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10/13/2009 05:44 PM

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Dyke, Nancy" <nvandyke@louisberger.com>, "Sherwood,
Dayna" <DSherwood@louisberger.com>
bcc
Subject CAHA Soundscapes Analysis

Hi Sandy and Frank,

As discussed, attached is our draft soundscapes analysis. You will see there is still some more coordination that needs to occur between NPS and Berger to get this where it needs to be. Areas with question are called out with comment boxes, or highlighted in green. Some of the larger items for discussion:

1. Duration of impacts. I know Dayna and Frank discussed this and decided to use long-term impacts. Upon review by others (Nancy) questions came up as to why impacts are not short-term (intermittent events) that will occur over the life of the plan. How we address duration is probably an issue we need to discuss further.
2. We need to close the loop with Frank as to how you would like to see wildlife and visitor use addressed in this section.
3. Methodology. We need to put some language in the methodology as to how the threshold numbers were developed, as well as explain further why actual measurements of surf were not taken at CAHA.

Those are the big ones. Frank, after you have had time to review, a call to hammer out these last few things would probably be useful. If you think so, let us know when you are available.

Take care,
Lori

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Chapter 4 Environmental Consequences-Soundscapes 2009-10-13.docx

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES: SOUNDSCAPES

Guiding Regulations and Policies

The NPS Organic Act (16 USC 1) establishes and authorizes the NPS “to conserve the scenery and the national and historic objects and wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (NPS Organic Act, 16 USC 1). An important ~~part-aspect~~ of the ~~ecological~~ natural communities that the NPS wishes to preserve within our national parks is the natural soundscape, which ~~in turn~~ protects visitors’ experience as well as wildlife. ~~Thus, there are many laws, regulations and policies that guide the protection and management of natural soundscapes.~~

Regarding general park soundscape management, *NPS Management Policies 2006, Section 4.9 Soundscape Management*, requires that the NPS “preserve, to the greatest extent possible, the natural soundscapes of parks.” Additionally, the NPS “will restore to the natural condition wherever possible those park soundscapes that have become degraded by the unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts.” (NPS Management Policies 2006 [NPS 2006f, sec 4.9], 56). Additionally, *Director’s Order #47: Soundscape Preservation and Management*, was developed to emphasize NPS policies “that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources.” This Director’s Order also directs park managers to measure acoustic conditions, differentiate existing or proposed human-made sounds that are consistent with park purposes, set acoustic goals based on the sounds deemed consistent with the park purpose, and determine which noise sources are impacting the parks (NPS, 2000).

As discussed in Chapter 1: Purpose and Need for Action, off-road motor vehicle use within national parks is governed by Executive Order 11644, Use of Off-road Vehicles on Public Lands, as amended by Executive Order 11989. In accordance with this executive order and as discussed in *NPS Management Policies 2006, Section 8.2.3.1 Motorized Off-road Vehicle Use*, ORV’s are allowed in locations where no adverse impacts to the natural, cultural, scenic and esthetic values would occur (NPS Management Policies 2006 [NPS 2006f, sec 8.2.3.1], 104). Additionally, *NPS Management Policies 2006, Section 8.2.3 Use of Motorized Equipment* acknowledges that motorized equipment operating in national parks could adversely impact the park’s natural soundscape. ~~In order to~~ preserve the natural soundscape, park superintendent’s will manage when and where motorized equipment is used, evaluating effects on the natural soundscape against the natural ambient sound level (that which exists in the absence of human-induced sounds) (NPS Management Policies 2006 [NPS 2006f, sec 8.2.3], 103-104).

Additionally, 36 CFR 2.12 Audio Disturbance prohibits the operation of motorized vehicles within national parks in excess of 60 dBA at a distance of 50 feet ~~from the source~~, or if below that noise level, noise which is unreasonable. Reasonableness is dependent upon several factors including the nature and purpose of the actor’s conduct, location and time of occurrence, the park’s purpose and the impact the noise has on park users (36 CFR 2.12).

Methodology, Assumptions, and Impact Thresholds

~~Prepared Note: Methodology may change when vehicle counts become available. Once these data are received, Beger will coordinate with NPS Sound Program to determine if the thresholds need to change to use Leq levels.~~

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The methodology used to assess impacts to the natural soundscape from the management of ORV use at the Seashore is consistent with *NPS Management Policies 2006* and *Director's Order # 47: Soundscape Preservation and Noise Management*. The policies require the type, magnitude, duration, and frequency of occurrence of noise to be determined for the affected environment as well as the significance of noise levels or impacts (NPS, 2000).

Impacts to the natural soundscape of the Seashore from ORV use were assessed using published information from the Federal Highway Administration (FHWA) regarding automobile noise emission levels for travel speeds of 15 and 25 mph, measured at reference distances of approximately 15 meters (49 feet). These travel speeds are consistent with current and future proposed action speed limits for ORVs in the Seashore. Using these known vehicle noise emission levels, which vary by frequency, for the aforementioned travel speeds, the NPS Natural Sounds Program extrapolated vehicle noise levels at several distances from an ORV track. The extrapolation accounts for the effects of atmospheric absorption of sound waves with frequency, which is dependent upon the atmospheric conditions of the park. Specifically, factors including temperature and humidity affect sound absorption depending on the frequency spectrum of the sound wave (CALTRANS, 1998). Sound waves may be further attenuated by ground surfaces such that soft surfaces, which include soft dirt, grass, or scattered bushes and trees, tend to absorb some of the sound energy as it passes over the soft surface from source to receiver. Conversely, hard surfaces like parking lots and smooth bodies of water tend to reflect sound waves, thereby providing no additional attenuation of sound energy (CALTRANS, 1998). The extrapolated vehicular sound levels conservatively assume no significant ground absorption in order to provide a general sense of vehicle noise drop-off rates with distance from a given ORV track. Thus, depending upon the ground surface between the source and receiver, noise levels in the park may be further attenuated.

As noise from the surf is a predominant natural sound source at the Seashore, the Natural Sounds Program also calculated estimates of surf noise levels at several distances from an ORV track. These calculations assume a surf noise level estimate of 55 dBA as measured 15 meters (49 feet) from the surf line, which is representative of the maximum value of surf noise in a range (20-55 dBA) identified in *Disposition of Offshore Cooling Water Conduits SONGS Unit 1 EIR*, as discussed in Chapter 3: Affected Environment. This surf noise level is also consistent with estimates of ambient levels at the surf line based on calculations using the measurement data collected on Bodie Island and at Cape Point (refer to Chapter 3: Affected Environment). A median distance from the surf line to an ORV track of 21 meters (69 feet) was used as part of the calculation based on information from the NPS, which indicates typical distances between the surf line and ORV tracks ranging between 18 and 24 meters (59 and 79 feet) (F. Turina, NPS, pers. Comm., 2009x).

Preparer's note: Need input next) from NPS sounds program in to why these general calculations were used for surf noise, rather than actual measurements at the Seashore.

Impacts to the natural soundscape were assessed according to distances at which vehicle noise dominates the sound energy, as compared to the predominant natural sound of the surf, both landward and seaward from a given ORV track. Thus, vehicular and surf noise level estimations were predicted for both landward and seaward directions from a given ORV track. No additional sources of noise, including from visitor presence throughout the Seashore, were considered as part of the impacts analysis. As vehicle counts on ORV tracks are not available, vehicle noise level predictions are representative of the intensity of the vehicle noise during a single pass-by event and do not reflect the frequency of occurrence. The landward and seaward vehicle and surf noise level predictions are provided in Table 1 and Table 2, respectively. The distances shown in both tables represent distances from a given ORV track in meters and feet. Since Table 1 depicts vehicle and surf noise levels at distances landward from a given ORV track, the distance from the surf is determined by adding the median distance between the surf line and ORV track (21 meters/69 feet) to the particular distance from the ORV track. For example, at a distance

Comment [ds1]: Surf noise levels do not account for ground absorption either because they are not based on measured levels, but rather on published data of surf sounds.

Frank – see comment below...do you agree/disagree that ground absorption would need to be factored in for both vehicle and surf noise and would therefore not change the results of the analysis because the analysis is relative (i.e. compare vehicle to surf and if both are adjusted equally, impact would be same?)

Comment [ds2]: Question for NPS: Should this be mentioned considering that ground absorption, if considered, would have to be factored into the surf and vehicle extrapolations, which would therefore produce the same impact results (i.e. changes are relative, if vehicle noise level changes and surf noise level changes, impacts are the same).

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Comment [ds3]: Reviewer question: Is this analysis assuming a worse case scenario?

Dayna: Since we are not predicting noise levels based on the frequency of their occurrence, I don't think we are technically assuming a worst-case scenario.

Frank – can you weigh in on this? I think this analysis would be more of a "worst-case" scenario if we could predict the frequency of occurrence using vehicle count data.

of 15 meters (49 feet) landward from the ORV track, a given receiver is located approximately 36 meters (118 feet) from the surf line. Conversely, since Table 2 depicts vehicle and surf noise levels at distances (in meters and in feet) in a seaward direction from an ORV track, the distance from the surf line is given by subtracting the distance from the ORV track from the 21 meter (69 foot) distance between a typical ORV track and the surf line. For example, at a distance of 15 meters (49 feet) from an ORV track, a receiver is located approximately 6 meters (20 feet) from the surf line. Beyond 21 meters (69 feet) from an ORV track, a receiver is located in the ocean. Therefore, surf noise levels beyond 21 meters (69 feet) are listed as "N/A" (i.e. "not applicable.")

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Table 1
Vehicle and Surf Noise Levels at Distances from an ORV Track-Landward

Sound Source	Noise Level at Reference Distance (dBA)	Reference Distance of Measured Noise Level (meters)	Other Distances from an ORV Track in (meters (feet))								
			4 (13)	10 (33)	15 (49)	20 (66)	30 (98)	50 (164)	150 (492)	200 (656)	250 (820)
Auto at 15 mph (FHWA)	52	15.24	64.0	56.0	52.5	49.9	46.3	41.7	31.5	28.7	26.4
Ocean surf ambient	55	15	52.8	51.8	51.2	50.6	49.7	48.2	44.4	43.3	42.4
Auto at 25 mph (FHWA)	59	15.24	71.0	63.0	59.4	56.9	53.3	48.7	38.5	35.7	33.4

Source: NPS Natural Sounds Program, Modified by the Louis Berger Group, October 5, 2009.

Notes:

- 1.] Distances are in meters and feet from a given ORV track. Assumed distance between ORV track and surf is 21 meters (69 feet).
- 2.] Distance from surf may be calculated by adding the distance from the ORV track to 21 meters (69 feet).

Table 2
Vehicle and Surf Noise Levels at Distances from an ORV Track-Seaward

Sound Source	Noise Level at Reference Distance (dBA)	Reference Distance of Measured Noise Level (meters)	Other Distances from an ORV Track in (meters (feet))							
			4 (13)	10 (33)	15 (49)	20 (66)	50 (164)	150 (492)	250 (820)	
Auto at 15 mph (FHWA)	52	15.24	64.0	56.0	52.5	49.9	41.7	31.5	26.4	
Ocean surf ambient	55	15	54.5	56.3	59.0	66.8	N/A	N/A	N/A	
Auto at 25 mph (FHWA)	59	15.24	71.0	63.0	59.4	56.9	48.7	38.5	35.7	

Source: NPS Natural Sounds Program, Modified by the Louis Berger Group, October 5, 2009.

Notes:

- 1.] Distances are in meters and feet from a given ORV track. Assumed distance between ORV track and surf is 21 meters (69 feet).
- 2.] Distance to surf may be calculated by subtracting the distance from the ORV track from 21 meters (69 feet).
- 3.] "N/A" ("not applicable") indicates the receiver is located in the ocean, and surf noise levels are not calculated.

In addition to determining the impacts to the natural soundscape of the Seashore, considerations were given to visitor experience and safety as well as impacts to wildlife from ORV use. Impacts to visitor experience and safety were evaluated based on visitor awareness of vehicles on beaches as well as on visitors' ability to enjoy the natural sounds of the Seashore. Considerations for wildlife impacts included the potential for changes in communication by shifting call frequencies away from those typically associated with transportation noise (100Hz to 1 kHz). Species at greatest risk include the piping plover, black skimmer, Wilson's plover, least tern, common tern and gull-billed tern. Additional considerations for wildlife impacts included the potential for reductions in listening area for predators seeking prey and reductions in alerting distance for prey listening for predators. More specifically, a 3 dBA increase in ambient sound levels by ORV noise would reduce a predator's listening area by half, while the same decibel increase would reduce the alerting distance of prey by 30 percent. Similarly, a 3 dBA increase in ambient sound levels would also reduce, by 50 percent, the area in which humans may listen for birds. For example, under conditions where natural sounds prevail and ORV use is not present as an intrusion, prey listening for a predator may be able to hear a predator as far as 90 feet from said predator. However, if the introduction of ORV noise increases the ambient sound level by a factor of 3 dBA, the distance at which prey can hear the approaching predator reduces to 60 feet. These reduction factors are based on geometric spreading of sound energy in space and are larger for greater increases in the ambient environment.

Thresholds for identifying natural soundscapes impacts are defined as follows:

Negligible: Natural sounds would prevail; the area would be closed to vehicles or noise generated by the use of ORVs would be infrequent or absent, and mostly not measurable or detectable.

Minor: Vehicle noise dominates sound energy to a distance of 30 meters inland from the vehicle; or to a distance of 10 meters toward the surf.

Moderate: Vehicle noise dominates sound energy to a distance of 60 meters inland from the vehicle; or vehicle noise dominates sound energy to the surf line.

Major: Vehicle noise dominates sound energy at distances greater than 60 meters inland from the vehicle; or vehicle noise levels at the surf line exceed sound energy from the surf by 3 dBA.

Duration: Short-term impacts would occur during closure periods for ORV use, including safety, resource, administrative and seasonal closures, representing "noise-free" periods.

Long-term impacts would occur over the life of the management plans.

Comment [ds4]: Frank – can you provide further clarification on how threshold distances were determined for each threshold?

Comment [15]: To discuss with NPS. Duration provided by NPS Sounds Program. Need to provide the reader and explanation of why we have long-term impacts. Another way to approach is that all impacts are short-term, but occur throughout the life of the plan.

Study Area

The study area for which soundscape impacts were assessed includes the entire area within the Seashore Boundary.

Impacts of Alternative A: No Action Alternative – Continuation of 2007 Interim Protected Species Management Strategy

Analysis. Under alternative A, all areas of the Seashore would continue to be open to ORV use, unless closures were established for resource protection, administrative, or safety reasons. ORV use would also

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be temporarily prohibited during seasonal closures in front of villages from September 16 to May 14. The speed limit would be 25 mph (unless otherwise posted) on park beaches for public and private vehicles, although the speed limit in front of villages (from September 16 to May 14) would be 10 mph.

According to Table 1, a vehicle traveling at 25 mph would dominate the sound energy as far as 50 meters landward from an ORV track, producing a noise level of 48.7 dBA versus 48.2 dBA produced by the natural sound of the surf. Since vehicle noise dominates beyond 30 meters inland from the vehicle, landward impacts from ORV use would be moderate and adverse. Additionally, as depicted in Table 2, a vehicle traveling at 25 mph would dominate the sound energy to a distance of 10 meters from an ORV track towards the surf. At 15 meters seaward, vehicle noise and surf sounds are nearly equivalent, with a vehicle contribution of 59.4 dBA and a contribution from the surf of 59.0 dBA. Since vehicle noise is still prevalent beyond 10 meters seaward from the ORV track, moderate adverse impacts to the natural soundscape would occur along the beaches between an ORV track and the surf.

During time periods when and in locations where the speed limit is lowered from 25 mph to 10 mph, vehicle noise would be noticeably less and would not dominate the sound energy as far from the ORV track as a vehicle traveling at 25 mph. Comparing vehicle noise levels at 25 mph with those produced at 15 mph (15 mph may be used as a close approximation of noise levels produced by a vehicle traveling 10 mph), noise levels for the lower speed are approximately 7 dBA less for all distances inland and seaward from an ORV track. Additionally, noise emissions from vehicles traveling at 15 mph would dominate the sound energy to a distance of 15 meters inland from an ORV track, at which point vehicle noise levels would be 52.5 dBA while surf sounds would be 51.2 dBA. Thus, moderate adverse impacts occurring at 25 mph speeds would become minor adverse impacts inland from an ORV track when vehicle speeds are limited to 10 mph. Similarly, vehicle noise would dominate the sound energy to a distance of 4 meters from an ORV track towards the surf and become nearly equivalent at 10 meters from the ORV track. Therefore, minor adverse impacts to the natural soundscape would result from ORV use in areas where and during times when speeds are lowered to 10 mph.

As ORV use would continue for the length of the management plan, minor to moderate adverse impacts to the natural soundscape would be recurring throughout the entire Seashore where ORV routes are designated, and thus considered to be long-term impacts. However, regions of the Seashore subject to seasonal, resource, safety and administrative closures would experience short-term beneficial impacts to natural soundscapes during those closure periods such that the natural sounds of the surf, birds and other wildlife would prevail. Such closures would provide "noise-free" periods lasting the length of the specific closure period. Since these closures would also occur continuously over the length of the management plan, they would also provide a long-term benefit to the natural soundscape.

As noise from ORV use would increase the natural ambient sound levels within the Seashore, wildlife would experience adverse impacts. Bird species including the piping plover, black skimmer, Wilson's plover, least tern, common tern and gull-billed tern, whose communication calls are within the typical frequency range of transportation noise, would potentially be forced to shift the frequency of their calls. For example, the piping plover's call is between 1 and 3 kHz, with most energy centered around 2kHz while the fundamental frequency of the black skimmer's call is at or below 2 kHz. Similarly, most acoustic energy in the call of the Wilson's plover occurs below 3 kHz. Therefore, since the acoustic energy of the calls of these bird species may fall within the frequency range associated with transportation noise (100 Hz to 1 kHz), communication may be compromised for these bird species, requiring them to potentially shift their call frequencies away from the transportation noise (Slabbekoorn and Boer-Visser, 2006). In addition to the effects of ORV use on communication calls, wildlife may experience impacts to their abilities to detect predators and hunt for prey. For example, at vehicle speeds of 25 mph, vehicle noise would dominate the sound energy by 3 dBA or more above the predominant natural sound of the surf to a distance of 30 meters inland from an ORV track (see Table 1). This increase in the ambient

Comment [ds6]: NPS to review text and aid with classification of impacts to wildlife, particularly in terms of reductions in listening area and alerting distances.

Wildlife impacts may remain here or be removed from this section and placed in the wildlife section.

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Comment [ds7]: Need further input from NPS on call frequencies of other bird species (least tern, common tern, gull-billed tern)

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environment would reduce listening areas and alerting distances for predators and prey, respectively, located within 30 meters inland from an ORV track. As the percentage of listening area and alerting distance reductions are dependent upon the magnitude of the increase in the ambient environment by the vehicle noise and the magnitude of the increase in the ambient environment is dependent upon the distance from the ORV track, the degree of the impact on wildlife species would vary with distance from the ORV track. Similarly, ambient levels would be increased by more than 3 dBA to a distance of 10 meters seaward from an ORV track, thereby creating adverse impacts for wildlife species located between an ORV track and the surf, the degree of which is dependent upon the distance to the ORV track and the magnitude of the increase above the natural ambient level. When speeds are reduced to 15 mph, increases above the natural ambient would occur closer to ORV tracks, thus reducing the potential for adverse impacts to wildlife depending upon locations of wildlife relative to ORV tracks. As ORV use would continue over the life of the plan, adverse impacts would be long-term. Short-term benefits would occur during seasonal closures as well as closures for resource protection, safety and administrative purposes. Since these closures would occur continuously over the life of the plan, they would also provide long-term benefits.

The presence of vehicles on the beach at the Seashore presents a visitor safety issue for visitors enjoying recreational activities along the beaches between an ORV track and the surf. When visitors are 15 meters from an ORV track towards the surf (i.e. 6 meters from the surf line) where speed limits are set to 25 mph, the sounds of the surf and vehicle noise would become nearly equivalent. At this distance, vehicle noise would contribute 59.4 dBA to the ambient sound level while surf sounds would contribute 59.0 dBA. As an individual continues to approach the surf line, surf sound would begin to dominate the sound energy, reaching levels approximately 10 dBA above vehicle noise at the surf line. The surf sound would therefore be perceived as being twice as loud as the vehicle noise (see Table 3 in Chapter 3: Affected Environment). The domination of the sound of the surf over the vehicle noise would potentially result in a reduction in vehicle awareness by the visitor. At reduced speeds, the surf sound would begin dominating the sound energy at even closer to an ORV track as a result of the lower noise emission produced by vehicles traveling at slower speeds. Just beyond 10 meters from an ORV track, the surf noise begins to dominate the sound energy. At a distance of 15 meters from an ORV track towards the surf, the surf sound level would increase to approximately 6.5 dBA above the vehicle noise level, which equates to a readily perceptible change in the ambient environment (see Table 3 in Chapter 3: Affected Environment). Although vehicle noise would still be a contributing factor to the ambient sound level at 15 meters, the domination of the surf sound over the vehicle noise would potentially reduce visitor awareness of approaching vehicles at even closer distances to an ORV track than during times and in locations where vehicles are traveling at 25mph. Additional impacts to visitors from ORV use would include reductions in listening areas over which individuals may hear the sounds of birds. As ORV use would continue over the life of the plan, adverse impacts would be long-term. Short-term benefits would occur during seasonal closures as well as closures for resource protection, safety and administrative purposes, when visitors would be able to experience noise-free periods. Since these closures would occur continuously over the life of the plan, they would also provide long-term benefits.

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Comment [ds8]: Visitor experience impacts from ORV noise may be kept here or placed in visitor experience section.

Input from NPS is needed on degree of impacts to visitors from ORV noise, particularly in terms of visitor safety/awareness.

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Cumulative Impacts. Other past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. In recent years, hurricanes, storms, and other events have resulted in roads being over washed with sand and water, including ramps to beaches and ORV corridors. Depending upon the degree of the damage, roads may be closed for a substantial period of time, thus limiting ORV use and access and providing for "noise-free" periods. Therefore, roadway damage from weather events may provide a short-term benefit to the natural soundscape, lasting the length of the closure period. However, damage to roadways also presents the potential for reconstruction of access roads, not only reintroducing ORV noise once roadways are repaired, but also creating noise during construction activities. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels produced by such equipment. Since noise from construction

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equipment would be louder than traveling vehicles, distances to which construction equipment dominates the sound energy would be greater. Therefore impacts would potentially be major and adverse, but short-term as they would only last for the duration of the construction period.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor to moderate vehicle noise impacts associated with alternative A, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Comment [ds9]: Would like input from NPS Sound Program

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Conclusion. Based on predicted vehicle noise levels at distances both landward and seaward from an ORV track for a posted speed limit of 25 mph, vehicle noise would dominate the sound energy to distances between 30 and 60 meters inland from an ORV track and beyond 10 meters from an ORV track towards the surf line. Conversely, for a posted speed of 10 mph, vehicle noise would dominate the sound energy between the ORV track and a distance of 30 meters inland from the track. Vehicle noise would dominate within 10 meters seaward of the vehicle track. As ORV use would continue over the life of the management plan, vehicle noise would be a recurring impact. Thus, vehicle noise from ORV use would create potential minor to moderate long-term adverse impacts, dependent upon vehicle speed. Short-term and long-term benefits would occur during seasonal and temporary resource protection, safety and administrative closures. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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Impacts of Alternative B: No Action Alternative – Continuation of Management under the Consent Decree

Analysis. Under alternative B, areas accessible to ORVs would be essentially the same as under alternative A, except that the area from ramp 43 to 0.4 miles north would be open to ORVs year-round instead of just seasonally. Basically, all areas of the Seashore would continue to be open to ORV use, unless closures are established for resource protection, administrative, or safety reasons or routes are designated for seasonal use. Further, vehicle speed limits for ORVs would be similar to those under alternative A, except that under alternative A, speeds would be limited to 25 mph with a reduction to 10 mph in front of villages during the off season (September 16 – May 14). Under alternative B, in general, a reduced speed limit (15 mph) would be imposed from May 15 through September 15 while the speed limit would increase to 25 mph from September 15 through May 14. Since speed limits would be consistent with those identified under alternative A, impacts to the natural soundscape would remain the same under alternative B, and thus range from long-term, minor and adverse under 15 mph speed conditions to long-term, moderate and adverse under 25 mph conditions. Also similar to under alternative A, short-term benefits would occur during seasonal and temporary resource protection, safety and administrative closures by providing “noise-free” periods. As such closures would recur throughout the life of the management plan, they would also provide a long-term benefit to the natural soundscape of the Seashore similar to under alternative A.

Additionally, under alternative B, the time of allowable ORV access would be regulated to eliminate night driving from May 1 to September 15 and to restrict it to only those with a permit from September

16 to November 15. Larger resource protection buffers identified under alternative B, as compared to under alternative A, would also result in larger temporary beach closure areas. The seasonal elimination of night driving coupled with larger beach closure areas would potentially provide some additional short-term benefit, as compared to alternative A, by creating additional temporary "noise-free" locations and time periods. These benefits would also be considered long-term since night driving regulations and resource protection buffers would be implemented for the life of the management plan.

Visitor safety impacts, in terms of the awareness of approaching vehicles, would be consistent with those described under alternative A.

Since vehicle speeds would be similar to those imposed under alternative A, impacts to wildlife would generally remain the same. However, as the larger resource protection buffers identified under alternative B would potentially provide larger areas of temporary beach closures, short-term benefits would be provided to wildlife. As these closures would recur over the life of the management plan, they would also be considered long-term benefits to wildlife.

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Cumulative Impacts. Under alternative B, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. Impacts would be the same as described under alternative A. Although weather events may result in roadway closure periods, thus limiting the potential for vehicle noise intrusions and resulting in short-term benefits to the natural soundscape, construction related noise impacts may result if roadways are in need of repair. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels produced by such equipment. As the distance to which construction equipment dominates the sound energy would potentially be greater than for vehicle noise, impacts would be short-term, lasting only the length of the construction period, major and adverse.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor to moderate vehicle noise impacts associated with alternative B, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Conclusion. As described under alternative A, impacts to the natural soundscape of the Seashore would be minor to moderate, depending upon vehicle speed. Since ORV use would continue over the life of the management plan, vehicle noise would be a recurring impact. Thus, vehicle noise from ORV use would create potential minor to moderate long-term adverse impacts, dependent upon vehicle speed. Short-term and long-term benefits would occur during seasonal and temporary resource protection, safety and administrative closures. Additional short-term and long-term benefits may occur as a result of regulations imposed to seasonally eliminate night driving and due to larger proposed resource protection buffers that may would increase the potential temporary closure areas. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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Impacts of Alternative C: Seasonal Management.

Analysis. Under alternative C, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and high visitor use would generally be designated as seasonal ORV routes with restrictions based on seasonal resource and visitor use or as year-round non-ORV areas. The establishment of vehicle-free areas year-round would provide opportunities for non-ORV users to experience the Seashore without the presence of vehicles and would also reduce the extent of vehicle noise impacts within the Seashore as compared to alternatives A and B. However, areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, thus resulting in vehicle noise impacts in those areas.

Since ORV speeds would be limited to 15 mph, with no proposed increases during the off season, impacts to the natural soundscape in areas with designated ORV routes, open seasonally or year-round, would therefore be the same as those described for alternatives A and B during time periods of 15 mph speed restrictions. Both inland and along the beaches between ORV tracks and the surf, impacts would be long-term, minor and adverse. Short-term and long-term benefits would occur during seasonal and temporary closure periods for resource protection and visitor safety.

As part of this alternative, existing ramps would be improved, reconfigured and/or supplemented by new ramps, including the construction of a new ramp 47. As noise from construction equipment is louder than noise produced by vehicles traveling at 15 or 25 mph, construction related noise activities would dominate the sound energy beyond the 30 meter and 60 meter limits defined for minor and moderate impacts, respectively. Therefore, construction related noise impacts would be major and adverse.

Comment [ds10]: NPS input needed on duration and degree of impact.

Impacts to wildlife would remain the same as under alternative A. However, under alternative C, additional resource protection closures as well as designated vehicle-free areas would be established based on an annual nonbreeding habitat assessment conducted after the breeding season. Such closures and designated vehicle free areas would provide areas of nonbreeding shorebird habitat with reduced human disturbance.

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Cumulative Impacts. Under alternative C, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. Impacts would be the same as described under alternative A. Although weather events may result in roadway closure periods, thus limiting the potential for vehicle noise intrusions and resulting in short-term benefits to the natural soundscape, construction related noise impacts may result if roadways are in need of repair. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels produced by such equipment. As the distance to which construction equipment dominates the sound energy would potentially be greater than for vehicle noise, impacts would be short-term, lasting only the length of the construction period, major and adverse.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor adverse vehicle noise impacts associated with alternative C, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Conclusion. As described under alternative A, for a vehicle traveling at a speed of 15 mph, vehicle noise would dominate the sound energy within 30 meters inland from an ORV track and within 10 meters seaward of an ORV track. Therefore, impacts would be minor and adverse. Since ORV use would continue to be regulated as such over the life of the management plan, vehicle noise would be a recurring minor adverse impact. Thus, vehicle noise from ORV use would create long-term adverse impacts. Short-term and long-term benefits would occur during seasonal and temporary resource protection and visitor safety closures. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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Alternative D: Increased Predictability and Simplified Management

Analysis. Under this alternative, ORV routes would be determined by identifying areas that historically do not support sensitive resources and areas of lower visitor use. These areas would be designated ORV routes year-round. Unlike under alternative C, areas of historically high resource sensitivity or high visitor use would not be designated as ORV routes. Year-round vehicle-free areas would include the area in front of villages and lifeguarded beaches as well as designated "Species Management Areas." Compared to the no action alternatives, the designated ORV use and non-ORV use areas proposed under this alternative would decrease the area over which vehicle noise may potentially impact the natural soundscape of the Seashore. Protection from ORV noise would also be provided for residences and visitors residing or staying in the villages.

In addition to reducing the extent of vehicle noise intrusions upon the natural soundscape of the Seashore, designated vehicle-free areas would provide for visitor safety during periods of high visitation, particularly in the summer months, and would also provide a vehicle free experience for visitors during the off-season.

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Although designated vehicle free areas would reduce the area of the Seashore over which vehicle noise impacts would occur, areas with designated ORV routes would experience long-term minor adverse impacts from proposed vehicle speeds of 15 mph as described under the no action alternatives. Short-term and long-term benefits would result from temporary resource protection, as described under the no action alternatives.

Similar to alternative C, as part of this alternative, existing ramps would be improved, reconfigured and/or supplemented by new ramps. As noise from construction equipment is louder than noise produced by vehicles traveling at 15 or 25 mph, construction related noise activities would dominate the sound energy beyond the 30 meter and 60 meter limits defined for minor and moderate impacts, respectively. Therefore, construction related noise impacts would be major and adverse.

Comment [ds11]: NPS input needed on duration and degree of impact.

Impacts to wildlife would remain the same as under alternative A. However, under alternative D, additional resource protection closures as well as designated vehicle-free areas would be established based on an annual nonbreeding habitat assessment conducted after the breeding season. Such closures and designated vehicle free areas would provide areas of nonbreeding shorebird habitat with reduced human disturbance.

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Cumulative Impacts. Under alternative D, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. Impacts would be the same as described under alternative A. Although weather events may result in roadway closure periods, thus limiting the potential for vehicle noise intrusions and resulting in short-term benefits to the natural soundscape, construction related noise impacts may result if roadways are in need of repair. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels

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produced by such equipment. As the distance to which construction equipment dominates the sound energy would potentially be greater than for vehicle noise, impacts would be short-term, lasting only the length of the construction period, major and adverse.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor adverse vehicle noise impacts associated with alternative D, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Conclusion. As described under alternative A, for a vehicle traveling at a speed of 15 mph, vehicle noise would dominate the sound energy within 30 meters inland from an ORV track and within 10 meters seaward of an ORV track. Therefore, impacts would be minor and adverse. Since ORV use would continue to be regulated as such over the life of the management plan, vehicle noise would be a recurring minor adverse impact. Thus, vehicle noise from ORV use would create long-term adverse impacts. Short-term and long-term benefits would occur during temporary resource protection closures. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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Alternative E: Variable Access and Maximum Management

Analysis. Management of ORV use under alternative E would be similar to management techniques proposed under alternative C with regards to the methodology for determining locations of ORV and non-ORV routes and access. Specifically, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and high visitor use would generally be designated as seasonal ORV routes with restrictions based on seasonal resource and visitor use or as year-round non-ORV areas. As described under alternative C, the establishment of vehicle-free areas year-round, under the implementation of alternative E, would provide opportunities for non-ORV users to experience the Seashore without the presence of vehicles and would also reduce the extent of vehicle noise impacts within the Seashore as compared to the no action alternatives. However, areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, thus resulting in vehicle noise impacts in those areas.

Under this alternative, ORV speeds would be limited to 15 mph, with no proposed increases during the off season. As described under the no action alternatives, minor adverse impacts to the natural soundscape would result from travel speeds of 15 mph in areas with designated ORV routes both inland and seaward from the designated route. Impacts would occur whether the ORV routes are opened seasonally or year-round. Since ORV routes would be regulated as such for the life of the management plan, minor to moderate adverse impacts would be long-term. Short-term and long-term benefits would occur during seasonal and temporary closure periods for resource protection and visitor safety purposes.

As with the other action alternatives, existing ramp relocation would occur, however more new ramps would be constructed. As noise from construction equipment is louder than noise produced by vehicles traveling at 15 or 25 mph, construction related noise activities would dominate the sound energy beyond the 30 meter and 60 meter limits defined for minor and moderate impacts, respectively. Therefore, construction related noise impacts would be major and adverse.

Comment [ds12]: NPS input needed on duration and degree of impact.

An additional source of noise potentially resulting in adverse impacts to the natural soundscape under this alternative includes the use of water taxis as an alternative form of transportation to Bodie Island Spit and South Point.

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Comment [ds13]: NPS: Need to discuss the potential impact of water taxi's, if any, to soundscapes

Impacts to wildlife would remain the same as under alternative A. However, as is common to all action alternatives, additional resource protection closures as well as designated vehicle-free areas would be established based on an annual nonbreeding habitat assessment conducted after the breeding season. Such closures and designated vehicle free areas would provide areas of nonbreeding shorebird habitat with reduced human disturbance.

Comment [ds14]: Frank – Throughout, I only addressed noise impacts from ORV use. Do you think we should delete reference to additional noise from water taxis? I believe it may be mentioned in visitor use and experience section as well. If we address noise from water taxis, where do we draw the line in terms of what noise sources we address to assess impacts on natural soundscape?

Need further discussion with NPS on the impact of implementing carrying capacity, if any, under the action alternatives.

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Cumulative Impacts. Under alternative E, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. Impacts would be the same as described under alternative A. Although weather events may result in roadway closure periods, thus limiting the potential for vehicle noise intrusions and resulting in short-term benefits to the natural soundscape, construction related noise impacts may result if roadways are in need of repair. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels produced by such equipment. As the distance to which construction equipment dominates the sound energy would potentially be greater than for vehicle noise, impacts would be short-term, lasting only the length of the construction period, major and adverse.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor adverse vehicle noise impacts associated with alternative E, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Conclusion. As described under alternative A, for a vehicle traveling at a speed of 15 mph, vehicle noise would dominate the sound energy within 30 meters inland from an ORV track and within 10 meters seaward of an ORV track. Therefore, impacts from vehicles traveling at 15 mph would be minor and adverse. Since ORV use would continue to be regulated as such over the life of the management plan, vehicle noise would be a recurring minor adverse impact. Thus, vehicle noise from ORV use would create long-term adverse impacts. Short-term and long-term benefits would occur during seasonal and temporary resource protection and visitor safety closures. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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Alternative F: Management Based on Advisory Committee input

Analysis. Management of ORV use under alternative F would be similar to management techniques proposed under alternatives C and E with regards to the methodology for determining locations of ORV and non-ORV routes and access. Specifically, ORV access would be prohibited in all areas of the Seashore except where an ORV route is specifically designated. Areas of high resource sensitivity and

high visitor use would generally be designated as seasonal ORV routes with restrictions based on seasonal resource and visitor use or as year-round non-ORV areas. As described under alternative C, the establishment of vehicle-free areas year-round, under the implementation of alternative F, would provide opportunities for non-ORV users to experience the Seashore without the presence of vehicles and would also reduce the extent of vehicle noise impacts within the Seashore as compared to the no action alternatives. However, areas of historically lower visitor use and resource sensitivity would be designated as year-round ORV routes, thus resulting in vehicle noise impacts in those areas.

Since ORV speeds would be limited to 15 mph, with no proposed increases during the off season, impacts to the natural soundscape in areas with designated ORV routes, open seasonally or year-round, would therefore be the same as those described for the other action alternatives. Both inland and along the beaches between ORV tracks and the surf, impacts would be long-term, minor and adverse. Short-term and long-term benefits would occur during seasonal and temporary closure periods for resource protection and visitor safety purposes.

As with the other action alternatives, existing ramp relocation would occur, however more new ramps would be constructed. As noise from construction equipment is louder than noise produced by vehicles traveling at 15 or 25 mph, construction related noise activities would dominate the sound energy beyond the 30 meter and 60 meter limits defined for minor and moderate impacts, respectively. Therefore, construction related noise impacts would be major and adverse.

Comment [ds15]: NPS input needed on duration and degree of impact.

Impacts to wildlife would remain the same as under alternative A. However, as is common to all action alternatives, additional resource protection closures as well as designated vehicle-free areas would be established based on an annual nonbreeding habitat assessment conducted after the breeding season. Such closures and designated vehicle free areas would provide areas of nonbreeding shorebird habitat with reduced human disturbance.

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Cumulative Impacts. Under alternative F, the same past, present and planned future actions within the Seashore have the potential to affect the natural soundscape of the Seashore. Impacts would be the same as described under alternative A. Although weather events may result in roadway closure periods, thus limiting the potential for vehicle noise intrusions and resulting in short-term benefits to the natural soundscape, construction related noise impacts may result if roadways are in need of repair. The degree of impacts would be dependent upon the equipment necessary to repair the damage and the noise levels produced by such equipment. As the distance to which construction equipment dominates the sound energy would potentially be greater than for vehicle noise, impacts would be short-term, lasting only the length of the construction period, major and adverse.

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Additional adverse impacts would potentially result from construction-related noise associated with the continued maintenance of NC-12 and would be major and long-term. The Bonner Bridge replacement would also result in construction noise related impacts that would be short-term, major and adverse. The introduction of improved access for vehicles from the Bonner Bridge replacement as well as natural increases in traffic over time will result in minor to moderate long-term adverse impacts, depending upon vehicle speeds.

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The potential major adverse impacts associated with construction noise and minor to moderate adverse impacts associated with increased vehicle presence as well as the minor adverse vehicle noise impacts associated with alternative F, would result in long-term, minor to major adverse cumulative impacts on the natural soundscape within the Seashore.

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Conclusion. As described under alternative A, for a vehicle traveling at a speed of 15 mph, vehicle noise would dominate the sound energy within 30 meters inland from an ORV track and within 10 meters

seaward of an ORV track. Therefore, impacts would be minor and adverse. Since ORV use would continue to be regulated as such over the life of the management plan, vehicle noise would be a recurring minor adverse impact. Thus, vehicle noise from ORV use would create long-term adverse impacts. Short-term and long-term benefits would occur during seasonal and temporary resource protection and visitor safety closures. Cumulative impacts to the natural soundscape would be long-term, minor to major and adverse.

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