

4 Environmental Consequences

4.1 Introduction

This section describes the potential environmental impacts of the proposed action and alternatives. The direct and indirect impacts of Alternatives 1, 2, and 3, and the No Action Alternative are described and compared by resource area. Proposed mitigation measures to minimize or avoid adverse impacts, if applicable, are also discussed for each of the resources evaluated here.

Significance in the context of NEPA was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 *Federal Register* 56003, Nov. 29, 1978]. The primary factors considered for each resource area in determining significance requires considerations of both context and intensity.

- (a) **Context.** The significance of an action must be analyzed in several *contexts* such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.
- (b) **Intensity.** This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating *intensity*:
- 1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that, on balance, the effect would be beneficial.
 - 2) The degree to which the proposed action would affect public health or safety.
 - 3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
 - 4) The degree to which the potential effects on the quality of the human environment may be highly controversial.
 - 5) The degree to which the possible effects on the human environment would be highly uncertain or would involve unique or unknown risks.
 - 6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
 - 7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
 - 8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the NRHP, or may cause loss or destruction of significant scientific, cultural, or historical resources.

- 9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined critical under the ESA.
- 10) Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

4.2 Airspace and Airfield Operations

4.2.1 Airspace

Alternative 1

Since no modifications of or additions to the current airspace are proposed in support of the proposed action, the impact analysis focuses on changes in airspace use that would result from changes in the number of aircraft operations. Furthermore, the proposed increase in air operations of 2.7% would not place additional significant restrictions on civilian aircraft use of the airspace. As such, no significant impacts on airfields and airspace would occur under Alternative 1.

Alternatives 2 and 3

Because the VAQ EA-18G would be operating within the same flight parameters used for NAS Whidbey Island airspace and the proposed increase of 3.1% in air operations would not place additional significant restrictions on civilian aircraft use of the airspace, Alternatives 2 and 3 would not have a significant impact on airfields and airspace.

No Action Alternative

Under the No Action Alternative, there would be no increase in personnel and no construction to support the new aircraft. Therefore, the No Action Alternative would have no significant impact on airfields and airspace.

4.2.2 Airfield Operations

Alternative 1

The projected number of annual aircraft operations (Table 4-1) was calculated by assuming that the majority of operations by the transitioned Expeditionary VAQ squadrons would be the same as the operations currently performed by the existing EA-18G Growler squadrons at NAS Whidbey Island. The exceptions are that the Expeditionary VAQ squadrons would not conduct any FCLP operations and would conduct only about 75% as many GCA patterns as the baseline EA-18G squadrons. Total operations by the transitioned Expeditionary VAQ squadrons would increase over baseline operations by the existing Expeditionary VAQ

EA-6B Prowler squadrons under Alternative 1, with a corresponding increase in total annual operations at NAS Whidbey Island of 2.7% (1,961 operations).

Table 4-1 Proposed VAQ Air Operations at Ault Field (2014)

	No Action Alternative (Baseline)		Alternative 1		Alternative 2		Alternative 3	
	12 EA-6B VAQ Aircraft	Total Airfield Operations	21 EA-18G VAQ + FRS Aircraft	Total Airfield Operations	26 EA-18G VAQ + FRS Aircraft	Total Airfield Operations	26 EA-18G VAQ + FRS Aircraft	Total Airfield Operations
Departures	589	12,009	979	12,399	1,212	12,468	1,212	12,468
Arrivals	589	12,009	979	12,399	1,212	12,468	1,212	12,468
Pattern Operations	1842	46,539	3023	46,756	3,743	47,799	3,743	47,799
Total	3,020	70,557	4,981	71,554	6,167	72,735	6,167	72,735
Net Air Operation Change	NA	NA	1,961	2.7%	2,178	3.1%	2,178	3.1%

Key:

VAQ = Electronic Attack

FRS = Field Replacement Squadron

The proposed Expeditionary VAQ EA-18G Growler squadrons would follow the same training and deployment cycle as the EA-6B Prowler squadrons, and no change is proposed to existing types of flight operations or flight tracks. Projected operations would consist primarily of direct arrivals and departures and T&G operations, with the remaining operations including “depart and re-enter” patterns and GCA patterns. The proposed increase in air operations for Alternative 1 is well below the recent historical air operations tempo of more than 78,000 for NAS Whidbey Island (U.S. Navy 2008b). Therefore, the increase in air operations under Alternative 1 would have no significant impact on air operations at NAS Whidbey Island.

Alternatives 2 and 3

Under Alternatives 2 and 3, total annual operations at NAS Whidbey Island would increase by 3.1% (2,178 operations). As noted under Alternative 1, the proposed Expeditionary VAQ EA-18G Growler squadrons would follow the same training and deployment cycle as the EA-6B Prowler squadrons, and no change is proposed to existing types of flight operations or flight tracks. The total number of proposed air operations at NAS Whidbey Island under Alternatives 2 and 3 (72,735), although higher than proposed air operations under Alternative 1, still would be below the air station’s recent historical air operations tempo of more than 78,000 (U.S. Navy 2008b), and thus the increase in air operations under Alternatives 2 and 3 would have no significant impact on air operations at NAS Whidbey Island.

No Action Alternative

Under the No Action Alternative, there would be no change in the number of annual air operations (70,557) and thus there would be no significant impact on air operations.

4.2.3 Aircraft Safety

Alternative 1

Airspace managers work to minimize safety risks through a number of measures. These include but are not limited to providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace.

Alternative 1 would add nine aircraft and an associated 1,961 operations at NAS Whidbey Island. This is an approximate 2.7% increase in overall airfield flight operations at Ault Field.

Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented. Additional airfield flight operations would adhere to established safety procedures. No changes in established clear zones, APZs, or other established airfield safety features would be required. Thus, no significant impact on the probability that an aircraft mishap would occur and no impact on mishap response would be expected under Alternative 1.

There would be no changes in the potential for public health or safety impacts under Alternative 1, including those related to aviation safety. All current training regulations and procedures would continue to reflect EA-18G-specific rules, and pilots would continue to adhere to training policies. Since the EA-18G is an existing airframe at the base, an update to response plans and associated equipment, including the emergency and mishap response plans, would not be required. As such, the NAS Whidbey Island airfield safety conditions would be similar to existing conditions. No significant safety impacts from operational training actions would be expected for NAS Whidbey Island airfield airspace.

Alternatives 2 and 3

As noted under Alternative 1, there would be no changes in the potential for public health or safety impacts under Alternatives 2 and 3. Flight operations would continue to be conducted as described above according to existing safety protocols.

Alternatives 2 and 3 would add 14 aircraft and an associated 82,178 operations at NAS Whidbey Island. This is an approximate 3.1% increase in overall airfield flight operations at Ault Field. Current airspace safety procedures, maintenance, training, and inspections would continue to be implemented. Additional airfield flight operations would adhere to established safety procedures. No changes in established Clear Zones, APZs, or other established airfield safety features would be required. Thus, no significant impact on the probability that an aircraft mishap would occur and no impact on mishap response would be expected under either Alternative 2 or 3.

No Action Alternative

Under the No Action Alternative, the number of annual air operations at NAS Whidbey Island would not change. As such, no impacts on public health or safety, including those related to aviation safety, would be expected. NAS Whidbey Island would continue to conduct flight training in the local airfield environment and annual operations would continue to operate according to existing safety protocols. Therefore, no significant safety impacts under the No Action Alternative would be expected for NAS Whidbey Island airspace.

4.3 Noise

Alternative 1

Operations. Under any alternative, the noise environment would decrease compared to baseline conditions. Compared to the current noise environment (CY2011) (baseline), the noise generated by operations of the Expeditionary EA-18G VAQ squadron flights at and around Ault Field is expected to be less based on noise modeling conducted specifically for this proposed action (see Appendix C). The DOD analyzes aircraft noise near military airfields through a suite of computer-based programs, collectively called NOISEMAP. NOISEMAP, like its cousin, Integrated Noise Model (INM; which is used at civil airports) examines all the primary factors influencing aircraft noise, including:

- Aircraft type;
- Number and time of operations;
- Flight tracks;
- Aircraft power settings, speeds and altitudes;
- Numbers, duration and location of engine maintenance run-ups;
- Terrain; and

- Environmental data (temperature and humidity).

For the noise generated by specific aircraft, the DOD draws on a vast aircraft noise library. This library contains acoustic information on aircraft in the military inventory measured under controlled conditions. Aircraft noise characteristics from the noise library are used in NOISEMAP, adjusting the characteristics to local environmental conditions, to accurately predict the noise environment. Models, like NOISEMAP and INM, are particularly useful in predicting the noise environment where operational tempos and even aircraft types are projected to change.

NOISEMAP uses the DNL metric to present noise contours in the near airfield environment. DNL combines those factors that concern the public most about noise—the loudness and the number and duration of all events (total noise energy) —that occur in an average annual day. DNL also considers the time of day, adding a 10-dB penalty to night operations (between 10:00 p.m. and 7:00 a.m.) to account for the more intrusive noise at a time when the ambient noise level is low.

The noise contours presented for the action alternatives connect points of equal value, and range from 60 DNL to 85 DNL, in 5-dB increments. The Navy makes land use recommendations for compatible development (U.S. Navy 2008). Residential land uses are normally considered incompatible with noise levels above 65 DNL.

Alternative 1 has the largest decrease in the noise environment for implementing the proposed action. The noise contours for Alternative 1 are similar to, but slightly smaller than, the contours for Alternatives 2 and 3. This is because the same type of aircraft will be performing the same types of operations and using the same flight tracks near Ault Field. The total number of air operations is also very similar. Alternative 1 would have 4,981 EA-18G VAQ operations while Alternatives 2 and 3 would have 6,167 EA-18G VAQ operations. This would be an increase of 23.8% for Alternatives 2 and 3 over Alternative 1.

Because the aircraft type, flight tracks, and types of operations are the same, the Navy calculated the difference in decibels using the following formula:

$$\begin{aligned} 10 * \log (1+ \% \text{ increase}) &= \text{Decrease in DNL (dB)} \\ 10 * \log (1.2381) &= \text{dB} \\ &= .93 \text{ dB} \end{aligned}$$

A difference of less than 1 dB is imperceptible to the human ear and will have minimal impact on the contour lines between Alternative 1 and Alternative 2. A change in decibels would have to be above 3 dB DNL to be barely perceptible to the human ear.

Potential noise impacts under each alternative are presented as changes in the DNL. The area of the projected 2014 DNL noise zones would decrease under Alternative 1 compared to the baseline. A large portion of this area is located over the open waters of Puget Sound and Skagit Bay. Likewise, fewer people would be located in the projected noise zones under Alternative 1. The existing population exposed to noise levels greater than 80 dB DNL would decrease slightly under Alternative 1. No new populated areas would be exposed to noise levels greater than 80 dB DNL. Because no new areas of population would be exposed to noise levels greater than 80 dB DNL, no increase in hearing loss risk would be expected.

Because of the decrease in population and land area within the less than 65-dB DNL noise zone, Alternative 1 would have no significant impacts on the noise environment in the vicinity of Ault Field at NAS Whidbey Island. Even though total air operations would increase by 2.7% after transition to the EA-18G aircraft, the noise exposure generated by the proposed air operations would decrease relative to baseline conditions. The primary reason for this is that on a single-event basis, the EA-18G SEL decreases in noise levels by 2 to 8 dB when compared to the EA-6B SEL for most types of air operations (Wyle 2012). The single events with the greatest SEL affecting the area approximately 500 feet offshore to the west of NAS Whidbey Island have been identified and are presented in Appendix C, Tables 7-1 and 7-2. EA-6B SELs range between 121 and 133 dB at a distance of 500 feet offshore. EA-18G SELs range between 104 and 127 dB at a distance of 500 feet offshore (Wyle 2012). For the arrival portions of closed patterns, the EA-6B and the EA-18G produce similar noise levels (similar SELs, with differences of 3 dB or less). However, for departures, the EA-6B SELs are 18 to 23 dB greater than the EA-18G, primarily due to the lower altitude climb-out profile of the EA-6B (Wyle 2012).

NAS Whidbey Island has recently received complaints of building rattle/vibration due to Fleet Growler operations. While the aircraft decreases noise levels by 2 dB to 8 dB for most air operations conducted at NAS Whidbey Island, the EA-18G emits a lower frequency noise at takeoff, which, while not considered “louder” in technical terms, has a higher potential to cause noise-induced vibrations (Wyle 2012). See Appendix C for more detailed information.

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations or rattling of objects within the dwelling such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may vibrate noticeably when

exposed to certain levels of airborne noise. The Growler’s unweighted spectral levels are, on average, 11 dB greater than the Prowler during a Mil power takeoff passing through 1,000 feet agl for frequencies less than 50 Hz. For approaches and cruise power at 1,000 feet agl, the frequency spectra of the two aircraft are similar for frequencies less than 50 Hz with average differences of 3 to 5 dB. With its increased low-frequency content, the Growler takeoff events have the slightly higher potential to cause noise-induced vibration.

While aircraft noise is assessed for land use compatibility in terms of A-weighted decibels (dBA) (of Day-Night Average Sound Level), to assess the potential for structural vibration, rattle or damage, C-weighting is utilized. Due to the EA-6B’s spectra sound levels, especially in frequencies minimally affected by the C-weighting, C-weighted sound levels for the EA-6B and EA-18G only differ by 1 to 2 C-weighted decibels (dBC) for the takeoff and approach conditions. In cruise flight, the C-weighted sound levels for the EA-6B are approximately 8 dBC greater than EA-18G. None of these conditions cause C-weighted sound levels to exceed 130 dBC and structural damage would not be expected, however, the takeoff condition has C-weighted sound levels greater than 110 dBC for both aircraft, creating an environment conducive to noise-induced vibration. (Wyle 2012). Due to the minor differences in noise-induced structural vibrations between the EA-6B and EA-18G, and the fact that the change in aircraft has little effect on the overall noise environment, no significant impacts are expected. **Construction.** Construction under Alternative 1 would result in short-term construction-related noise impacts. Typical noise emission levels for construction equipment are listed in Table 4-2. Noise impacts related to construction would be intermittent and temporary (during the approximate 10-month construction period). Furthermore, at the airfield, noise from aircraft operations is the dominant noise and would tend to mask the construction-related noise; thus, Alternative 1 would have no significant impact on the existing noise environment. (For the complete noise report, see Appendix C.)

Table 4-2 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83

Table 4-2 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	88
Delivery Truck	88
Diamond Saw	90
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-Driven Vibro-compactor	76
Hoist	76
Jackhammer (paving breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85
Vibratory Pile Driver/Extractor	89

Source: Patterson et al. 1974.

Key:

dBA = A-weighted decibels

Alternatives 2 and 3

Operations. The projected 2014 DNL noise zones also would decrease in area under Alternatives 2 and 3. These alternatives represent the largest contour but smallest decrease from the baseline in the noise environment (and therefore the greatest impact, i.e., the worst case scenario) for implementing the proposed action. The noise contours for Alternative 1 would be slightly smaller than those of Alternatives 2 and 3; however, because the difference between the projected Alternative 1 noise contour and the projected Alternatives 2 and 3 noise contours would not be discernible when drawn on a map, the contours that represent the largest change in baseline conditions were used in this analysis. Thus, the greatest potential impact for the off-station area and estimated population within the projected 2014 DNL noise zones at NAS Whidbey Island would occur under Alternatives 2 and 3. Projected 2014 DNL noise zones for NAS Whidbey Island for Alternatives 2 and 3 are shown on Figure 4-1.

Under Alternatives 2 and 3, the land area in the noise zones would be reduced by 14% and, therefore, the corresponding population in the noise zones would be reduced by 9%. The proposed 65- to 75-dB DNL zone for Alternatives 2 and 3 would decrease as much as 1 mile

relative to the baseline scenario (see Figure 4-1). The area within the DNL noise zones would decrease by approximately 5,032 acres, a large portion of which would be located over the open waters of Puget Sound and Skagit Bay. The population exposed to the greater-than-65-dB DNL noise zone would decrease by an estimated 948 people. Similar to Alternative 1, Alternatives 2 and 3 would have a less than significant impact on the noise environment in the vicinity of NAS Whidbey Island because of the noise exposure generated by the proposed action would decrease when compared to baseline conditions. This results from the lower EA-18G SEL, compared to the EA-6B SEL, as explained under Alternative 1. Similar to Alternative 1, Alternatives 2 and 3 could result in a slightly higher potential for noise-induced vibration impacts from EA-18G take-off operations. In conclusion, there would be no significant impact on the noise environment as a result of operational noise.

The existing population exposed to noise levels greater than 80 dB DNL would decrease slightly under Alternatives 2 and 3. No new areas of population would be exposed to noise levels greater than 80 dB DNL. Therefore, there are no new populations with a potential for long-term increase hearing loss risk.

Construction. Projected construction-related noise under Alternatives 2 and 3 would be similar to Alternative 1 because each alternative would require similar construction equipment (see Table 4-2 for typical noise emission levels for construction equipment). In addition to the minor facilities construction and modifications for Alternative 1, Alternatives 2 and 3 would include constructing an up to 25,000-square-foot addition to Hangar 10. Noise impacts related to construction would be intermittent over the approximate 10-month construction period. As noted under Alternative 1, aircraft noise would tend to mask construction-related noise at the airfield; thus, Alternatives 2 and 3 would have no significant impact on the existing noise environment.

No Action Alternative

Under the No Action Alternative, there would be no new facility construction or change in the aircraft operating at NAS Whidbey Island and thus no change to and no significant impact on the existing noise environment in the vicinity of the air station.

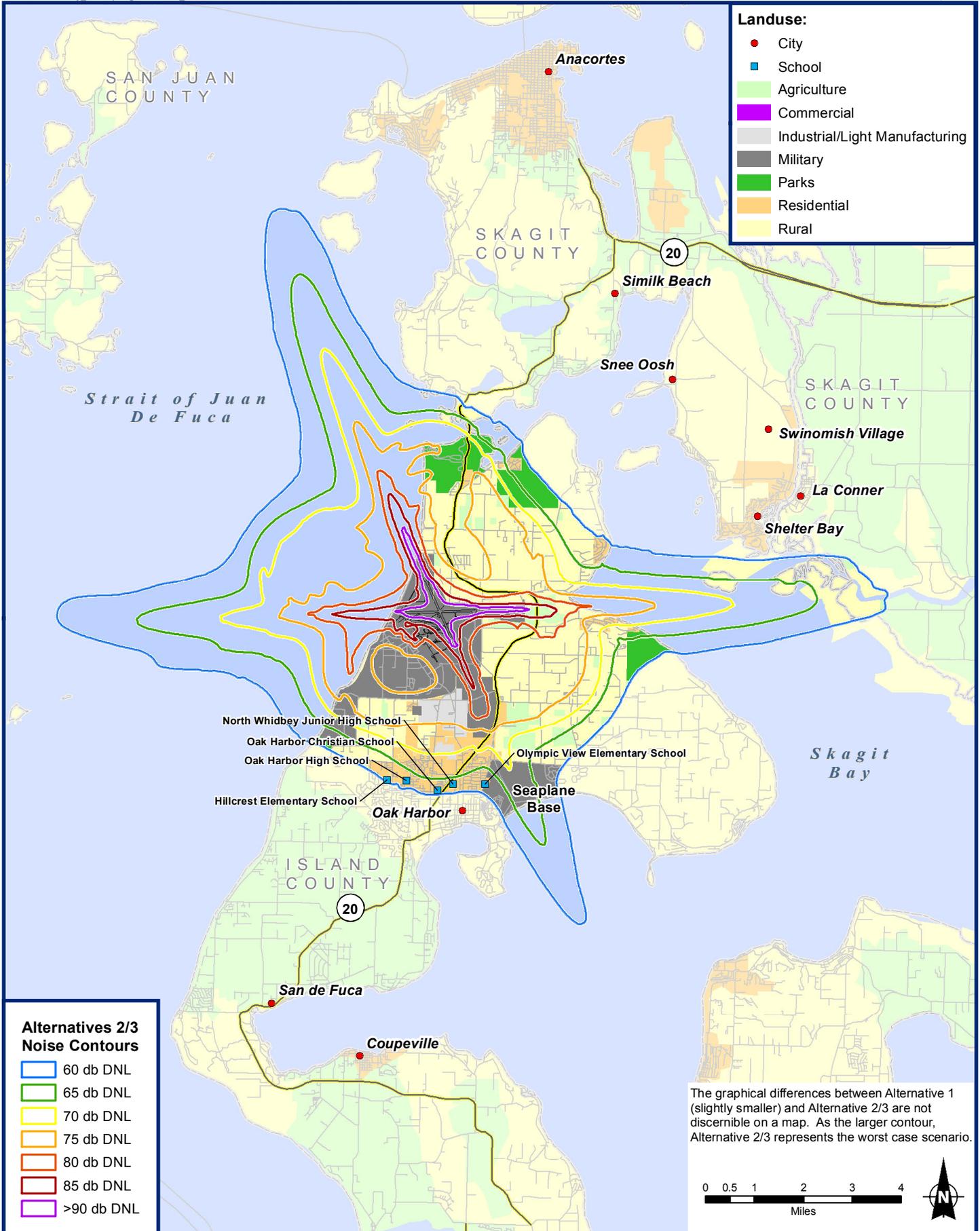


Figure 4-1
 Proposed Alternative 2/3 Noise Contour,
 Transition of Expeditionary EA-6B Prowler Squadrons to
 EA-18G Growler at NAS Whidbey Island, Washington

4.4 Land Use

4.4.1 Installation Land Use

Alternative 1

Under Alternative 1, the proposed construction, demolition, and renovation projects would be located entirely within the existing developed area of the flight line and would be consistent with the current training and operations land uses at the flight line. The addition to the flight simulator building would be constructed on land that is currently maintained lawn. This land use change would be consistent with adjacent land uses. Thus, Alternative 1 would have no significant impact on land use at NAS Whidbey Island.

Alternatives 2 and 3

The proposed construction, demolition, and renovation projects under Alternatives 2 and 3, similar to the projects under Alternative 1, would be located entirely within the existing developed area of the flight line and would be consistent with existing land uses in that area. Alternatives 2 and 3 would also include constructing an addition to Hangar 12 (25,200 square feet under Alternative 2 and 4,300 square feet under Alternative 3,) which also would be consistent with the training and operations land uses in that area. Constructing the flight simulator building in the maintained lawn area would be consistent with adjacent training uses. Thus, Alternatives 2 and 3 would have no significant impact on land use at NAS Whidbey Island.

No Action Alternative

The No Action Alternative would maintain current land use conditions and therefore would have no significant impact on land use at NAS Whidbey Island.

4.4.2 Regional Land Use

Alternative 1

Construction, demolition, and renovation associated with Alternative 1 would occur entirely on NAS Whidbey Island and would not affect areas outside the air station. Under Alternative 1, a negligible number of new personnel would transfer to the air station. This influx of new personnel and their families would not be expected to result in changes to regional land use (e.g., through construction of new housing or new businesses or changes in transportation

infrastructure). For these reasons, Alternative 1 would have no significant impact on regional land use.

Alternatives 2 and 3

Construction, demolition, and renovation associated with Alternatives 2 and 3 would occur entirely on NAS Whidbey Island and would not affect areas outside the air station. Under Alternatives 2 and 3, 311 additional personnel, 97 of which are selective reservists, would transfer to Whidbey Island. Most of the selective reservists already reside in the region and would commute to the air station. Any additional influx of new personnel and their families would not be expected to result in changes in regional land use, so Alternatives 2 and 3 would have no significant impact on regional land use.

No Action Alternative

Under the No Action Alternative, no changes in regional land use would occur and, thus, there would be no significant impact on regional land use.

4.4.3 Land Use Compatibility

Alternative 1

The Navy typically issues land use compatibility recommendations for the greater-than-65-dB DNL noise zones. The noise contours for Alternative 1 are similar, but slightly smaller, than the contours for Alternatives 2 and 3. Aircraft operations associated with transition of the Expeditionary VAQ squadrons would result in a reduction in land area in the greater-than 65-dB DNL noise zones under Alternative 1. Because no additional residential areas within Oak Harbor would be included within the projected greater-than-65-dB DNL noise zones, Alternative 1 would have no significant impacts on land use compatibility but would result in a positive impact on land use compatibility in the vicinity of NAS Whidbey Island.

Alternatives 2 and 3

Aircraft operations associated with transition of the Expeditionary VAQ squadrons would result in a reduction in land area within the greater-than-65 dB DNL noise zones under Alternatives 2 and 3. The noise contours for Alternative 1 would be slightly smaller than those of Alternatives 2 and 3. However, because the difference between the projected Alternative 1 noise contour and the projected Alternatives 2 and 3 noise contours would not be discernible when drawn on a map, the contours that represent the largest change in baseline conditions were

used in this analysis. Table 4-3 shows the change in the acreages of different land uses within the greater-than-65-dB DNL noise zones between the baseline (2011) and projected (2014) noise zones under Alternatives 2 and 3. Alternatives 2 and 3 represent the worst-case scenario of increased Expeditionary VAQ aircraft operations at Ault Field, with an increase of 3,482 annual operations. Under Alternatives 2 and 3, there would be a reduction of approximately 14% in the acreage of land and water within the projected greater-than 65-dB DNL noise zones. The majority of the change in the reduction in noise would occur in the 65- to 80-dB DNL noise contour (87%). No additional residential areas within Oak Harbor would be in the projected greater-than-65-dB DNL noise contours under Alternatives 2 and 3. Thus, Alternatives 2 and 3 would have no significant impacts on land use compatibility but would result in a positive impact on land use compatibility in the vicinity of NAS Whidbey Island.

No Action Alternative

The No Action Alternative, represented as the baseline condition in Table 4-3, would have no significant impact on land-use compatibility because current aviation activities at NAS Whidbey Island would continue unchanged.

Table 4-3 Comparison of 2011 Baseline/No Action Alternative and Alternatives 2 and 3 Projected Noise Contours at Ault Field

Alternative	Noise Zone (acres)						Total Acres
	65 to 70 dB DNL	70 to 75 dB DNL	75 to 80 dB DNL	80 to 85 dB DNL	85 to 90 dB DNL	>90 dB DNL	
2011 Baseline No Action Alternative	12,088	10,657	9,489	2,544	1,111	849	36,736
Alternatives 2 and 3	9,252	9,641	8,987	2,270	1,019	535	31,704
Change	(2,836) ¹	(1,016)	(502)	(274)	(92)	(314)	(5,032)
%Change	(23.5%)	(9.5%)	(5.3%)	(10.8%)	(8.3%)	(37.0%)	(13.7%)

¹Numbers in parentheses represent a reduction in value.

Key:

dB = Decibel.

DNL = Day-night average sound level.

4.5 Air Quality

Air emissions associated with the proposed action would be generated from short-term construction and long-term changes to aircraft operations and personnel commuting (e.g., privately operated vehicles [POVs]).

Construction would result in construction equipment emissions from all equipment operations as well as volatile organic compound (VOC) emissions from paving and painting and fugitive dust from grading and earth-moving. These emissions are calculated separately from operational emissions because they would be temporary in nature and would occur prior to

full implementation of the proposed action. Changes in mobile operational emissions and test cell operations would result from the replacement of EA-6B with EA-18G aircraft operations and new EA-18G aircraft operations associated with this action. Increased POV use from commuting activities of new station personnel would also result in an increase of emissions. Other site emissions not specifically listed in the impact analysis, such as those from stationary sources (other than the test cells), other aircraft and station vehicles, ground support equipment, and other sources, are assumed to remain constant under this action. (Cumulative impacts are discussed in Section 5.3.4.)

4.5.1 Construction Emissions

Construction emissions for all three action alternatives were estimated using emission factors from the EPA’s NONROAD model, based on estimates of equipment to be used throughout the year, and assuming a one-year construction period, with an estimated total of 250 workdays. A workday is assumed to be eight hours long. Construction-worker commuting and material deliveries are also considered, as VOC emissions from paving and painting and particulate emissions from site grading. Total projected annual construction emissions in tons per year at NAS Whidbey Island under each alternative are listed in Table 4-4. The construction equipment, activities, emission factors, and calculations are detailed in Appendix D.

Table 4-4 Construction Emissions at NAS Whidbey Island, All Action Alternatives

Activity	Emissions (tpy)				
	VOCs	CO	NO _x	SO ₂	PM ₁₀
Alternative 1					
Construction equipment	0.21	1.11	2.37	0.01	0.19
VOCs from paving and painting	1.12				
PM ₁₀ from grading and demolition					0.20
Worker commuting and deliveries	4.10	0.54	0.44	0.01	1.00
Total	5.43	1.65	2.80	0.01	1.39
Alternative 2					
Construction equipment	0.21	1.11	2.37	0.01	0.19
VOCs from paving and painting	1.79	5.20			
PM ₁₀ from grading and demolition					0.20
Worker commuting and deliveries	4.10	0.54	0.44	0.01	1.00
Total	6.10	6.84	2.80	0.01	1.39
Alternative 3					
Construction equipment	0.21	1.11	2.37	0.01	0.19
VOCs from paving and painting	1.23	2.95			
PM ₁₀ from grading and demolition					0.20
Worker commuting and deliveries	4.10	0.54	0.44	0.01	1.00
Total	5.54	4.60	2.82	0.01	1.39

Table 4-4 Construction Emissions at NAS Whidbey Island, All Action Alternatives

Key:

- CO = carbon monoxide
- NAS = Naval Air Station
- NO_x = nitrogen oxides
- PM₁₀ = particles 10 micrometers or less in diameter
- SO₂ = sulfur dioxide
- tpy = tons per year
- VOCs = volatile organic compounds

4.5.2 Operations Emissions

This analysis considers emissions from the replacement of EA-6B flight and maintenance operations with EA-18G operations, the increase in EA-18G Growler flight and maintenance operations, and new POV operations by additional station personnel for each of the action alternatives. Flight and maintenance operation changes were determined based on noise analysis operation totals (Wyle 2012). Inter-facility operations and FCLPs were excluded because the Expeditionary VAQ squadron does not fly to OLF Coupeville or conduct FCLP operations. All other total operations were estimated using a ratio of total aircraft considered in the noise analysis and aircraft specifically affected by this action. The net change in emissions was estimated based on the removal of 12 EA-6B existing aircraft and operations of 21 (Alternative 1) or 26 (Alternatives 2 and 3) new EA-18G aircraft. Existing test cell emissions were based on reported data and calculated according to the NSA Whidbey Island Air Operating Permit. Projected test cell operations were estimated from a ratio to 2011 test cell operations as estimated in the Aircraft Noise Study for the Introduction of the P-8A MMA to the Fleet (Wyle July 2008) and emissions calculated using emission factors developed by the Navy's Aircraft Environmental Support Office (AESO March 2011a, March 2011b). The change in annual emission totals that result from this action are listed in Table 4-5. Emissions of EA-18G Growler flight operations and maintenance operations are based upon operational emission factors developed by the Navy's Aircraft Environmental Support Office (AESO 2009 and 2011b). See Appendix D for emissions calculations and specific document references.

Emissions from POVs were estimated using the EPA's Mobile 6 (EPA 2010c) emission factors based on the change in personnel estimates summarized in Table 2-2 (Section 2) and assuming that 56% of new personnel would be full time and commute 250 days per year, while 44% of personnel would be part-time and commute 25% of these days.

Table 4-5 Operations Emissions

Operation	Emissions (tpy)				
	CO	NO _x	HC	SO ₂	PM ₁₀
Existing EA-6B Operations (12 Aircraft)					
LTOs ¹	18.0	3.4	8.6	1.3	9.0
Pattern Operations ²	1.1	5.5	0.2	0.8	3.0
Total Emissions from Flight Operations	19.1	8.9	8.8	2.1	12.0
Water Wash	0.9	0.1	0.4	0.05	0.4
Low Power	3.5	0.4	1.6	0.2	1.7
High Power	0.01	0.0	0.00	0.003	0.01
Test Cell	3.14	3.8	1.24	0.835	3.61
Total Emissions from Maintenance Operations	7.6	4.2	3.2	1.1	5.8
Total Emissions from Existing Expeditionary VAQ EA-6B Operations	26.7	13.1	12.0	3.2	17.8
Alternative 1: Projected EA-18 G Operations (21 Aircraft)					
EA-18G					
LTOs	130.1	15.2	34.3	2.6	8.7
Pattern Operations	0.5	14.2	0.1	1.4	3.9
Total Emissions from Flight Operations	130.6	29.4	34.3	4.0	12.6
Water Wash	0.3	0.005	0.1	0.006	0.03
Low Power	13.3	0.5	8.8	0.3	1.7
High Power	1.1	0.1	0.1	0.0	0.0
Test Cell	11.2	5.2	1.5	0.4	0.7
Total Emissions from Maintenance Operations	25.9	5.7	10.5	0.7	2.5
Total Emissions from Proposed Expeditionary VAQ EA-18G Operations	156.5	35.2	44.8	4.7	15.1
Total Change in Aircraft Operation Emissions	129.8	22.0	32.9	1.5	-2.8
Total Change in POV Emissions	8.8	0.7	0.9	0.0	2.0
Total Change in Operation Emissions	138.6	22.7	33.8	1.5	-0.8
Alternative 2 and 3: Projected EA-18 G Operations (26 Aircraft)					
EA-18G					
LTOs	161.1	18.9	42.4	3.2	10.8
Pattern Operations	0.6	17.6	0.1	1.7	4.8
Total Emissions from Flight Operations	161.7	36.4	42.5	4.9	15.6
Water Wash	0.4	0.0	0.2	0.0	0.0
Low Power	16.4	0.6	10.9	0.4	2.1
High Power	1.3	0.1	0.1	0.0	0.0
Test Cell Operations	13.9	6.4	1.9	0.5	0.9
Total Emissions from Maintenance Operations	32.0	7.1	13.0	0.9	3.0
Total Emissions from Proposed Expeditionary VAQ EA-18G Operations	193.8	43.5	55.5	5.8	18.7
Total Change in Aircraft Operation Emissions	167.1	30.4	43.5	2.6	0.8
Total Change in POV Emissions	30.1	2.3	3.2	0.0	6.7
Total Change in Operation Emissions	197.2	32.7	46.7	2.6	7.5

Table 4-5 Operations Emissions

Notes:

1 LTOs include departure and arrival, auxiliary power unit (APU), idling, taxi, and run-up operations.

2 Pattern operations include Touch and Go, Depart/re-enter, and GCA Box operations.

Key:

- CO = carbon monoxide
- HC = hydrocarbon
- NAS = Naval Air Station
- NO_x = nitrogen oxides
- PM₁₀ = particles 10 micrometers or less in diameter
- POV = personally operated vehicle
- SO₂ = sulfur dioxide
- TPY = tons per year
- VAQ = electronic attack

4.5.3 Air Quality Impacts

Total annual emissions from construction and operations for each alternative are summarized in Tables 4-4 and 4-5 above. Since NAS Whidbey Island is located in a region that is *in attainment* for all criteria emissions, the conformity rule does not apply to the implementation of this action at NAS Whidbey Island. There are no applicable regulations or regulatory thresholds for mobile emissions. New Source Review (NSR) or Prevention of Significant Deterioration (PSD) standards establish 250 tpy thresholds for criteria pollutants for major stationary emissions sources under which emissions from stationary sources are considered insignificant. While mobile and temporary emissions are not subject to these standards, they provide an adequate yet conservative threshold to compare total emissions from the action.

In addition, the projected increase in emissions under this proposed action would occur in a large, three-dimensional area at and above NAS Whidbey Island, Island County, and Skagit County, or the NWCAA region. The airspace in which the projected emissions from the new replacement aircraft would occur extends beyond the boundaries of NAS Whidbey Island, its horizontal extent being generally on the order of a county and vertically extending 3,000 feet. The last available inventory of mobile sources in the region was conducted for 2002 by the NWAPA (2004) (see Table 4-6).

Alternative 1

Under Alternative 1, the annual emissions from temporary construction and the projected changes in operations would be below 250 tpy for all criteria emissions. Emissions represent less than 0.27% of total annual mobile source emissions in the region, and total regional mobile emissions have not resulted in exceedances of the NAAQS in the region. Therefore, the net

increase in annual emissions as a result of implementing Alternative 1 would not have a significant, adverse impact.

Alternative 2 and 3

Under Alternative 2 and 3, the annual emissions from temporary construction and the projected changes in operations are projected to be greater than emissions under Alternative 1, but will still be below 250 tpy for all criteria emissions. Emissions represent less than 0.65% of total annual mobile source emissions in the region, and total regional mobile emissions have not resulted in exceedances of the NAAQS in the region. Therefore, the net increase in annual emissions as a result of implementing of Alternative 2 or 3 would not have a significant, adverse impact.

No Action Alternative

Under the No Action Alternative, there would be no new air emissions due to new facility construction or change in the aircraft operating at NAS Whidbey Island and thus no change to and no significant impact on the existing air emissions in the vicinity of the air station.

Table 4-6 Comparison of Percent Change in Mobile Source Emissions with NWCAA Region

	Emissions (tpy) ²				
	CO	NO _x	VOCs	SO ₂	PM ₁₀
Change in Emissions Associated with Alternative 1	138.6	22.7	33.8	1.5	(0.8)
Total Mobile Source Emissions in Skagit, Island, and Whatcom Counties (NWCAA Region) ¹	140,341.2	23,747.8	12,735.6	2,983.4	1,159.4
% Change in Mobile Source Emissions in NWCAA Region, Alternative 1	0.10%	0.10%	0.27%	0.05%	-0.07%
Change in Emissions Associated with Alternative 2 and 3	197.2	32.7	46.7	2.6	7.5
% Change in Mobile Source Emissions in NWCAA Region, Alternative 2 and 3	0.14%	0.14%	0.37%	0.09%	0.65%

Note:

¹ Emission totals provided by NWAPA 2004. Total mobile emissions do not include aircraft emissions; therefore, existing aircraft emissions at NAS Whidbey Island as calculated in the 2005 *Environmental Assessment for Replacement of EA-6B with EA-18G* (U.S. Navy 2005) analysis are added to the totals provided by the Northwest Air Pollution Authority (NWAPA; now the Northwest Clean Air Agency [NWCAA]).

4.6 Biological Resources

4.6.1 Wildlife

Alternative 1

Construction. The paved surfaces and maintained lawn and landscaped areas that would be affected by the proposed construction under Alternative 1 are not likely to support a high diversity or abundance of wildlife species. Species present in these areas would be expected to be acclimated to human disturbance. Construction in these areas would result in both direct and indirect impacts on resident wildlife. Direct effects could include mortality of less mobile species, such as small mammals and reptiles. The loss of the mowed lawn and landscaped area would cause species to move to other areas with suitable habitat, indirectly resulting in a decrease in the number of wildlife species in the area. However, the overall loss of wildlife species would be considered minor, given the relatively large amount of suitable habitat that would remain near the proposed development. Since the proposed construction projects would be located directly next to existing developed areas, negligible impacts on wildlife as a result of habitat fragmentation would occur. Temporary displacement of wildlife may occur in peripheral areas during construction, when noise and human activity levels increase. However, once construction has been completed, wildlife should return to these peripheral areas. Some wildlife species such as songbirds, small mammals, reptiles, and amphibians that are able to adapt to the landscaped conditions of urban environments can be expected to inhabit the developed areas. Therefore, construction under Alternative 1 would have no significant impact on wildlife.

Operation. Under Alternative 1, the total number of annual EA-18G Growler flight operations at Ault Field would increase by approximately 2.7%. Studies that focus on investigating the impacts of aircraft noise on wildlife and domestic animal species have observed a variety of species, including waterfowl, shore birds, songbirds, terrestrial mammals, marine mammals, and domestic animals (cows, chickens, sheep, and horses). Overall, the studies suggest that species differ in their response to aircraft noise (Manci et al. 1988). All species not exposed to aircraft noise, however, seem to initially respond with some form of a startle response, the intensity and duration of which diminishes or disappears with subsequent exposures. Other general responses include running, stampeding, flying, circling, or becoming motionless. Several studies indicate that there is a strong tendency for species to acclimate or habituate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Manci et al. 1988; Fraser et al. 1985; Black et al. 1984). Given the nature of the current NAS Whidbey Island operations,

locally occurring wildlife species have likely become habituated to aircraft noise, and operational changes under Alternative 1 would have no significant impact on wildlife.

Alternatives 2 and 3

Construction. Construction and any environmental consequences of construction under Alternatives 2 and 3 would be the same as under Alternative 1. As construction would have no significant impact on wildlife under Alternative 1, construction under Alternatives 2 and 3 also would have no significant impact on wildlife.

Operation. Under Alternatives 2 and 3, the total number of annual EA-18G Growler flight operations at Ault Field would increase by approximately 3.1%, as opposed to 2.7% under Alternative 1. Even though there would be less than a 2% increase in operations under these two alternatives, compared to Alternative 1, overall noise would be less than historic averages at NAS Whidbey Island. Wildlife has become habituated to aircraft noise at NAS Whidbey Island since its establishment in the early 1940s, as discussed under Alternative 1. As such, environmental consequences of operations under Alternatives 2 and 3 would have no significant impact on wildlife.

No Action Alternative

Under the No Action Alternative, no additional facilities would be constructed, and current aviation activities at the station would continue unchanged; therefore, there would be no significant impact on wildlife.

4.6.2 Federally Protected Species

4.6.2.1 Threatened and Endangered Species

As noted in Section 3.6.1 above, 13 federal ESA-listed threatened and endangered species potentially occur in the vicinity of NAS Whidbey Island (see Table 3-8). These species are the golden Indian paintbrush, eight fish species, one bird, and three marine mammal species. Of these species, the USFWS has expressed particular concern over potential impacts on the marbled murrelet, discussed separately below (see Section 4.6.2.2).

Alternative 1

Construction. No populations or individual occurrences of the golden Indian paintbrush have been identified on Ault Field. Furthermore, no suitable habitat to support the species occurs within the proposed construction area. Consequently, the Navy has determined that the

proposed action would have no effect on the golden Indian paintbrush, which is federally listed as threatened.

None of the construction proposed under Alternative 1 would directly affect any of the aquatic habitats that could be inhabited by ESA-listed aquatic species (see Table 3-8). Indirect effects would be mitigated because stormwater runoff would be contained in existing detention facilities, preventing degradation of water quality in marine waters surrounding the installation and thereby avoiding impacting ESA-listed aquatic species.

Construction would occur on currently developed land that is not suitable habitat for any of the ESA-listed species either occurring or potentially occurring at or in the vicinity of NAS Whidbey Island. As a result, construction activities under this alternative would have no effect on federally protected threatened and endangered species present at NAS Whidbey Island or in the surrounding areas under the ESA. There would be no significant impact on federally protected threatened and endangered species present at NAS Whidbey Island under NEPA.

Operation. Under Alternative 1, the number of EA-18G Growler flight operations at Ault Field would increase from the current number by 2.7%. Transmission of sound from a moving airborne source to a receptor under water is influenced by numerous factors, but significant acoustic energy is primarily transmitted into the water directly below the craft in a narrow cone (Naval Sea Systems Command [NAVSEA] 2012). As a result, underwater sounds from the aircraft are strongest just below the surface and directly under the aircraft. For example, the maximum sound levels in water from an aircraft overflight at 985 feet altitude is approximately 150 dB re 1 μ Pa for an F/A-18 aircraft (and the EA-18G, which is a variant of the F/A aircraft [NAVSEA 2012]). However, in general, acoustic energy generated from an aircraft is reflected away from entering the water column because noise from atmospheric sources does not transmit well under water (Richardson et al. 1995). While underwater sound is strongest directly under the aircraft, this would be extremely short-term under the proposed action because the sound levels created by the EA-18G would decline at increasing lateral distances from the aircraft's flight track or location and with increasing depth in the water. Any underwater sounds propagated from the aircraft would decline rapidly after the aircraft has passed and would not indirectly impact ESA-listed aquatic species. Unlike the EA-6B, the EA-18G departing from Ault Field typically would ascend more rapidly at takeoff, thereby spending less time than the EA-6B at less than 1,000 feet over water. For example, based on a departure from Runway 13, an EA-18G would reach 1,622 feet in altitude approximately 500 feet offshore, compared to the EA-6B, which, on the same flight track, would reach 750 feet in altitude.

Overall, the replacement of the EA-6B Prowler with the EA-18G Growler and the associated changes in flight operations would result in a slight decrease in the <75 dB noise contours in the marine environment off of Ault field. While ESA-listed aquatic species would be exposed to aircraft-generated noise wherever aircraft overflights occur, under Alternative 1 potential direct over-water noise impacts would decrease slightly.

Steller sea lions are the only species that spend considerable time out of the water as well as submerged underwater and are therefore exposed to both over-water noise and underwater noise. While Steller sea lions may occur in Puget Sound waters, they are likely infrequent visitors to the shoreline of Whidbey Island; there are no Steller sea lion rookeries or haul-outs in the vicinity of Whidbey Island. Thus, the infrequency of occurrence, coupled with the ongoing flight activities at NAS Whidbey Island and the lack of construction in marine waters or near shorelines, would result in no direct effect on the Steller sea lion.

The 2.7% increase in flight operations associated with the proposed action would not be expected to measurably change the existing underwater environment of the marine waters off of Ault Field. Thus, there would be no indirect effect on foraging habitat or a reduction in the primary food stocks of humpback whales (krill, herring, sand lance, and capelin), southern resident killer whales (salmon), or Steller sea lions (fish and cephalopods) from changes in aircraft noise.

Given these conclusions, as well as the nature of ongoing air operations at NAS Whidbey Island under all action alternatives and of other sources of noise (e.g., shipping traffic) in the surrounding area, the predicted change in noise levels would not disrupt the life history of ESA-listed marine species present in marine waters adjacent to Ault Field. Thus, Alternative 1 would have no effect on ESA-listed species, excluding the marbled murrelet (see Section 4.6.2.2), and no significant impact on threatened and endangered species under NEPA.

Alternatives 2 and 3

Construction. Construction activities under Alternatives 2 and 3 would be very similar to Alternative 1 and would be located in the immediate area of the airfield away from the shoreline. Thus, no effect under the ESA and no long-term or short-term significant impacts on threatened and endangered species are anticipated under NEPA.

Operation. Under Alternatives 2 and 3, there would be an increase in the number of EA-18G Growler flight operations at Ault Field compared to baseline conditions. The total number of annual flight operations at Ault Field would increase by 3.1% compared to baseline

conditions. Similar to Alternative 1, the replacement of the EA-6B Prowler with the EA-18G Growler and the associated changes in flight operations would not cause a measurable change in the existing noise environment in the marine environment off of Ault Field. Alternatives 2 and 3 would have no effect on ESA-listed species excluding the marbled murrelet (see Section 4.6.2.2), and no significant impact on threatened and endangered species under NEPA for reasons similar to Alternative 1.

No Action Alternative

Construction. Under the No Action Alternative, the EA-6B would not be replaced and no construction would occur. Therefore, the environmental consequences of the No Action Alternative are represented as no change from the existing conditions, and there would be no effect on threatened and endangered species under the ESA and no significant impact on threatened and endangered species under NEPA.

Operation. The No Action Alternative would maintain the current aviation activities at the station; therefore, there would be no effect on threatened and endangered species under the ESA and no significant impact on threatened and endangered species in or nearby NAS Whidbey Island under NEPA.

4.6.2.2 Marbled Murrelet

As murrelets occur year-round near the project area, in Crescent Harbor, the EA-18G Growler aircraft departing or landing at Ault Field could affect them. As noted in Section 3.6.1.1, the USFWS is concerned about a trend of decreasing population of murrelets and has identified two stressors that may occur as a result of the changes to the Expeditionary VAQ squadrons: noise and the risk of a bird/aircraft strike. Of the two stressors, noise impact is a greater concern. Departing aircraft, in particular, increase the risk of noise impacts more than approaching aircraft (USFWS 2010c; 2011c).

Noise

Surrounding noise sources may impact hearing and predator detection, vocalization, and response behavior of a marbled murrelet. As a result, changes in noise in an area may alter an individual's survival ability by decreasing its predator-detection capabilities or effectiveness at foraging. Assessing potential impacts of noise on murrelets involves a complex interaction of several factors such as location of nearby noise source, predators, and foraging habitat, and habituation of birds to an area.

Impacts on Murrelet Hearing and Predator Detection. The hearing frequency of marbled murrelets is unknown, as is the level of physical hearing damage from aircraft noise. Hearing may play a less important role in predator detection for the murrelet than vision. In the marine environment, where murrelets spend virtually their entire lives, vision is typically unobstructed. Murrelets are also often associated with other seabirds in the marine environment, which likely enhances early predator detection for all species. Any murrelets with diminished hearing sensitivity would be expected to continue to forage without a significant reduction in their predator-detection capabilities.

Vocalization. Vocalization plays an important role in foraging for murrelets in the marine environment (Strachan et al. 1995), so the proposed changes in noise from the increase in flight operations could inhibit or disrupt this behavior. Murrelets may respond with an increase in scanning (head turning), a raised vocal output, and changed singing location. It is not expected that intermittent masking periods of short duration (e.g., aircraft takeoff or landing) would alter the murrelet's daily or seasonal foraging activities.

Response Behaviors. In general, response behaviors that could indicate disturbance of murrelets in the marine environment include aborted or delayed feeding, reduced foraging success (exhibited through more foraging dives or longer foraging bouts), and avoidance of foraging areas. Crescent Harbor is considered to be a murrelet foraging site and these behaviors, if chronic, could result in a fitness reduction in adults or nestlings (Frid and Dill 2002; Romero 2004; Walker et al. 2005 as cited in USFWS 2010a), the outcome of which could affect survival and fertility of individuals.

Habituation appears to be an important consideration in measuring bird response in terms of whether or not the stressor causes a disturbance, such as the change in noise levels from increased EA-18G Growler operations. Currently, there are no studies documenting behavioral responses of marbled murrelets to aircraft noise or whether the species is habituated to such noise. However, studies assessing habituation of waterfowl to aircraft noise have typically shown limited response of the birds to aircraft overflights (Black et al. 1984 as cited in Mancini et al. 1988; Ward et al. 1987, 1988; Fleming et al. 1996; Conomy et al. 1998). For example, the responses of American black ducks (*Anas rubripes*), American wigeon (*A. americana*), gadwall (*A. strepera*), and American green-winged teal (*A. crecca carolinensis*) to exposure to low-level flying military aircraft at Piney and Cedar islands, North Carolina, were assessed. Investigators determined that the cost to each species was low because disruptions represented a low percentage of their time-activity budgets, only a small proportion of birds reacted to disturbance

(approximately 2%), and the likelihood of resuming the activity disrupted by an aircraft disturbance event was high (64%) (Conomy et al. 1998a). Investigators concluded that levels of aircraft disturbance recorded were not adversely affecting the time-activity budgets of selected waterfowl species wintering at these islands. Based on these previous studies, it is assumed that murrelets that have had no previous exposure to aircraft sound fields initially may have a strong behavioral response, but that over time, as they become habituated to the noise, they are not likely to abort foraging as a result of encountering a sound field.

Strike Risk

Assessing the strike risk for birds involves measuring a complex interaction of several factors such as aircraft speed and altitude, time of day, weather conditions that affect visibility, and the seasonal or daily flight behavior of the species in question. Murrelets spend a considerable amount of time on top of the water (not foraging) in any given day. While there is no nesting habitat on Whidbey Island, murrelets could fly over Whidbey Island from more distant marine waters to inland nesting sites. Their flight behavior is predominantly associated with foraging and flights to nest sites. When flying, murrelets generally fly at lower altitudes (less than 500 feet) and at slower speeds in marine areas, similar to those around Whidbey Island. Murrelets likely have adapted this behavior of low flight altitudes in the marine environment to optimize energy expenditure (by gaining increased lift from the interaction of air currents and wave action) or to maintain proximity to the surface of the water for escape from aerial predators through diving.

Alternative 1

Construction. As construction would be more than 1 mile from the Strait of Juan Fuca, combined with ongoing noise generated at the airfield there would be no construction-related impacts on either marbled murrelets or their habitat under this alternative; therefore, under NEPA no significant impact on the marbled murrelet is likely as a result of construction.

Operation.

Noise. Under Alternative 1, the proposed realignment and transition of the Expeditionary VAQ squadrons at NAS Whidbey Island would increase the total number of annual EA-18G Growler flight operations at Ault Field by approximately 2.7% compared to baseline conditions; however, SELs would decrease from 121 to 133 dB for the EA-6B to 104 to 127 dB for the EA-18 (see Section 4.3).

No detailed studies of the effect of airborne noise on marbled murrelets or that evaluate the response of marbled murrelets (or other alcids) to elevated in-air sound in the marine environment have been conducted. It is assumed for projects in the marine environment that marbled murrelet response to above-ambient sound levels on the water would be similar to those expected in the terrestrial environment. Historically, surrogate species studies, such as the examination of the emperor penguin (*Aptenodytes forsteri*) hearing, have established 92 dBA SEL as the disturbance threshold for airborne noise for the marbled murrelet (USFWS 2010a, 2011a). As such, the Navy used the 92-dB SEL contour for air operations at Ault Field as well as for analysis of the frequency and duration of aircraft operations at a greater-than-92-dBA SEL as part of its assessment of impacts (USFWS 2010c, 2011c).

The frequency, duration, and intensity of the murrelets' exposure to the noise signature of the EA-18G aircraft depends upon the flight profile being performed. The greater-than-92-dB noise created by an EA-18G would be intermittent and range between 20 and 60 seconds in duration, with the longer time period occurring when aircraft are arriving at the airfield. This short-term, intermittent disruption, combined with the low density of marbled murrelets per kilometer (km) in waters off of NAS Whidbey Island (fewer than five birds per km), could briefly change an individual murrelet's behavior (Marbled Murrelet Effectiveness Monitoring Module 2008; Falxa et al. 2011). This alteration is comparable to that currently observed for the EA-6B operations. Regardless of the brief behavior response discussed above, even under the worst-case conditions, the impact would be for a relatively short duration (up to 60 seconds). This installation has been in operation since the 1940s, so it is likely that individual birds in waters next to Ault Field are habituated to ongoing aircraft activity.

Strike Risk. The height at which the marbled murrelet flies and the speed of the aircraft is the risk factor considered when assessing the likelihood of aircraft colliding with murrelets. It is assumed that flight altitudes of murrelets over marine waters next to Ault Field would be low as they descend from these altitudes to foraging sites (USFWS 2010a). Murrelets likely have adapted this behavior of low flight heights to optimize energy expenditure (increased lift from the interaction of air currents and wave action) or to stay near the water to escape from aerial predators through diving. Although data are lacking, it is assumed that flight altitude over water is generally less than 500 feet.

As such, the likelihood of collision between a marbled murrelet and an EA-18G on any given flight is largely determined by jet speed, the flight duration within 500 feet of the water, and the number of individuals present. Unlike the EA-6B, the EA-18G departing from Ault

Field typically ascends more rapidly at takeoff, thereby spending less time than the EA-6B to pass through the 0- to 500-foot range of highest collision risk. For example, based on a standard departure, an EA-18G would reach 1,622 feet in altitude approximately 500 feet offshore, compared with the EA-6B, which, on the same flight track, would reach only 750 feet in altitude. Given the very short duration and rapid ascent of the EA-18G, the risk of collision is expected to be lower for departing flights than current operations of the EA-6B.

Approaching aircraft spend comparatively more time in murrelet airspace (less than 500 feet) than departing aircraft because they maintain lower flight altitudes and a more horizontal trajectory. Aircraft approaching Runway 25 typically do not descend below 1,000 feet agl until they are over Whidbey Island itself. However, aircraft would descend to 1,000 feet agl or less over the Strait of Juan de Fuca when approaching Runway 13, increasing the potential risk of collision with murrelets in this area. However, murrelets in the vicinity of Ault Field are primarily located at Crescent Harbor and are likely to fly well below the flight paths of aircraft approaching Ault Field. Because both the EA-6B and EA-18G have similar arrival flight profiles and operate at similar speeds, altitudes, and descent rates while approaching Ault Field, the potential for bird strike upon arrival by either aircraft is low.

There have been no documented murrelet aircraft strikes at Ault Field. The expected intersection of murrelet flight with the EA-18G airspace is expected to be infrequent and brief, given the murrelet densities next to Ault Field, their low-flight patterns in the marine environment, and the rapid ascent of the EA-18G from Ault Field.

The Navy consulted with the USFWS on the potential risk of noise impacts and strike on December 10, 2010, and then on December 8, 2011. Following these consultations, the Navy completed and submitted a biological assessment to the USFWS on March 30, 2012, that addressed the potential impacts of realignment and transition of the expeditionary VAQ squadrons on the marbled murrelet. The Navy determined that the proposed action may affect, but is not likely to adversely affect, the marbled murrelet. Based on the Navy's findings in their biological assessment, the USFWS issued a letter of concurrence on May 24, 2012 (see Appendices A and B).

Overall, because of the faster climb rate and slightly less noise generated by the EA-18G Growler compared with the EA-6B Prowler, there would be fewer long-term impacts on marbled murrelets than under baseline conditions. The proposed action may affect, but is not likely to adversely affect, the marbled murrelet under the ESA. Under NEPA, there would be no significant impact on the marbled murrelet as a result of operations under Alternative 1.

Alternatives 2 and 3

Construction. Construction under Alternatives 2 and 3 would be in the same location as Alternative 1. As this construction would be more than 1 mile from the shoreline and ongoing noise at the airfield, no construction-related impacts on marbled murrelets or their habitat are anticipated under these alternatives; therefore, under NEPA, no significant impact on the marbled murrelet is likely as a result of the proposed construction.

Operation. Alternatives 2 and 3 would increase the total number of annual EA-18G Growler flight operations at Ault Field by approximately 3.1%. Implementation of these alternatives would result in long-term noise levels similar to those described under Alternative 1. Although noise levels would be similar between all action alternatives, the increase of 3.1% in flight operations under Alternative 2 and 3 would increase the overall risk of potential strikes to nearby marbled murrelets. As a result, there would be an increased negative impact on marbled murrelets over the long-term under Alternatives 2 and 3.

However, because the EA-18G ascends faster than the EA-6G, there would be an overall decrease in the potential risk of strike when compared with historic operations at the airfield. The faster climb rate and slightly lower sound level of the EA-18G would result in fewer long-term impacts on marbled murrelets under these two alternatives than under baseline conditions. The proposed action may affect, but is not likely to adversely affect, the marbled murrelet under the ESA. Therefore, under NEPA, there would be no significant impact on the marbled murrelet as a result of operations under Alternatives 2 and 3.

No Action Alternative

Because the No Action Alternative would not increase noise levels or the number of flight operations above baseline conditions, it is anticipated that there would be no effect on the marbled murrelet under the ESA and no significant impact on the marbled murrelet under NEPA.

4.6.2.3 Marine Mammals

Marine mammals protected under the MMPA potentially occurring in the marine waters adjacent to Ault Field (i.e., Puget Sound and the Strait of Juan de Fuca) include the minke whale, gray whale, harbor porpoise, Dall's porpoise, California sea lion, and harbor seal.

Alternative 1

Construction. No construction activities in the marine environment would occur under Alternative 1; therefore, there would be no direct impacts on marine mammals under the

proposed action. Proper implementation of the measures to control stormwater runoff from construction sites and new impervious surfaces would prevent degradation of water quality in surface waters surrounding the installation, thereby avoiding any indirect impacts on marine mammals. Construction activities under Alternative 1 thus are not expected to impact marine mammals protected under the MMPA, so there would be no significant impact under NEPA.

Operation. Alternative 1 proposes a 2.7% increase in flight operations. Studies have documented that 1) marine mammals (specifically gray whales) have shown no outward physical behavioral response to aircraft noise or overflights; 2) exposure to noise from very low-flying aircraft does not always alarm or cause hauled-out seals (specifically monk seals) to flee into the water; and 3) aircraft are thought to have a much smaller potential for impacting marine mammals compared with other sources of underwater noise, including ship traffic, drill rigs, and seismic surveys (NPS 1994; U.S. Air Force 2000; Zhang et al. 2003). However, as discussed in Section 4.5.1.1, transmission of sound from a moving airborne source to an underwater receptor is influenced by significant acoustic energy, primarily transmitted into the water directly below an aircraft in a narrow cone (NAVSEA 2012). As a result, underwater sound from the aircraft is strongest just below the surface and directly under the aircraft. For example, the maximum sound levels in water from an aircraft overflight at 985 feet altitude is approximately 150 dB re 1 μ Pa for an F/A-18 aircraft³ (NAVSEA 2012).

Although underwater noise directly under an aircraft at less than 1,000 feet altitude can be high, in general, acoustic energy generated from an aircraft is reflected away from the water column, as noise from atmospheric sources do not transmit well under water (Richardson et al. 1995). While underwater sound is strongest directly under the aircraft, this would be extremely short-term under the proposed action because the sound levels created would decline at increasing lateral distances from the aircraft's flight track or location and with increasing depth in the water. Any underwater sounds propagated from the aircraft would decline rapidly after the aircraft has passed and would not indirectly impact a marine mammal.

Both the EA-6B and EA-18G have similar arrival flight profiles and operate at similar speeds, altitudes, and descent rates while approaching Ault Field. Approaching aircraft spend comparatively more time in 1,000-foot altitude airspace than departing aircraft because they maintain lower flight altitudes and a more horizontal trajectory. Aircraft approaching Runway 25 typically do not descend below 1,000 feet agl until they are over Whidbey Island itself.

³ The EA-18G Growler is a variant of the FA-18F (Super Hornet) strike-fighter aircraft.

However, aircraft would descend to 1,000 feet agl or less over the Strait of Juan de Fuca when approaching Runway 13, increasing noise near marine mammals in this area. However, because no haul-outs have been identified immediately next to Ault Field and because the EA-18G transmits less noise than the EA-6B, descending EA-18G would not affect marine mammals when compared with baseline conditions.

Unlike the EA-6B, the EA-18G departing from Ault Field typically ascends more rapidly at takeoff, thereby spending less time than the EA-6B at less than 1,000 feet altitude. For example, on a departure from Runway 13, an EA-18G would reach 1,622 feet in altitude approximately 500 feet offshore, compared with the EA-6B, which, on the same flight track, would reach only 750 feet in altitude. This, combined with the fact that no haul-outs have been identified immediately next to Ault Field, would not affect marine mammals when compared with baseline conditions. Consequently, the Navy has determined that this alternative would not affect nor result in reasonably foreseeable “takes” of a marine mammal species by harassment, injury, or mortality as defined under the MMPA, and under NEPA there would be no significant impact on marine mammals as a result of operations under Alternative 1.

Alternatives 2 and 3

Construction. Because construction activities would be the same under Alternatives 2 and 3 as under Alternative 1, any environmental consequences also would be the same. As construction activities under Alternative 1 would have no impact on marine mammals protected by the MMPA, construction activities under Alternatives 2 and 3 also would have no effect to marine mammals protected under the MMPA, so there would be no significant impact under NEPA.

Operation. Under Alternatives 2 and 3, the proposed transition of the Expeditionary VAQ squadrons at NAS Whidbey Island would increase the total number of annual EA-18G Growler flight operations at Ault Field by approximately 3.1%. Consequently, the Navy has determined that this alternative would not affect or result in reasonably foreseeable “takes” of a marine mammal species by harassment, injury, or mortality as defined under the MMPA.

Because the EA-18G ascends faster than the EA-6G, there would be an overall decrease in the noise impacts on marine mammals when compared with historic operations at the airfield. The faster climb rate and slightly lower sound level of the EA-18G would result in fewer long-term impacts on marine mammals under these two alternatives than under baseline conditions.

Descending EA-6B and EA-18G aircraft approaching NAS Whidbey Island do not descend below 1,000 feet agl until they are either over Whidbey Island itself or the Strait of Juan de Fuca, exposing marine mammals to similar impacts because of the aircrafts' similar trajectories. However, because no haul-outs have been identified immediately next to Ault Field and the EA-18G transmits less noise than the EA-6B, a descending EA-18G would not affect marine mammals when compared to baseline conditions.

Therefore, under NEPA there would be no significant impact on the marine mammals as a result of operations under Alternatives 2 and 3.

No Action Alternative

Under the No Action Alternative, no additional facilities would be constructed, current flight operations at the station would continue, and there would be no change in existing conditions or impacts on marine mammals protected under the MMPA. Therefore, under NEPA there would be no significant impact on marine mammals as a result of the No Action Alternative.

4.6.2.4 Bald and Golden Eagles

Alternative 1

Construction. Given the historical occurrence of bald eagles in the vicinity of NAS Whidbey Island, there is the potential for bald eagles to be in the general vicinity of the proposed area. However, no bald eagles are likely to be present within the immediate proposed construction area because of the absence of preferred foraging or nesting habitat. In addition, a take permit as authorized under the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978) is not applicable. Therefore, construction activities under Alternative 1 would not impact bald and golden eagles near NAS Whidbey Island, and under NEPA, there would be no significant impact.

Operation. Alternative 1 proposes a 2.7% increase in the number of EA-18G Growler flight operations at Ault Field. A study by Grubb and King (1991) on the reactions of bald eagles to human disturbances showed that pedestrians and helicopters elicited far greater responses than aircraft. Ellis et al. (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 300 feet, rather than the noise level.

Based on bald eagle response to human disturbances and the slight decrease in noise of the EA-18G, aircraft operations under Alternative 1 would not impact bald and golden eagles, and under NEPA there would be no significant impact.

Alternatives 2 and 3

Construction. Construction activities under Alternatives 2 and 3 would be similar to Alternative 1. Therefore, construction activities under these alternatives would not impact bald and golden eagles near NAS Whidbey Island; therefore, under NEPA there would be no significant impact.

Operation. Under Alternatives 2 and 3, the proposed transition of the Expeditionary VAQ squadrons at NAS Whidbey Island would increase the total number of annual EA-18G Growler flight operations at Ault Field by approximately 3.1%, an increase in operations similar to the increase under Alternative 1. Therefore, based on bald eagle response to human disturbances and the slight decrease in noise of the EA-18G, aircraft operations under Alternatives 2 and 3, as compared with the baseline, would not impact bald and golden eagles; therefore, under NEPA there would be no significant impact.

No Action Alternative

Under the No Action Alternative, no additional facilities would be constructed, and current flight operations at the station would not change; therefore, under NEPA there would be no significant impact on bald and golden eagles.

4.6.2.5 Migratory Birds

Alternative 1

As discussed in Section 3.6.4, routine operation and maintenance of the EA-18G Growler at Ault Field and proposed construction of support infrastructure are not exempt from the take prohibitions of the MBTA (see Rule 72, *Federal Register* 56926). The paved surfaces and maintained lawn and landscaped areas that would be affected by the proposed construction under Alternative 1 would not support a high diversity or abundance of birds. While the proposed new construction would disturb approximately 0.2 acre of habitat potentially used by various species of neotropical migratory songbirds, removal of this habitat would not impact migratory bird species populations at the station, considering the availability of remaining suitable habitat. Furthermore, no direct mortality of migratory birds would result from construction because birds would be expected to relocate to other areas of suitable habitat during construction. The NAS

Whidbey Island BASH Plan provides project and operations guidance to aid in MBTA compliance. Based on the availability of remaining suitable habitat, removal of habitat due to construction under Alternative 1 would not impact migratory birds at NAS Whidbey Island. In addition, noise levels under Alternative 1 would decrease slightly and would therefore have no significant impact on migratory bird species under NEPA.

Alternatives 2 and 3

Construction. Construction activities under Alternatives 2 and 3 would be similar to Alternative 1. Therefore, construction activities under these alternatives would not impact migratory bird species near NAS Whidbey Island; therefore, there would be no significant impact under NEPA.

Operation. Under Alternatives 2 and 3, the proposed transition of the Expeditionary VAQ squadrons at NAS Whidbey Island would increase the total number of annual EA-18G Growler flight operations at Ault Field by approximately 3.1%, an increase in operations similar to the increase under Alternative 1. Therefore, based on migratory bird species response to human disturbances and the slight decrease in noise of the EA-18G, aircraft operations under Alternatives 2 and 3, as compared with the baseline, would not have a significant impact on these species under NEPA.

No Action Alternative

Under the No Action Alternative, no additional facilities would be constructed, and current aviation activities at the station would continue unchanged. Therefore, no significant impact on migratory bird species is anticipated under NEPA.

4.6.3 Bird/Aircraft Strike Hazard

Alternative 1

Alternative 1 would not create attractants, such as diverse habitat structure, that would have the potential to increase the concentration of birds in the vicinity of Ault Field. (Potential bird species susceptible to strike in the vicinity of Ault Field are described in Section 3.6.4).

Considering the minor increase (2.7% under Alternative 1) in annual air operations and utilization of existing flight tracks, a minor increase in the BASH risk would occur at NAS Whidbey Island. With the minor increase in air operations, there would be a potential for increased bird strikes of one to two birds a year under Alternative 1. This increase would be offset by the strike mitigation/BASH plans implemented at NAS Whidbey Island. The

implementation of BASH measures would decrease any significant increase of strike hazards or impact of such hazards on birds and, therefore, would not be a significant impact.

Alternatives 2 and 3

Similar to Alternative 1, Alternatives 2 and 3 would not create attractants for birds and would only result in a minor increase (3.1%) in annual air operations. With ongoing BASH mitigations measures implemented, environmental consequences under Alternatives 2 and 3 would be the same as baseline conditions. Therefore, there would be no significant increase of or significant impact on strike hazards or impact of such hazards on birds.

No Action Alternative

Under the No Action Alternative, no additional facilities would be constructed, and current aviation operations at the station would continue unchanged; therefore, no changes in and no significant impact on BASH risk would occur

4.7 Cultural Resources

4.7.1 Architectural Resources

Alternative 1

Use of existing facilities and functions with minor internal modifications or renovations under Alternative 1 would not impact cultural resources at NAS Whidbey Island. The airfield facilities that would be modified or renovated are not listed on the NRHP, nor are they considered potentially eligible for listing on the NRHP (Hardlines Design Company 2010). Six structures at NAS Whidbey Island have been determined to be NRHP-eligible: Buildings 118, 112, 386, 410, 457, and 458.

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB there is the possibility of vibration (Wyle 2012). While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds above 130 dB lasting more than one second are potentially damaging to structural components (Wyle 2012). A study, directed specifically at the effects of low-altitude, high-speed aircraft on structures showed that there is little probability of structural damage occurring as a result of such operations (Wyle 2012). As noted above, there

would be no instances of aircraft sound levels exceeding or reaching 130 dB with replacement of the EA-6B with the EA-18G. In fact, future sound levels would be lower with replacement of the EA-6B.

The Navy initiated Section 106 consultation on June 18, 2012 with the Washington SHPO regarding Alternative 1 and its effects on historic properties at the NAS Whidbey Island (see Appendix B). In a letter dated July 3, 2012, responding to the Navy's request for consultation, the Washington SHPO concurred with the Navy's determination that the proposed Expeditionary VAQ squadron transition at NAS Whidbey Island under Alternative 1 would have no adverse effect on historical resources because none are located in or immediately adjacent to the APE (see Figure 2-1). Therefore, Alternative 1 would have no significant impact on historical resources.

Alternatives 2 and 3

Use of existing facilities and functions with minor internal modifications or renovations and future sound levels under Alternatives 2 and 3 would not impact cultural resources at NAS Whidbey Island for the same reasons described under Alternative 1. The Navy initiated Section 106 consultation on June 18, 2012 with the Washington SHPO regarding Alternatives 2 and 3 and their effects on historic properties at NAS Whidbey Island (see Appendix B). In a letter dated July 3, 2012, responding to the Navy's request for consultation, the Washington SHPO concurred with the Navy's determination for Alternatives 2 and 3. The Navy has determined that no historical resources are located in the APE. However, one NRHP-eligible historical resource, Hangar 5 (Building 386), is located outside of, but adjacent to, the APE and northwest of Hangar 12 (Building 2737). Hangar 5 was determined eligible for the NRHP under Criterion C (i.e., for its architectural design as the only example of a Miramar Hangar in Washington State).

The Navy concluded that Alternatives 2 and 3 would have no adverse effect on historical resources, specifically Hangar 5 (Building 386), because the setting of this building has not been identified as contributing to the significance of this building and because changes to the setting, which would be visible only from or in views of the rear of the hangar, would not affect those architectural design qualities that make it eligible for listing in the NRHP. Therefore, Alternatives 2 and 3 would have no significant impact on historical resources.

No Action Alternative

Under the No Action Alternative, there would be no changes to and no adverse effects on architectural resources at NAS Whidbey Island. Therefore, the No Action Alternative would have no significant impact on historical resources.

4.7.2 Archaeological Resources

Alternative 1

The APE for Alternative 1 is an area of construction in previously disturbed areas at Ault Field located in an area of NAS Whidbey Island that is not considered sensitive for archaeological resources. The Navy concluded the proposed Expeditionary VAQ squadron transition at NAS Whidbey Island would have no effect on archaeological resources. In case of an inadvertent discovery of Native American human remains and/or archaeological resources during construction, the Navy will notify the appropriate tribal governments and the state Department of Archaeology and Historic Preservation as to the treatment of the remains and/or archaeological resources per applicable laws. Because the APE is located entirely on the airfield the Navy determined there would be no significant impacts on tribal treaty resources, tribal rights, or Indian lands under Alternative 1; therefore, government-to-government consultation is not required. A letter was sent to the tribes on June 27, 2012, notifying them of the project and the Navy's effect determination (see Appendix B).

Alternatives 2 and 3

The APE for Alternatives 2 and 3 is the same as for Alternative 1 and is located in an area of NAS Whidbey Island that is not considered sensitive for archaeological resources. The Navy concluded that the proposed Expeditionary VAQ squadron transition at NAS Whidbey Island would have no effect on archaeological resources. In case of an inadvertent discovery of Native American human remains and/or archaeological resources during construction, the Navy will notify the appropriate tribal governments and the state Department of Archaeology and Historic Preservation as to the treatment of the remains and/or archaeological resources per applicable laws. The Navy determined there would be no significant impacts on tribal treaty resources, tribal rights, or Indian lands under Alternatives 2 and 3; therefore, government-to-government consultation is not required. A letter was sent to the tribes on June 27, 2012, notifying them of the project and of the Navy's effect determination (see Appendix B).

No Action Alternative

Under the No Action Alternative, there would be no effect on archaeological resources. Therefore, the No Action Alternative would have no significant impact on archaeological resources.

4.8 Water Resources

4.8.1 Surface Water

Alternative 1

As noted in Section 3.8.1, because no surface waterbodies are located in the proposed project area, the construction, demolition, and renovation projects under Alternative 1 would not directly impact surface waters. Sediments could be eroded from exposed ground, or fuels or other chemicals could potentially be released during construction, which could indirectly impact surface waters. However, these potential impacts would be minimized or avoided by incorporating BMPs for erosion and sediment control during ground-disturbing activities, which would prevent the uncontrolled discharge of sediments and associated pollutants.

Under Alternative 1, the addition to the flight simulator building (Building 2593) would create 0.2 acre of new impervious surface, which would generate approximately 123,800 gallons of stormwater runoff per year. The NAS Whidbey Island Public Works Department confirmed that this runoff would be contained on-site in existing and proposed retention facilities (Tyhuis 2012). No other new impervious surface would be created under Alternative 1.

The current NPDES permit for NAS Whidbey Island includes restrictions on the amount of stormwater that may be discharged to either the Strait of Juan de Fuca or Dugualla Bay. With the increase in the amount of impervious surface proposed under Alternative 1, it is expected that the additional stormwater runoff would be within the conditions of the existing NPDES permit and would not require a revision to the current permit (Tyhuis 2012). As a result, impacts on water quality from stormwater discharge would be highly localized, given the small amount of new impervious surface (less than 1 acre), implementation of on-site BMPs to reduce storm water runoff, use of existing stormwater detention facilities, and compliance with existing permit conditions. Thus, Alternative 1 would have no significant impact on surface water quality.

Alternatives 2 and 3

Construction, demolition, and renovation projects under Alternatives 2 and 3 would not directly impact surface waters. As noted under Alternative 1, potential impacts from the release

of sediments or fuels or other chemicals from the construction sites would be minimized or avoided by incorporating BMPs for erosion and sediment control during ground-disturbing activities. Alternatives 2 and 3 would create the same amount of new impervious surface that would be created under Alternative 1 (0.2 acre). As explained under Alternative 1, this small increase in impervious surface, coupled with implementation of on-site BMPs, use of existing stormwater detention facilities, and compliance with existing permit conditions, would minimize impacts on surface water quality. Thus, Alternatives 2 and 3 would have no significant impact on surface water quality.

No Action Alternative

The No Action Alternative would not change existing conditions; therefore, the No Action Alternative would have no significant impact on water quality.

4.8.2 Groundwater

Alternative 1

As the first of the three main aquifers, the shallow aquifer begins at approximately 20 feet bgs. None of the proposed construction and demolition activities under Alternative 1 would extend to a depth below the surface that would directly impact this underlying water table. Furthermore, recent geotechnical borings in the surrounding area suggest that the new impervious surface also would not impact groundwater in the area (Tyhuis 2012). Potential spills of fuels or other chemicals could occur during construction and/or demolition. However, the Navy would use BMPs, including spill prevention and immediate cleanup of spills, to prevent any infiltration of fuels or other chemicals into area groundwater resources in the unlikely event of a spill. Therefore, Alternative 1 would have no significant impact on groundwater resources.

Alternatives 2 and 3

Alternatives 2 and 3 would have no significant impact on groundwater resources for the same reasons described under Alternative 1.

No Action Alternative

Under the No Action Alternative, there would be no construction or demolition; therefore, the No Action Alternative would have no significant impact on groundwater resources.

4.8.3 Floodplains

Alternative 1

The FEMA Flood Insurance Rate Map indicates that the proposed construction areas under Alternative 1 are located outside of the 100-year floodplain (FEMA 2007). Furthermore, because of their locations, the proposed construction areas at NAS Whidbey Island are not prone to flooding from stormwater flow in the airfield ditch system. Therefore, there would be no significant impact on floodplains under Alternative 1.

Alternatives 2 and 3

The proposed construction areas under Alternatives 2 and 3, including the northeast end of Hangar 12, are located outside the 100-year floodplain and the area prone to flooding during periods of heavy stormwater flow (FEMA 2007). Therefore, there would be no significant impact on floodplains under Alternatives 2 and 3.

No Action Alternative

Under the No Action Alternative, there would be no changes in existing conditions; therefore, there would be no significant impact on floodplains.

4.9 Socioeconomics

Alternative 1

Under Alternative 1, construction projects undertaken to support the proposed action would have a short-term, beneficial impact on the regional economy because a large portion of the construction funds would be spent on labor and materials purchased in the region. As additional income is injected into the regional economy through expanded employment, procurement, and construction expenditures, employment and earnings would multiply. Every additional dollar spent on local contractors and suppliers to support the construction would stimulate the regional economy and create more employment and business opportunities.

However, because construction-related investments are considered one-time expenditures, these positive economic impacts would be short-term. Once these funds leave the regional economy through savings, taxes, or purchases of goods and services from outside the region, the positive effects would no longer be multiplied. Construction of the proposed Hangar 10 addition and the construction of the flight simulator building (Building 2593) addition would have a temporary beneficial impact on the local economy in the vicinity of NAS Whidbey Island,

primarily due to an increase in temporary employment during construction of the proposed facilities.

Over the long-term, Alternative 1 would result in a small increase in the number of personnel at the air station when compared to the population of the City of Oak Harbor and Island County, which would generate a proportionate increase in payroll. This small, long-term increase in payroll, although beneficial, would not be expected to impact the overall regional economy. Therefore, this minor change in the number of personnel employed at the air station or on the air station's payroll would not have significant negative impacts on the regional economy under Alternative 1.

The environmental justice analysis focuses on the potential for a disproportionately high and adverse exposure of minority, low-income, and child populations projected to occur from aircraft noise associated with the alternatives. The noise contours for Alternative 1 are similar, but slightly smaller than the contours for Alternatives 2 and 3. The difference between the projected Alternative 1 noise contour and the projected Alternatives 2 and 3 noise contours would not be discernible when drawn on a map; therefore, the contours that represent the largest change in baseline conditions were used in this analysis. The greatest potential impact for the off-station area and estimated population within the projected 2014 DNL noise zones at NAS Whidbey Island would occur under Alternatives 2 and 3.

However, the area of the projected 2014 DNL noise zones would decrease under either Alternative 1 or Alternatives 2 and 3, compared to the baseline. Fewer people would be located in the projected noise zones under Alternative 1, therefore, reducing the population potentially affected by noise. Because of the lesser population and land area within the ≥ 65 -dB DNL noise zone, Alternative 1 would not be expected to result in any disproportionately high and adverse impacts on minority, low-income, or child populations. Thus, there would be no significant impact.

Alternatives 2 and 3

Alternatives 2 and 3 would have short-term, beneficial impacts similar to those described under Alternative 1, resulting from the proposed construction, demolition, and renovation projects. Over the long-term, Alternatives 2 and 3 each would result in a small increase in the number of personnel at the air station when compared with the population of the City of Oak Harbor and Island County, which would generate a proportionate increase in payroll. This small,

long-term increase in payroll, although beneficial, is not expected to impact the overall regional economy.

Additionally, under Alternatives 2 and 3, NAS Whidbey Island would gain an additional 311 people, with 97 being selective reservists, who would work approximately seven days per month at the air station. It is assumed that most of these selective reservists already reside in the region and would commute to the air station. Because the selective reservists currently reside in the region, there would be a negligible change in regional spending as a result of the proposed action. The transition of the selective reservists to NAS Whidbey Island would have a slight positive impact on local spending on goods and services in Oak Harbor and Island County. Thus, Alternatives 2 and 3 would have no significant impact on the regional economy.

As discussed under Alternative 1, the area of the projected 2014 DNL noise zones would decrease under either Alternative 1 or Alternatives 2 and 3, compared to the baseline. Fewer people would be located in the projected noise zones under Alternatives 2 and 3; therefore, reducing the population potentially affected by noise. Because of the lesser population and land area within the ≥ 65 -dB DNL noise zone, Alternatives 2 and 3 would not be expected to result in any disproportionately high and adverse impacts on minority, low-income, or child populations. Thus there would be no significant impact.

No Action Alternative

The No Action Alternative would not involve any construction, demolition, or renovation projects or change the number of personnel employed at the air station or the air station's payroll. Thus, there would be no short- or long-term beneficial impacts on the overall regional economy under the No Action Alternative; existing economic conditions would remain unchanged. Therefore, the No Action Alternative would have no significant impact on the regional economy.

Under the No Action Alternative, there would be no change in the aircraft operating at NAS Whidbey Island and thus no change to the existing noise environment or the affected population within the ≥ 65 -dB DNL noise zone. Therefore, there would be no disproportionately high and adverse impacts on minority, low-income, or child populations. Thus there would be no significant impact.

4.10 Environmental Management

4.10.1 Hazardous Materials and Waste Management

Alternative 1

Under Alternative 1, transition of the Expeditionary VAQ squadrons and continued operation of these squadrons would not introduce any additional hazardous materials and/or waste streams that cannot be managed by existing hazardous material and waste management functions and facilities at NAS Whidbey Island. NAS Whidbey Island currently handles hazardous materials and hazardous waste associated with operation and maintenance of EA-6B Prowler aircraft and EA-18G Growler aircraft, and facilities or functions needed to handle EA-18G Growler equipment and associated materials and waste streams are already in place.

Proposed construction would be completed with the use of minimal quantities, if any, of potentially hazardous materials (e.g., paint, solvents). Spills of fuel, oil, or other chemicals from construction vehicles and equipment could occur during construction. Any spills will be immediately cleaned up following procedures in OPNAVINST 5100.23G, *Navy Safety and Occupational Health (SOH) Program Manual*, NAS Whidbey Island's *Spill Prevention, Control, Countermeasures Plan* and the air station's *Hazardous Waste Management Plan* (NAVFAC NW April 14, 2009) to minimize potential impacts on human health and the environment.

Vehicle repair and maintenance activities at NAS Whidbey Island are not projected to change with transitioning from EA-6B Prowler aircraft to EA-18G Growler aircraft. The EA-18G aircraft would be serviced using the same cleaners, coolants, paints, and other materials used to service the existing aircraft fleet. All hazardous wastes would continue to be collected, managed, and stored on-site in accordance with NAS Whidbey Island's Central Hazardous Waste 90-Day Accumulation Facility guidelines, which includes the following regulations:

- OPNAVINST 5100.23G, Navy Safety and Occupational Health (SOH) Program Manual
- WAC Chapter 296-62 Part I-1, Occupational Health Standards, Safety Standards for Carcinogens
- Washington State Dangerous Waste Regulations, WAC Chapter 173-303
- Toxic Substances Control Act of 1976 (40 CFR 761 and 40 CFR 763)
- 40 CFR 260-265, Hazardous Waste Management System.

Based on the above, Alternative 1 would have no significant impact on hazardous materials and waste management at NAS Whidbey Island.

Alternatives 2 and 3

Components of the hazardous materials and waste management procedures for the transition of the Expeditionary VAQ squadrons and continued operation of these squadrons under Alternatives 2 and 3 would be the same as described under Alternative 1. Proposed construction under Alternatives 2 and 3 would add a minor amount to the quantities of potentially hazardous materials currently handled by NAS Whidbey Island. Therefore, Alternatives 2 and 3 would have no significant impact on hazardous materials and waste management at NAS Whidbey Island.

No Action Alternative

Under the No Action Alternative, NAS Whidbey Island would continue to handle hazardous materials and hazardous waste associated with operation and maintenance of EA-6B Prowler aircraft and EA-18G Growler aircraft. The No Action Alternative would have no significant impact on hazardous materials and waste management at NAS Whidbey Island.

4.10.2 Installation Restoration Program Sites

Alternative 1

Alternative 1 would have no impact on ongoing remedial activities at NAS Whidbey Island. None of the proposed demolition or construction activities would require removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover near or within any IRP site; therefore, contaminated media are not likely to be encountered during implementation of Alternative 1. Because of this, Alternative 1 would have no significant impact on IRP sites.

Alternatives 2 and 3

Alternatives 2 and 3 would have no impact on ongoing remedial activities at NAS Whidbey Island. Likewise, contaminated media are not likely to be encountered during implementation of Alternatives 2 and 3, for the same reasons listed under Alternative 1. Therefore, Alternatives 2 and 3 would have no significant impact on IRP sites.

No Action Alternative

The No Action Alternative would not result in changes in ongoing remedial activities or IRP sites on NAS Whidbey Island and, therefore, would have no significant impact on IRP sites.