 ft	rest	flush	N/A	CSL = 0, SSL = 3
1611	BC	LH	Landing	8,6,7	3,4,0,0	4,0,3	2	200 ft	rest	flush	N/A	CSL = 3, SSL = 4

Table 1: Summary of marine mammal level 3 responses to helicopter operations.

TOTAL MARINE MAMMAL LEVEL 3 DISTURBANCES BY SPECIES	
SPECIES	TOTAL LEVEL 3 DISTURBANCES
California Sea Lion (CSL)	62
Steller Sea Lion (SSL)	151
Pacific Harbor Seal (PHS)	0
Northern Fur Seal (NFS)	0

Table 2: Total number of level 3 disturbances by species recorded during the observation window.

First flight of the day

Take off: 08:08 Landing: 08:18
 Taken from (circle one): helicopter
 PSO Name taking photos: Corinne Eller
 Time window of photos: 08:12 to 08:15
 Photo taken: yes
 Altitude of photos: 400 meters (must be greater than 300m)
 Description of helicopter approach: approached from the north, circled once

Weather Conditions:

Time: 08:30 BSS: 1 Cloud Cover: 20 % Fog: Y / N Glare: 5 %

Visibility to Horizon: 5 miles Estimated Observable Distance: 1 mile

Marine Mammal Sightings on island:

Time (24-HR)	PSO Initial	Activity at time of Sighting	Group Size (Max,Min,Best)	Group Composition (CSL,SSL,PHS,NFS)	# of animals by cohort (A,J,N) by Species	PSO Confidence (1-3)	Closest Point of Approach to Activity (feet)	Initial Observed Activity	Response to Activity
0815	LH	Landing	75, 50, 60	10, 40, 0, 0	unknown	1	300	Resting	BC
0815	LH	Landing	60,40,50	10,30,0,0	unknown	1	300	Resting	BC

Comments: BC = behavioral change in the form of flushing into the water. Two large groups, mixed species (primarily adults) flushed from rock upon initial approach.

Last flight of the day

Taken from (circle one): helicopter lantern room platform
 PSO Name taking photo: Lauren Himmelreich
 Time window of photos: 16:16 to 16:18
 Photo taken: yes
 Altitude of photos: 400 feet

Weather Conditions:

Time: 16:15 BSS: 2-3 Cloud Cover: 30 % Fog: Y / N Glare: 30 %

Visibility to Horizon: 5 miles Estimated Observable Distance: 1 mile

Marine Mammal Sightings on island:

Time (24-HR)	PSO Initial	Activity at time of Sighting	Group Size (Max,Min,Best)	Group Composition (CSL,SSL,PHS,NFS)	# of animals by cohort (A,J,N) by Species	PSO Confidence (1-3)	Closest Point of Approach to Activity (feet)	Initial Observed Activity	Response to Activity
16:15	LH	Take-off	110,95,100	Difficult to differentiate from the photo	50,30,20	1	500	Resting	N/A

Comments: observer was not able to capture if animals were flushed during the final departure of the day, and the data above is an estimation of animals left on the rock during departure based on photos from the helicopter.

Observer(s): Lauren Himmelreich, Corinne Eller, Brienna Wagler
 PSO(s) Location: main platform above major pinniped haul out, south facing
 Time Begin Observations: 08:51
 Time End Observations: 12:12

Activities Occurring during Monitoring (circle all that apply): helicopter flights tours maintenance

MARINE MAMMAL MONITORING												
Time (24-HR)	Event Code	PSO Initial	Activity at time of Sighting	Group Size (Max, Min, Best)	Group Composition (CSL, SSL, PHS, NFS)	# of animals by cohort (A, J, N) by Species	PSO Confidence (1-3)	Closest Point of Approach to Activity (feet)	Initial Observed Behavior	Response to Activity	Mitigations Implemented (if Applicable)	Comments
0851	BC	LH, CE, BW	Landing	5,2,3	1,2,0,0	1,2,0	2	200 ft	resting	flush	N/A	Flight coming in, 3 flushed
0922	BC	LH	Landing	12,8,10	8,2,0,0	10,0,0	2	200 ft	Swim, rest	flush	N/A	
0937	BC	LH, CE, BW	Landing	35,25,30	7,23,0,0	22,0,8	2	200 ft	rest	flush	N/A	8 SSL pups flush
0955	BC	LH, CE, BW	Landing	8,5,6	2,4,0,0	5,0,1	2	200 ft	rest	flush	Indirect approach	Approached from backside
1016	BC	LH, CE, BW	Landing	18,15,17	5,12,0,0	9,0,8	2	200 ft	rest	flush	N/A	8 SSL pups
1038	BC	LH, CE, BW	Landing	4,2,3	2,1,0,0	3,0,0	2	200 ft	rest	flush		
1056	WC	LH, CE, BW	No Flight									Weather change
1106	BC	LH, CE, BW	Landing	5,2,3	1,2,0,0	2,0,1	2	200 ft	rest	flush		Indirect approach
1125	BC	LH, CE, BW	Landing	6,4,5	3,2,0,0	4,0,1	2	200 ft	rest	flush	Indirect approach	
1212	BC	LH, CE, BW	Landing	7,4,6	2,4,0,0	3,0,3	2	200ft	rest	flush		

WEATHER CONDITIONS								
Time (24-HR)	PSO Initial	Event Code	BSS	Wind Direction	Glare (%)	Fog	Visibility to Horizon (Miles)	Estimated Observable Distance
1056	LH	WC	2	NSE	20	0	5m	1m

Species	Number of Takes
CSL	51*
SSL	122*
PHS	0
NFS	0

*totals are from both the initial landing and the first data sheet

Weather conditions to be recorded at the beginning and end of the daily monitoring period, and at any substantial change in weather.

Event Codes: WA = Weather Assessment (to be recorded at beginning and end of daily monitoring periods).

WC = Weather Change (substantial change in weather)

Observer(s): Lauren Himmelreich, Corinne Eller, Brienna Wagler
 PSO(s) Location: main platform above major pinniped haul out, south facing
 Time Begin Observations: 12:35
 Time End Observations: 15:33

Activities Occurring during Monitoring (circle all that apply): helicopter flights tours maintenance

MARINE MAMMAL MONITORING												
Time (24-HR)	Event Code	PSO Initial	Activity at time of Sighting	Group Size (Max, Min, Best)	Group Composition (CSL, SSL, PHS, NFS)	# of animals by cohort (A, J, N) by Species	PSO Confidence (1-3)	Closest Point of Approach to Activity (feet)	Initial Observed Behavior	Response to Activity	Mitigations Implemented (if Applicable)	Comments
1235	BC	LH	landing	2,1,3	0,3,0,0	2,0,1	2	200 ft	rest	flush		
1259	BC	LH	landing	5,3,4	2,2,0,0	4,0,0	2	200 ft	rest	flush		
1319	BC	LH	landing	5,3,4	0,4,0,0	4,0,0	2	200 ft	rest	flush		
1341	BC	LH	landing	3,2,2	1,1,0,0	1,0,1	2	200 ft	rest	flush	Indirect approach	
1358	WC											Weather change
1402	BC	LH	landing	4,2,3	0,3,0,0	2,0,1	2	200 ft	rest	flush	Indirect approach	
1441	BC	LH	landing	6,4,5	2,3,0,0	4,1,0	2	200 ft	rest	flush		
1500	BC	LH	landing	5,3,4	0,4,0,0	2,1,1	2	200 ft	rest	flush		
1517	BC	LH	landing	6,4,5	3,2,0,0	3,2,0	2	200 ft	rest	flush		
1533	-	LH	landing	0,0,0	0,0,0,0	0,0,0	2	200 ft	rest	none		No change in behavior

WEATHER CONDITIONS								
Time (24-HR)	PSO Initial	Event Code	BSS	Wind Direction	Glare (%)	Fog	Visibility to Horizon (Miles)	Estimated Observable Distance
1358	LH	WC	3	SE	10	0	>5mi	1 mi

Species	Number of Takes
CSL	8
SSL	22
PHS	0
NFS	0

Weather conditions to be recorded at the beginning and end of the daily monitoring period, and at any substantial change in weather.

Event Codes: WA = Weather Assessment (to be recorded at beginning and end of daily monitoring periods).

WC = Weather Change (substantial change in weather)

Survey Protocols:

First Flight of the day:

The PSO(s) aboard the first flight of the day to the Station will record the time of take-off from Crescent City Airport. Timing and technique of helicopter approach should occur when the tide is too high for hauling out on the rocks to decrease disturbance to marine mammals. Rapid and direct approaches should be avoided. The helicopter should maintain a relatively high altitude (e.g., 800–1,000 ft; 244–305 m). The final approach should be made where there is the least density of marine mammals on the rocks. If for any safety reasons (e.g., wind conditions or visibility) such helicopter approach and timing techniques cannot be achieved, the Society must abort the restoration and maintenance session for the day. Any deviations from standard procedures will be noted in observation forms. Once close to NWSR, a PSO will photograph all marine mammals that are hauled out on the island. The PSO will then record the time the photos were taken, the photo numbers from the camera, and the altitude that the photographs were captured at. The PSO will also record the environmental conditions while on the helicopter shortly before or after the photos have been captured. The corresponding marine mammal information will need to be filled out based on marine mammals present on the when the photos were captured.

Normal Observations:

Once stationed on NWSR, the PSO(s) will be stationed on the Lantern Room Platform. The PSO(s) will record the start of the monitoring period and will then record the environmental conditions. The PSOs will then begin to monitor any marine mammal activity in response to aircraft operations, lighthouse renovation activities etc. A new observation will need to be recorded when there is a new sighting (including a change in # of individuals in a group), if there is a change in behavior. If at any time during the observation period there is a significant change in the weather, the new weather conditions should be recorded in the environmental condition sections. At the end of the monitoring period, a final weather assessment will be recorded. Before the last flight of the day, a photograph will be taken of all marine mammals hauled out on the island.

Last Flight of the day:

The PSO(s) aboard the last flight of the day will record the time of take-off from NWSR. A PSO will photograph all marine mammals that are hauled out on the island as the helicopter leaves NWSR (photos may be taken on either the last flight of the day or while still stationed on the Lantern Room Platform). The PSO will then record the time the photos were taken, the photo numbers from the camera, and the altitude that the photographs were captured at. The PSO will also record the environmental conditions while on the helicopter shortly before or after the photos have been captured. The corresponding marine mammal information will need to be filled out based on marine mammals present on the island at takeoff.

Datasheet Codes:

Marine Mammal Monitoring:

Time: Time the animal was first sighted (24-hour, 00:00)

Event Code: NS = new sighting, BC = behavior change

PSO Initial: First and last initial of the observer that made the initial sighting

Activity at time of sighting: Type of activity during the observation (i.e. helicopter take-off, approach/landing, construction etc.)

Group Size: Estimation of minimum number of individuals, maximum number of individuals, and best estimation. (example: 10, 15, 12).

Group Composition: number of individuals within a group by species. (Example: a group with 6 CSLs, 11 SSL, 0 PHS, and 0 NFS will be written as 6, 11, 0, 0).

of individuals by cohort: number of individuals in each age cohort within a group, by species. (#of adults, #of juveniles, #of neonates). For example, there are 4 adult CSLs, 2 juvenile CSLs, 9 adult SSLs, and 2 juvenile CSLs hauled out in one group and no neonates. You can record this by writing: CSLs (4,2,0). SSLs (9,2,0).

PSO Confidence: level of confidence the PSO(s) have in their assessment of the information recorded.

Closest Point of Approach to Activity: distance from the nearest individual to the source of activity.

Initial Observed Activity: initial activity of the group i.e. feeding, resting, traveling etc.

Response to Activity: any response (or lack thereof) of individuals to the activity. Examples include: no response in behavioral state, changes in behavior (ceasing feeding, changing traveling direction, alerted to activity, movement, or flush. See Table from Proposed Rule pasted below)

Mitigations Implemented (if applicable): If a change in animal behavior resulting from any activity performed by the society occurs, what mitigation(s) were implemented? (i.e. calling personnel to move away from herd, cessation of current activity).

TABLE 2—DISTURBANCE SCALE OF PINNIPED RESPONSES TO IN-AIR SOURCES TO DETERMINE TAKE

Level	Type of response	Definition
1	Alert	Seal head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length.
2*	Movement	Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees.
3*	Flush	All retreats (flushes) to the water.

* Only Levels 2 and 3 are considered take, whereas Level 1 is not.

If a take of any marine mammal occurs, it needs to be recorded immediately in the sighting form. In addition, use the small table to record the total number of takes by species once that page has been completed or at the end of the survey.

Weather Conditions:

Time: Time of the weather observation (24-hour, 00:00)

PSO Initial: First and last initial of observer that is recording the weather conditions

Event Code: WA = Weather Assessment (to be recorded at beginning and end of daily monitoring periods), WC = Weather Change (substantial change in weather)

BSS: beaufort sea state (refer to chart provided)

Wind Direction (direction in which the wind is blowing) examples include: NW, N, SE etc.

Swell Height: estimation of swell height in feet.

Glare: percent of survey area that contains glare from the sun.

Visibility to Horizon: distance to be seen by observers (miles).

Estimated Observable Distance: distance that animals can be observed at from the point of observation.



Force 0: Wind Speed less than 1 knot
Sea: Sea like a mirror



Force 1: Wind Speed 1-3 knots
Sea: Wave height .1m (.25ft); Ripples with appearance of scales, no foam crests



Force 2: Wind Speed 4-6 knots
Sea: Wave height .2-.3m (.5-1 ft); Small wavelets, crests of glassy appearance, not breaking



Force 3: Wind Speed 7-10 knots
Sea: Wave height .6-1m (2-3 ft); Large wavelets, crests begin to break, scattered whitecaps



Force 4: Wind Speed 11-16 knots
Sea: Wave height 1-1.5m (3.5-5 ft); Small waves becoming longer, numerous whitecaps



Force 5: Wind Speed 17-21 knots
Sea: Wave height 2-2.5m (6-8 ft); Moderate waves, taking longer form, many whitecaps, some spray



Force 6: Wind Speed 22-27 knots
Sea: Wave height 3-4m (9.5-13 ft); Larger waves forming, whitecaps everywhere, more spray



Force 7: Wind Speed 28-33 knots
Sea: Wave height 4-5.5m (13.5-19 ft); Sea heaps up, white foam from breaking waves begins to be blown in streaks along direction of wind



Force 8: Wind Speed 34-40 knots
Sea: Wave height 5.5-7.5m (18-25 ft); Moderately high waves of greater length, edges of crests begin to break into spindrift, foam is blown in well marked streaks



Force 9: Wind Speed 41-47 knots
Sea: Wave height 7-10m (23-32 ft); High waves, sea begins to roll, dense streaks of foam along wind direction, spray may reduce visibility



Force 10: Wind Speed 48-55 knots (storm)
Sea: Wave height 9-12.5m (29-41 ft); Very high waves with overhanging crests, sea takes white appearance as foam is blown in very dense streaks, rolling is heavy and shocklike, visibility is reduced.



Force 11: Wind Speed 56-63 knots
Sea: Wave height 11.5-16m (37-52 ft); Exceptionally high waves, sea covered with white foam patches, visibility still more reduced

Addendum to the Labor Day report

Saint George Lighthouse Preservation Society made two flights in addition to the Labor Day flight since the L.O.A. was issued May 15th, 2022.

The first flight occurred on May 17th, 2022 to repair the light. There was one trip to the rock and the visit lasted approximately two hours. We had to leave quickly due to high winds. Photographs taken at the site were of insufficient detail for good pinniped identification. The PSO was advised regarding more satisfactory results in the future by the Marine Mammal Center in Crescent City, California.

On November 4th, 2023 another flight to the lighthouse was made in rough seas and deteriorating weather. No pinnipeds were observed as the seas were rough and the winds were high. We canceled our activities due to inclement weather.

No other trips occurred between May 15, 2022 through February 22, 2024.

Respectfully submitted,
John Zimmerman