Final Environmental Assessment- Adaptively Manage Predation on Caspian Terns in the Lower Columbia River Estuary

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US Army Corps of Engineers ®
Portland District

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List of Acronyms

AMP	Adaptive Management Plan
BiOp	Biological Opinion
BRNW	Bird Research Northwest
CORPS	United States Army Corps of Engineers
CRFM	Columbia River Fish Mitigation
CRITFC	Columbia River Inter-Tribal Fish Commission
DPS	Distinct Population Segment
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FCRPS BiOp	Federal Columbia River Power System Biological Opinion
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	NOAA's National Marine Fisheries Service
PFMC	Pacific Fishery Management Council
RM	River Mile
RM 5	River Mile 5 (East Sand Island)
RM 26	River Mile 26 (Willamette Falls)
RM 146	River Mile 146 (Bonneville Dam)
RPA	Reasonable and Prudent Alternative
USFWS	United States Fish and Wildlife Service
WRDA	Water Resource Development Act

Glossary of Terms

Anadromous. Describes fish that migrate from the sea to fresh water to spawn (breed).

Dredged material. Any excavated material from waterways.

Estuary. The wide part of a river where it nears the sea; fresh and salt water mix.

Foraging range. The area where an animal searches for food and provisions.

Habitat. The type of environment in which an organism or group normally lives or occurs.

Hazing. Any method, lethal or non-lethal designed to make an area unsuitable or undesirable for birds

Nest Site Fidelity. Commitment to a nest site or colony.

Out-migrating. Juvenile fish migrating out of their native rivers or streams on their way to ocean waters.

Pacific Region. The area birds migrate to for nesting, roosting and wintering. It is within the breeding range of the Western Population of Caspian terns.

Pelagic. Of or pertaining to the ocean; applied especially to animals that live at the surface of the ocean, away from the coast.

Piscivorous. Fish-eating.

PIT tags. Passive Integrated Transponder. Very small (12 mm by 2.1 mm) glass tube containing an antenna and an integrated circuit chip inserted into the juvenile fish's body cavity that remains inactive until activated at a PIT-tag monitoring facility.

Prospecting. To search for nesting habitat.

Productivity. The number of young raised per breeding pair.

Roosting. A place where birds regularly settle or congregate to rest at night.

Salmonid. Of, belonging to, or characteristic of the family Salmonidae, which includes the salmon, trout, whitefish and steelhead.

Smolts. Young salmon two or three years old, when it has acquired its silvery color.

Sub-yearling. A juvenile fish less than one year old.

Yearling. A fish that is one year old or has not completed its second year.

Chapter 1. Purpose of and Need for Action

1.1 Introduction

Since the late 1990's the U.S Army Corps of Engineers, Portland District (Corps) has been researching, monitoring and managing Caspian terns (*Hydroprogne caspia*) (also referred to as terns) on islands the Corps owns and/or uses to dispose of dredged material in the Columbia River Estuary. In 1999, the Corps began a project to socially attract the terns, using decoys and playing pre-recorded callbacks, from Rice Island to East Sand Island. East Sand Island is owned and managed by the Corps. This was done to decrease the numbers of juvenile salmon and steelhead consumed by the terns to meet the Corps' commitments made in consultation under the Endangered Species Act with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries).

Early studies on the diet of Caspian terns nesting on Rice Island indicated their consumption of juvenile salmonids was nearly two to three times higher when compared to a similar number of birds nesting on East Sand Island (Roby et al. 2002). Based on these studies, East Sand Island is generally considered to be the best location for piscivorous (fish-eating) waterbirds in the estuary in terms of their reduced impacts to juvenile salmon, because it is closer to the Pacific Ocean and contains a greater diversity of forage fish (anchovy, herring, etc.).

Figure 1. Vicinity Map of East Sand Island, Rice Island, Miller Sands Spit and Pillar Rock Island in the lower Columbia River Estuary. The Corps manages these islands for placement of dredged material

In 2000, the Corps was working to complete the project to socially attract the terns to East Sand Island and preclude nesting on Rice Island. This work was challenged under the National Environmental Policy Act (NEPA) by Seattle Audubon, National Audubon, American Bird Conservancy and Defenders of Wildlife. In 2002 the parties involved in the lawsuit reached a settlement agreement.

The 2002 settlement agreement allowed for the continuation of the efforts to socially attract the birds to East Sand Island but also required the Corps, U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries to develop an Environmental Impact Statement to develop a plan for managing the terns in the long term with the goal of reducing predation on juvenile salmonids. Subsequently, the three federal agencies (Corps, USFWS and NOAA Fisheries) completed the *Caspian Tern Management to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary Final Environmental Impact Statement* (USFWS 2005a) (also known as FEIS). The USFWS and Corps each issued their own record of decision (ROD) in 2006. These three documents are collectively referred to in this document as the Caspian Tern Plan.

1.1.1 Caspian Tern Plan

The Caspian Tern Plan called for redistribution (~ 60 percent) of the East Sand Island colony via construction of new habitat (islands) in Oregon, California and Washington. Reduction of habitat on East Sand Island would be contingent upon creation of the new islands at a 2:1 ratio. Because Caspian terns nested on an average of 4.4 acres from 2001 to 2004 on East Sand Island, approximately 6-7 acres of new habitat would need to be created to reduce the East Sand Island habitat from between 1 to 1.5 acres (USFWS, 2005). This acreage was selected because it was assumed it would be adequate to reduce the number of breeding pairs down to a range of 2,500- 3,125 and that a smaller Caspian tern colony on East Sand Island would achieve an overall increase in salmonids population growth rates (USFWS 2005a).

Table 2. Corps Constructed Islands from the Caspian Tern Plan

State and Site Name	Land Owner	Available Acreage Spring 2013	Estimated # of Nesting Pairs 2012*
OREGON			
Fern Ridge Lake, Lane County	Corps	1 acre	0
Summer Lake Wildlife Area, Lake County- Dutchy, Gold Dike and East Link	ODFW	(three) 0.5 acre islands	~14 at two islands (no success)
Crump Lake Lake County- Warner Valley	ODSL	1 acre	~115 (nesting success-50 young)
Sheepy Lake- Klamath Basin National Wildlife Refuge (NWR)	USFWS	0.8 acres (floating)	~200 (nesting success-140 young)
Orems Unit- Klamath Basin NWR	USFWS	1 acres (dry)	0
Malheur Lake, Harney County- NWR	USFWS	1 acre	~232 (nesting success-195 young)

California			
Tule Lake – Siskiyou County, Klamath Basin National Wildlife Refuge *	USFWS	2 acres- (dry in drought)	~207 (no success- due to predation)

***Source Data Draft Annual Report (Roby et al. 2013)**

Before the Corps' ROD was signed, plans for the creation of habitat in Washington State fell though, and a modified alternative was selected which involved constructing 7 acres of new habitat and ultimately reducing East Sand Island habitat to 1.5 to 2 acres. It was expected that reducing East Sand Island habitat by this amount would result in an estimated colony size of 3,125 to 4,375. Through identification and creation of new habitat, the acreage on East Sand Island could ultimately be reduced to 1 acre if other alternative sites are found, enhanced or created.

In 2008, implementation of the Caspian Tern Plan began. Over the last 4 years, the Corps has constructed 8.3 acres of new habitat, because some of the new islands have been unsuitable for nesting as they are dry during drought years, more habitat was created than was reduced on East Sand Island. In 2012, available habitat for the Caspian tern colony was reduced to 1.58 acres. Habitat reduction is accomplished by allowing vegetation to grow in naturally. Every year the designated colony area (Figure 2) is prepared to create suitable habitat by tilling the soil and removing the encroaching vegetation to achieve the desired habitat for the birds. Implementation of the plan called for the USFWS monitor the tern's regional population to ensure the conservation goals of Caspian terns are being met.

Figure 2. Caspian Tern Colony on the eastern portion of East Sand Island, 2012. Silt fence in vegetated area shows former areas of the colony (Photo Credit-BRNW)

The Corps' 2006 ROD was incorporated into the 2008 Federal Columbia River Power System (FCRPS) Biological Opinion as reasonable and prudent alternatives. This requires the Corps to monitor and report (to NOAA Fisheries) the number of acreage available and breeding pairs on East Sand Island, the newly constructed islands and report on the consumption rates on juvenile salmonids at East Sand Island.

1.1.2 Caspian Tern Adaptive Management Team

Recognizing the difficult and often unpredictable situation of trying to manage the largest colony of Caspian terns in the world, the Caspian Tern Plan called for an adaptive management plan. In 2012 an inter-agency adaptive management team (AMT) began meeting to discuss the effectiveness of the plan and to make recommendations to the Corps on taking new courses of actions. These recommendations are based upon the response Caspian terns are having to management efforts. Members of the AMT include USFWS, NOAA Fisheries, Corps and the Bonneville Power Administration (BPA). BPA funds the monitoring of the terns on East Sand Island.

Predictions were made in the Caspian Tern Plan on how many nesting pairs would occupy a reduced habitat of 1.5 to 2 acres. Based on previous nesting densities on East Sand Island and Rice Island, it was expected that the 1 to 1.5 acres would be adequate to provide for a colony range of 3,125 to 4,375 breeding pairs (Corps, 2006). It was also believed that the proposed acreage and associated colony size would be suitable to encourage social attraction and prevent colony abandonment (USFWS 2005a).

During implementation of the Caspian Tern Plan, the response from Caspian terns was somewhat unexpected, particularly in how many nesting pairs occupy available habitat. In 2012, nesting density at the East Sand Island tern colony increased to 1.06 nests per square meter which is the highest nesting density ever observed at this colony (Roby et al. 2013). In 2012 approximately 6,400 nesting pairs occupied the space that was intended for 3,125-4,375 pairs (Roby et al. 2013).

Caspian terns have also attempted (and have had limited success in nesting) on East Sand Island outside of the designated 1.58 acre colony area (Roby et al. 2013). Non-lethal hazing efforts (placement of flags to modify suitable habitat) has occurred on East Sand Island with the attempts to contain the colony to the designated and maintained area.

One factor not anticipated in the Caspian Tern Plan and is of immediate concern to the AMT is the impact native predators are having on the colony's productivity (number of young raised per breeding pair). For the last three nesting seasons (2010-2012), productivity for the colony has been at an all time low. In 2011 the colony did not produce a single fledgling (Figure 3).

The low productivity in 2011 and 2012 for the Caspian tern colony is attributed primarily to glaucous-winged/western gulls (*Larus spp.*), on the colony that consumes the tern eggs and chicks after bald eagles (*Haliaeetus leucocephalus)* flush the adults from the colony (Roby et al. 2013.). The threat of adult mortality, as in bald eagle disturbance, may cause immediate and permanent nest abandonment (Cuthbert 1988). Nest predation is considered to be a primary factor influencing Caspian tern production and nest-site fidelity (Cuthbert 1988; Danchin et al.1998; Strong et al.2004).

In 2012 the Corps lethally removed 50 glaucous-winged/western gulls under permit from the USFWS. The lethal removal of gulls began on May 5th 2012 and lasted until June 15th 2012. In spite of the efforts to remove predatory gulls, terns had very little reproductive success, raising only 400 young for the entire colony of 6,400 pairs. When the allowable number of gulls was removed in 2012, there was still a considerable amount of tern nest predation by gulls.

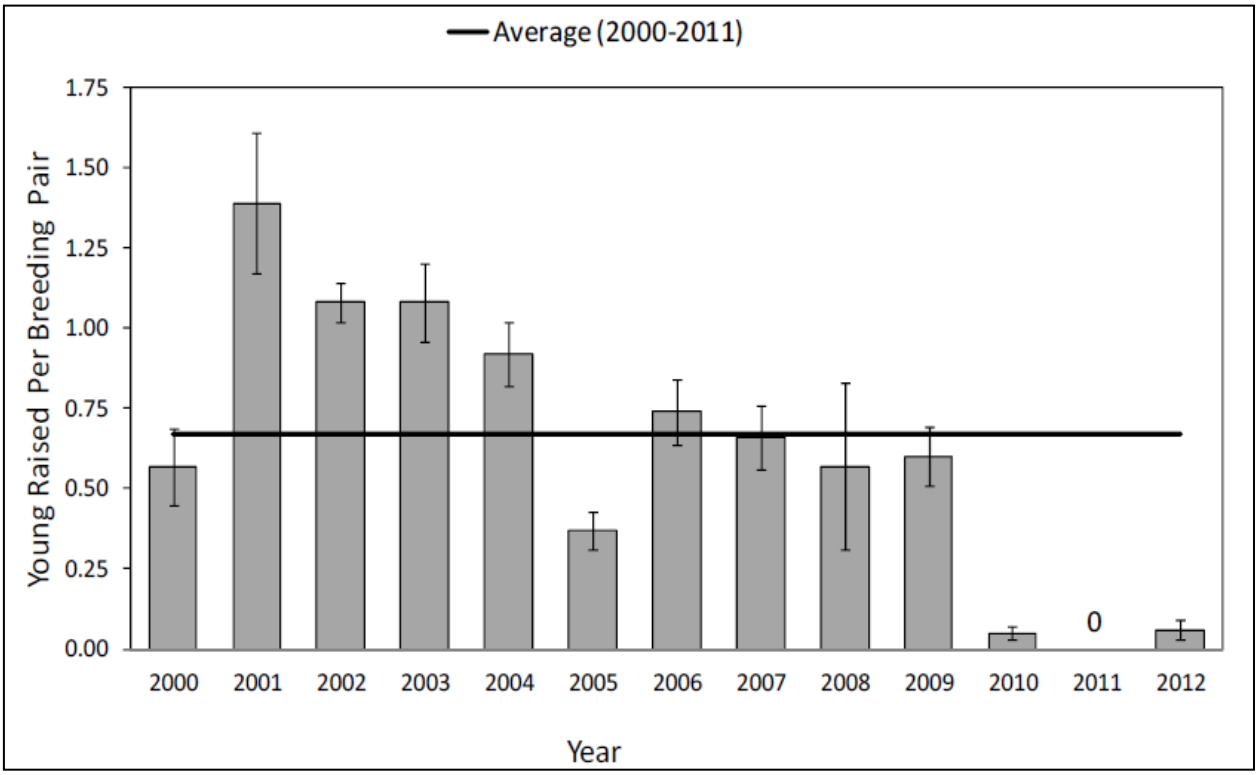

Figure 3. Number of Young Raised per Caspian Tern Breeding Pairs on East Sand Island (Roby et al. 2013)

1.1.3 Hazing Efforts on Rice Island, Miller Sands Spit and Pillar Rock Islands

To address concerns about the terns' potential to go upriver and consume greater numbers of salmon, the Caspian Tern Plan called for hazing at Rice Island, Miller Sands Spit and Pillar Rock Islands. The Corps uses these islands on a semi-regular basis to place dredged material thereby creating suitable habitat for the terns.

Recent efforts to haze the birds have only been necessary on Rice Island, as the birds have not exhibited nesting behavior on Miller Sands Spit or Pillar Rock Islands (Roby et al. 2012). However, Rice Island and Miller Sands Spit are the two most likely places Caspian terns may seek out for roosting or nesting as relatively recent placement of dredged material and clearing for that placement have created some suitable habitat (total area unknown). Caspian terns have used Rice Island and Miller Sands Spit for roosting/ foraging but their use of the islands in this way (as observed by monitors and hazers) has been limited to the mud flats on the beaches.

Placement of material on Miller Sands Spit occurs on annual or bi-annual basis and typically only on the shore where it erodes through natural process. In 2012, dredged material placed on Miller Sands Spit was contoured to establish mounds that were effective in making the newly created habitat less suitable for terns.

Methods used on Rice Island have primarily consisted of using silt fence and flagging to modify tern suitable habitat (Figure 4). Hazing efforts also include presence of human beings (hazers) to flush the birds away from the island. The Caspian Tern Plan also called for other measures to prevent terns from using these islands, such as establishing vegetation to make habitat unsuitable for the birds, using eagle kites, personnel with dogs and all terrain vehicles to cover the distances. These efforts begin April 1 and continue to June 15 each year (USFWS 2005a).

Figure 4. Wood stakes with rope and flagging used to modify suitable Caspian tern habitat on Rice Island. (Photo Credit Corps)

To assist in preventing the establishment of new tern colonies on Rice Island, Miller Sands Spit and Pillar Rock, the USFWS (per the Caspian Tern Plan) would issue a depredation permit annually to the Corps to collect eggs, should hazing with non-lethal methods fail to prevent tern

nesting. Since the implementation of the Caspian Tern Plan, a total of 10 eggs have been collected under permit, all from Rice Island. The Corps was issued a permit to collect 100 Caspian tern eggs each year from 2009 to 2012 and has applied for a renewal for 2013.

Periodic boat-based and aerial surveys of Rice Island, Miller Sands Spit and Pillar Rock Island are conducted annually during the breeding season in order to detect signs of nesting attempts by Caspian terns. In May of 2009, one year after implementation of the Caspian Tern Plan, approximately 520 Caspian terns were observed loafing on upland areas of Rice Island, and their observed behavior (courtship displays, exchange of courtship meals, copulations and digging of nest scrapes) indicated an intention to nest (Roby et al. 2010). Stakes and flagging were put out in these areas, and terns were successfully dissuaded from nesting. The following year in May, approximately 75 Caspian terns were observed in an upland area east of the old colony site on Rice Island and were again effectively hazed off the island by placing stakes and flagging on the island (Roby et al. 2011).

In April of 2011, Caspian terns appeared interested in nesting at two sites - on Rice Island near the former colony site that was used in the 1990s and on a pier at Tongue Point. Stakes and flagging were erected in the areas where terns were attempting to nest, and human hazers were on the island attempting to keep the birds off until June 15 when hazing ended. Caspian terns returned to Rice Island in late June and initiated nesting there. In July, 3 Caspian tern nests, with a total of 4 eggs, were discovered on Rice Island adjacent the old colony site and near areas that had previously been staked and flagged to prevent tern nesting. In August, approximately 460 adult Caspian terns (most were roosting) and 3 tern chicks were observed at the colony site on Rice Island (Roby et al. 2012). In 2012 efforts to dissuade terns from nesting on Rice Island were successful.

1.2 Purpose of and Need for Action

(New information emerged between the draft EA and final EA that influenced the decision making, see Appendix A, comments on purpose and need for additional information)

Purpose

The purpose of the proposed action is to prevent Caspian terns on East Sand Island from abandoning their designated colony during the 2013 nesting season and using nearby islands, specifically Rice Island and Miller Sands Spit for roosting and/or nesting, where their consumption of juvenile salmonids is known to be substantially higher.

Need

Nesting success peaked in 2001 and has been in decline since then (Roby et al. 2013). For three consecutive years reproductive success of the Caspian tern colony has been at zero or near zero productivity (less than 0.06 fledglings per pair). In 2010, 8,000 pairs produced approximately 500 young. In 2011 the colony experienced a total breeding failure, producing no young and in 2012 the colony produced only 400 fledglings (Roby et al. 2013). In the last few years there have been increasing instances where bald eagles fly over and flush the entire tern colony at dusk. Caspian terns are most vulnerable to this type of disturbance at dusk, during dim light and often will not return to their nest until the following day leaving their eggs and chicks susceptible to nest predation. Nest predation by gulls, especially during these disturbance events is considered to be a primary factor limiting productivity on the colony (Roby et al. 2013). It is expected based on 2011 and 2012 data that bald eagle colony disturbance and associate gull predation on tern eggs and chick will occur in 2013. The result would be the fourth year of zero to near zero tern productivity. This increases the likelihood of colony abandonment (Cuthbert 1988).

Predation on juvenile salmonids from avian predators is listed as one of the factors potentially limiting the recovery of: lower Columbia River Chinook, steelhead and coho; and Upper Willamette River Chinook and coho (NOAA, 2008). Studies on the diet of Caspian terns nesting on Rice Island indicated their consumption of juvenile salmonids doubled when compared to a similar sized colony nesting on East Sand Island (Roby et al. 2002). Based on this, there is a need to prevent the colony from abandoning East Sand Island and re-establishing a nesting colony on Rice Island or Miller Sands Spit, where suitable habitat is available.

Colonial waterbirds, like Caspian terns, tend to recruit to the previous year's most productive colonies and to emigrate from the least productive ones (Danchin, et al 1998). The likelihood of colony site abandonment increases with each year of poor reproductive success. The Caspian tern colony on East Sand Island is potentially entering its fourth consecutive year of low to nearly no nesting success on East Sand Island. Several studies suggest Caspian terns show a strong preference for a colony they have occupied before, unless their prior reproductive efforts were unsuccessful (Cuthbert, 1998). Because the colony has had little to no reproductive

success in the last three years, there is a need to address their potential to abandon the East Sand Island colony within the 2013 nesting season.

1.3 Lead Agency

U.S. Army Corps of Engineers, Portland District
The Corps is the lead agency for this draft environmental assessment (draft EA) under the National Environmental Policy Act (NEPA). As the lead agency, the Corps ensures overall compliance with all associated environmental laws and regulations regarding the proposed federal action. Statutory authority for the action comes from Section 906(b)(1) of the 1986 Water Resources Development Act, which specifically authorizes mitigation for adverse impacts from the operation of Corps facilities.

Funding comes from the Columbia River Fish Mitigation Program, which was set up to fund mitigation projects for the adverse impacts to salmonids from the Corps' operation of the hydroelectric dams within the Federal Columbia River Power System.

Chapter 2. Alternatives, Including the Proposed Action

2.1 Introduction

The following alternatives identify what types of management strategies the Corps could pursue to achieve the stated purpose and need.

2.2 Detailed Description of Alternatives

2.2.1 Alternative A – No Action

Under this alternative no actions would be taken to reduce the impacts the gulls are currently having on the Caspian tern colony. Existing hazing efforts as described in Chapter 1 would continue on Rice Island, Miller Sands Spit and Pillar Rock Islands, and these efforts would end as scheduled on June 15th. This time period was set to coincide with the end of the peak-nesting season for Caspian terns. Periodic boat-based and aerial surveys of these islands would continue to determine if terns are roosting or initiating nesting attempts. Monitoring of the East Sand Island colony will continue with field personnel observing the colony's behavior and productivity during the 2013 nesting season. Non-lethal hazing of terns on East Sand Island outside of the designated colony area would occur to prevent satellite colonies from forming.

2.2.2 Alternative B – Integrated Management of Gulls Using Non-Lethal and Lethal Methods (Proposed Action)

Alternative B relies on a combination of non-lethal and lethal methods to haze gulls away from the Caspian tern colony to prevent/minimize depredation on tern eggs and chicks. Decoys would be placed on the colony to socially attract the terns back to the colony and reduce the time they spend away from their nests and chicks. This alternative would allow personnel currently monitoring the colony to haze gulls with green laser lights, dispersing the gulls away from the colony before they begin depredating on Caspian tern eggs and chicks. Upon collection and if opportunity presents itself, carcasses would be used to create effigies (carcasses put on stakes) on the colony. This alternative would require approval from the USFWS for non-standard disposition of carcasses.

No additional infrastructure is needed to accommodate the shooters. The existing observation blinds (Figure 2 above) used to monitor the colony would be used to conduct the shooting. Shooters would travel via boats from the Port of Chinook, approximately 1 mile away and access the blinds travelling on foot. Shooters would use high-powered pellet guns with non-toxic solid copper pellets consistent with the standard permit condition for use of non-toxic shot 50 CFR 20.21(j).

Lethal removal of up to 150 glaucous-winged/western gulls would occur from between mid-May to no later than June 15th during the 2013-nesting season only. Lethal Removal of the gulls would occur only when productivity is low from mid-May to June 15th. Productivity is measured daily at twelve "productivity plots" on the colony. The productivity plots are located (in random distribution) within the 1.58 acres designated tern colony area. If productivity plots are not used by terns by mid-May, then additional plots may be delineated to maintain a represented sample of twelve. Productivity during the peak nesting period (even with some level of natural predation) is expected to be increasing throughout the peak-nesting season (May-June).

Lethal removal of gulls would only occur should the presence of bald eagles cause terns (both parents) to abandon their nests leaving eggs and chicks susceptible to predation by glaucous-winged/western gulls and these factors intensify such that the colony experiences negative productivity. Negative productivity (for the purposes of this action) is defined as a decline in the number of active nests containing live eggs and/or chicks for a period of three to four days consecutive days. Because productivity plots are monitored daily, documenting a negative trend in productivity during peak nesting season would indicate atypical population productivity.

In 2012 massive disturbance to the colony occurred during the first part of May, where a major loss in productivity caused near collapse of the colony. Lethal removal of gulls was undertaken to prevent total colony failure as experienced in 2011. The number of gulls (150) considered under Alternative B was recommended by the Caspian Tern AMT because it was determined to be the maximum number of gulls that would be necessary to remove in order to prevent complete colony failure during the nesting season.

2.2.3 Alternative C – Increase Hazing Efforts on Rice Island and Miller Sands Spit.

This alternative would implement the additional measures (use of dogs and all terrain vehicles) from the Caspian Tern Plan and increase the level of effort of ongoing hazing of the terns off of Rice Island and Miller Sands Spit. This alternative would only be necessary if terns on East Sand Island were to abandon the colony in large numbers and seek out Rice Island or Miller Sands Spit. The current efforts to haze terns off these islands would enable the Corps to determine if additional hazing is necessary. This alternative would extend the current Corps contract deadline from June 15 to August 1st to have continuous hazing on Rice Island Miller Sands Spit with increased number of hazers on hand to flush the birds from the islands, using dogs and all-terrain vehicles if necessary to cover the distance. Based on previous years of hazing on Rice Island and Miller Sands Spit, the tern's use of the island drops substantially by mid to late June.

Roosting on Rice Island occurs primarily from the mud flats on the beaches and a considerable distance from the other birds on the island, streaked horned larks and American white pelicans (white pelicans are only present on Miller Sands Spit. To minimize potential impact to nesting streaked horned larks and American white pelicans, personnel would survey the area to

determine if there were any active nests (nests with eggs or chicks) and if so, would stop hazing activities and coordinate with USFWS to determine if a buffer (keeping a certain distance) could be determined to avoid potential impacts or if hazing would need to stop entirely.

2.3 Comparison of Alternatives

The following is a comparison of the alternatives under consideration and their associated environmental impacts and estimated costs.

Table 1. Comparison of Alternatives

ACTIONS TAKEN UNDER EACH ALTERANTIVE			
	Alternative A **No Action**	**Alternative B- (Proposed Action)** **Integrated Management Non-Lethal and Lethal Gull Control on East Sand Island Caspian Tern Colony**	**Alternative C** **Increase Hazing Efforts on Rice Island and Miller Sands Spit**
Hazing	Yes, hazing of terns on East Sand Island outside of the designated colony to prevent satellite colonies. Hazing of terns off Rice Island, Miller Sands Spit and Pillar Rock Islands to June 15th.	In addition to Alternative A, hazing would occur to glaucous-winged/western gulls on East Sand Island. Use of decoys, green-light lasers and gull effigies.	In addition to Alternative A, Increased presence of human hazers, use of dogs and all-terrain vehicles to cover the distance on islands, extension of timeframe to August 1st
Lethal Removal of Gulls	No	Yes, up to 150 gulls beginning mid-May and ending June 15th	No
Caspian Tern Egg Collection	Yes, up to 100 Caspian tern eggs may be collected under permit at Rice Island, Miller Sands Spit and Pillar Rock Island only.	Yes, as described under Alternative A.	Yes, as described under Alternative A
Monitoring	Yes, ongoing monitoring is done as part of the Caspian Tern Plan. Monitors observe the colony through observation blinds.	Yes, as described under Alternative A	Yes, as described under Alternative A. Boat based and pedestrian surveys are done to determine if Caspian terns are exhibiting behavior that may lead to nesting.

ANTICIPATED ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES			
	Alternative A **No Action**	**Alternative B- (Proposed Action) Integrated Management Non-Lethal and Lethal Gull Control on East Sand Island Caspian Tern Colony**	**Alternative C** **Increase Hazing Efforts on Rice Island and Miller Sands Spit**
Caspian Terns	Colony experiences increased pressure from native predators, has little success for 4th consecutive year and may abandon East Sand Island colony in the 2013 nesting season for nearby islands (e.g. Rice Island or Miller Sands Spit).	Benefits to the colony from increased productivity. If number of fledglings per pair is sufficient to maintain colony fidelity, colony can be expected to continue to nest on East Sand Island. Terns may be slightly hazed or flushed by the use of pellet guns on their colony but pellet guns are considerably quieter than firearms and shooting is not expected to flush terns away.	Same as Alternative A, but temporary disturbance to terns if they are nesting or roosting on Rice Island or Miller Sands Spit. Terns may roost in greater numbers on Rice Island or Miller Sands Spit until habitat is available and they can be successful.
Gulls	No impact	Minor and temporary impact to glaucous-winged/western gulls, existing colony size is nearly 3,400 pairs. Therefore there would be no impacts to the overall populations.	Temporary disturbance to gulls that may be nearby during hazing efforts but hazing would concentrate on terns, and gulls would experience minor disruption if they are nearby.
Other Birds	No impact	No impacts are expected to other birds, as they are not on the colony and are geographically isolated from the colony where the action would take place. Use of non-toxic shot will mitigate potential effects to scavengers should they consume gull carcasses.	Temporary disturbance to other birds that may be nearby during hazing efforts. If other birds have active nests, hazing would cease in that area until a buffer could be established in consultation with USFWS. Hazing would concentrate on terns, and other birds would experience only minor disruption if they are nearby.

Juvenile Salmonids	If colony stays on East Sand Island consumption on juvenile salmonids would likely be similar to previous year's average of ~5 million, fluctuating dependent on other factors that influence predation (river flows and availability of other forage fish). If terns abandon the East Sand Island colony consumption on juvenile salmon could be higher dependent upon dispersal	Same as Alternative A	Similar to Alternative A, through successful hazing of terns off Rice and Miller Sands Spit may help reduce predation on juvenile salmonids if the terns stay nesting and roosting on East Sand Island.
ANTICIPATED COST OF ALTERNATIVES			
Contract	No new dollar cost- activities covered under existing contracts.	$10,000-$20,000- modifying existing contract.	$10,000-$15,000- modifying existing contract, or issue new contract.

2.4 Relationship to Federal, State and Local Policies and Plans

USACE- Columbia River Estuary Dredged Material Management Plan

The proposed action does not require a change or supplement to Corps planning documents. The Corps has a *Columbia River Estuary Dredged Material Management Plan* (2002) in which East Sand Island is identified as a possible location for placement of dredged material. East Sand Island is identified with two discrete sites with a total capacity for placement of dredged material of ~ 1,500,000 cubic yards. This plan precedes the Caspian Tern Plan, described in Chapter 1. The Corps Navigation Program has no plan to use East Sand Island for the placement of dredged material but does plan to use Rice Island, Miller Sands Spit and Pillar Rock Islands, see Section 3.3 for more information on reasonably foreseeable future actions.

Oregon Coastal Management Program- Clatsop County Comprehensive Plan

Congress enacted the Coastal Zone Management Act (CZMA) (16 U.S.C. 1451 et seq.) to protect the coastal environment from growing demands associated with development. In accordance with Section 304(a) of the Act, all federal lands, owned, leased, held in trust or whose use is otherwise subject solely to the discretion of the federal government are excluded from the coastal zone. However, if the federal agency conducts the action on federal lands, and the action does affect coastal uses or resources off of federal lands, then a state may review the action for consistency with the state's enforceable policies.

The state of Oregon has a federally approved coastal management program, which defines, through its land use planning process, enforceable policies that apply to activities proposed in a coastal zone. These policies are generally found in the statewide planning goals and the approved city or county comprehensive plan and implementing land use regulations. Federal agencies must follow the federal consistency provisions as delineated in 15 Code of Federal Regulations (CFR) Part 930.

2.5 Permits and Approvals Needed

The following permits or approvals are required prior to the implementation of the alternatives:

MIGRATORY BIRD DEPREDATION PERMIT Migratory Bird Treaty Act (MBTA) 50 CFR 21.41

A Federal Migratory Bird Depredation Permit from the USFWS is required to trap or kill migratory birds for depredation control purposes. The USFWS has statutory authority and responsibility for enforcing the Migratory Bird Treaty Act (MBTA) (16 United States Code or U.S.C. 703–711). A depredation permit can authorize lethal removal for the safety of the bird, human health and safety, protection of threatened/endangered species, and certain types of property damage No permit is required merely to scare or herd depredating migratory birds other than endangered or threatened species and bald or golden eagles. Conditions of the permit may require the integration of non-lethal techniques when implementing lethal measures. Lethal take is not to be the primary means of control. Active hazing, harassment or other non-lethal techniques must continue in conjunction with any lethal take of migratory birds.

Prior approval from Oregon Department of State Lands will be required to implement Alternative C.

Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

The affected environment chapter of a NEPA document should "…succinctly describe the environment of the area(s) to be affected by the alternatives under consideration…" (40 CFR 1502.15). The geographic scope of analysis for this draft EA is East Sand Island, and more specifically, the designated Caspian tern colony and the nearby Rice Island and Miller Sands Spit. Rice Island and Miller Sands Spit are the two most likely places Caspian terns may seek out for roosting or nesting as relatively recent placement of dredged material there has created some suitable habitat. The last placement of dredged material on Pillar Rock Island occurred in 2001.

This chapter also discusses the environment consequences (impacts) that may occur from implementing the three alternatives. Impacts may be *direct* (caused by the action, occurring at the same time and place), *indirect* (caused by the action, but is later in time or farther removed in distance but is reasonably foreseeable) or *cumulative*- impacts caused by the direct or indirect actions when combined with other past, present or reasonably foreseeable future actions. Impacts can be adverse or beneficial. Only those environmental resources that are likely to be affected (directly and indirectly) as a result of implementation are discussed in this section. Cumulative Impacts are discussed in Section 3.3.

3.2 Biological Environment

East Sand Island is in the state of Oregon (Clatsop County) near the mouth of the Columbia River, approximately one mile west of Chinook, WA and 10 miles northwest of Astoria, Oregon. The island, approximately 50 acres in size, was once connected to Sand Island, just to the northeast in Baker Bay. The islands have separated over time due to erosion. In 1954 the Island was transferred to the Corps for the Sand Island Channel Improvement Project.

Currently a variety of breeding seabirds and waterbirds overlap with the Caspian tern colony. Because of the large numbers and diversity of birds using the island, the American Bird Conservancy and the National Audubon Society recognize it as an Important Bird Area and Western Hemisphere Shorebird Reserve.

Miller Sands Spit and Rice Island are used regularly for placement of dredged material and are characterized by large expanses of bare sandy ground with areas of sparse grasses, forbs and small shrubs. These islands are a unique, almost desert-like habitat in the estuary (USFWS 2010). The lack of vegetation and relative absence of mammalian predators make the islands an

attractive nesting location for colonial waterbirds such as glaucous-winged/western gulls (hybrids), Caspian terns and pelicans and cormorants. Canada geese and streaked horned lark also nest on these islands (USFWS 2010). The off-channel edges of the islands slope into shrubby willows and cottonwoods near the water's edge and then into tidal marsh and shallow flats. These shallows attract large numbers of wintering ducks, as well as migrating shorebirds and juvenile salmonids (USFWS 2010).

3.2.1 Caspian Terns

The Caspian terns' migration to the lower Columbia River Estuary has dramatically changed distribution of the regional population in the Pacific Flyway. Caspian tern breeding was first documented in the Columbia River Estuary in 1984 when approximately 1,000 terns were reported nesting on fresh dredged material disposed on East Sand Island. Prior to 1984, the species was a non-breeding summer resident of the lower Columbia River. In 1986, possibly because of vegetation development on East Sand Island, the colony moved to Rice Island where they nested until the Corps took an action to relocate the terns via social attraction to East Sand Island.

The Caspian tern colony on East Sand Island is the largest of its kind in the world (Roby et al. 2013). Approximately 60% of the regional population currently resides on East Sand Island (M. McDowell, USFWS pers. comm). Caspian terns nest on the eastern end of the island, separated from the cormorant colony on the western portion of the island by dense upland shrub habitat. The number of adult terns on the East Sand Island colony peaks in mid-May, which corresponds to a peak period of migration for juvenile salmonids (many released from upriver hatcheries) through the estuary. A large number of terns use East Sand Island for nighttime roosting.

The number of breeding tern pairs on East Sand Island peaked in 2008 and has been trending downward (Figure 5). In the past three years, the colony has experienced very low nesting success. In 2011, the colony did not produce any young; this is the first time that a complete breeding failure has been recorded at this colony (Roby et al. 2012). The factors responsible for the decline in productivity and colony size is attributed to intense disturbance by bald eagles and associated gull predation on tern eggs and chicks. Climate conditions associated with a very strong La Niña and the resultant exceptionally high river flows also apparently contributed to the lack of nesting success through their effects on marine forage fish availability (Roby et al. 2012).

In 2012 the Corps lethally removed 50 glaucous-winged/western hybrid gulls under permit from the USFWS. The lethal removal began on May 5th and ended June 15th with a total of 50 gulls being removed (40 in May and 10 in June). In spite of the removal of predatory gulls in 2012, only 400 fledglings were raised by a colony of 6,400 breeding pairs.

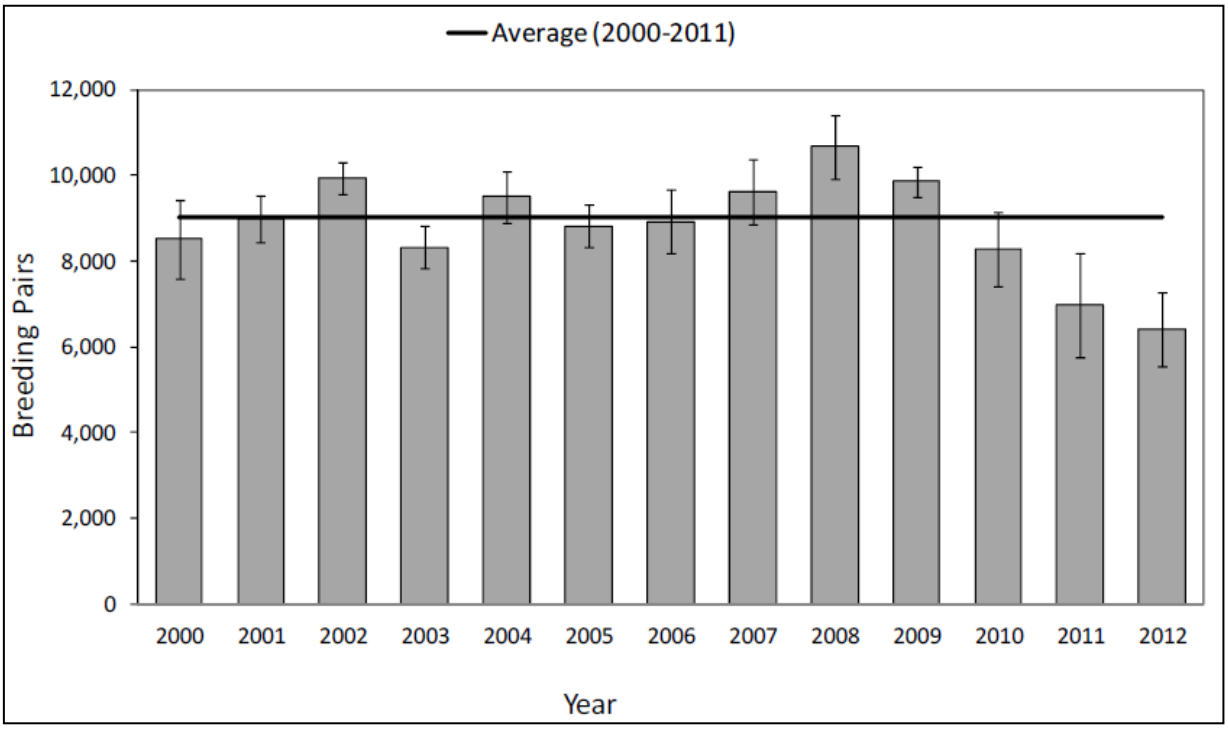

Figure 5. Number of Caspian Tern Breeding Pairs on the East Sand Island Colony (Roby et al. 2013)

3.2.2 Effects to Caspian Terns

The following identifies potential direct and indirect impacts resulting from the alternatives. For all alternatives, current monitoring efforts would continue and the results would be reported.

Alternative A- No Action

If no action would be taken and disturbances to the terns from bald eagles and subsequent eggs and chick mortality caused by gulls continue at the current rate, it is likely that for the fourth consecutive year, the productivity on the colony would be limited, and the colony may experience another season of low to no productivity. This would mean that the colony is no longer effectively reproducing at a rate that is replacing itself, somewhere around 0.32-0.74 fledglings per breeding pair (Suryan et al. 2004), and the colony would continue to decrease. Because the colony on East Sand Island comprises approximately 60% of the regional population, this decrease could lead to a decreasing regional population.

It is also possible that the birds may abandon the designated colony area and prospect for new nesting areas elsewhere on East Sand Island as they have attempted to do so in the last few years. The terns may also prospect for new nesting locations on Rice Island or Miller Sands Spit or leave estuary for other locations including the newly Corps constructed islands in southeast Oregon and northern California.

Alternative B- Integrated Management of Gulls using Non-Lethal and Lethal Methods (Proposed Action)

Access to the observation blinds by shooters would have no impact to the Caspian terns. Shooters would approach the colony by following the water's edge along the shore of the island. Above-ground tunnels (already in place) would allow for access to the blinds without disturbing the terns. Shooting would only occur when gulls are depredating on tern eggs and chicks.

Under this alternative it is anticipated that benefits to terns would be realized in increased nesting success and a colony that could be more productive under less pressure. Short term (several minutes) flushing of adult terns from the shooting gulls may occur, as was noted in 2012, but is not expected to be as long in 2013 because pellet guns are quieter than the .22 caliber rifle used in 2012. Should the colony experience increased productivity they may be less likely to abandon the East Sand Island colony either this year, or in subsequent years. Increased productivity for the terns would be a long-term benefit to the regional population.

Based on the response of Caspian terns in 2012 when the tern colony was experiencing frequent bald eagle disturbances, the terns appeared to be sensitive to shooting and the gull control was limited in order to avoid scaring terns off their nests. By using pellet guns, it is anticipated that shooting gulls will cause considerably less disturbance to terns on the colony.

Alternative C- Increase Hazing Efforts on Rice Island and Miller Sands Spit

Impacts would be similar to Alternative A. If terns do abandon the East Sand Island colony site this year and roost or attempt to nest on Rice Island or Miller Sands Spit, hazing would have to be constant and once the allowable egg take (100 eggs) was met, hazing would need to end in order to avoid any unauthorized take under the Migratory Bird Treaty Act. Increased hazing efforts on Rice Island and Miller Sands Spit would further disrupt the already stressed colony and potentially limit productivity for another year. Terns would experience lack of suitable nesting habitat until they disperse throughout their breeding range; or go through a population reduction.

3.2.3 Glaucous-Winged/Western Gulls

Glaucous-winged and western gulls (*Larus spp.*) are increasing throughout the Pacific Coast of North America with an estimated regional population is approximately 73,000 individuals (USFWS 2005b). A large gull colony is located on East Sand Island at the eastern end of the island near the tern colony. These gulls also have established colonies on Rice Island and Miller Sands Spit. In 2012, the population of glaucous-winged/western gulls on East Sand Island was estimated to be about 3,400 individuals (Roby et al. 2013). In 2012, the populations on Rice Island was estimated to be about 1,000 individuals and on Miller Sands Spit about 200-500 individuals. These numbers are similar to 2009 when a more comprehensive survey was conducted on their presence, with the exception of East Sand Island where approximately 6,200

adults were counted on the colony (Roby et al. 2012). These gulls are protected under the Migratory Bird Treaty Act.

3.2.4 Effects to Glaucous-Winged/Western Gulls

The following identifies potential direct and indirect impacts resulting from the alternatives

Alternative A- No Action

No impacts to glaucous-winged/western gulls are anticipated from this alternative. Monitoring of the gulls on islands in the lower Columbia River Estuary would continue, but this monitoring would be non-invasive and rely on boat based surveys and aerial photography.

Alternative B- Integrated Management of Gulls using Non-Lethal and Lethal Methods (Proposed Action)

This alternative would have direct adverse impacts to a small number of gulls (relative to their population). These impacts would be short term, occurring during the nesting season (May to August) and would be limited by the permitted number for lethal removal. Removal of 150 adult gulls would constitute about 0.04% of the local population on East Sand Island (3,400 individuals) and 0.002% of the regional population (73,000 individuals). Thus this level of removal would not adversely affect the existing gull populations, directly or indirectly. There would be temporary disturbance to gulls that may be nearby during hazing efforts and it is expected that gulls would flush from the area should they be in close proximity to the shot.

Alternative C- Increase Hazing Efforts on Rice Island and Miller Sands Spit

If glaucous-winged/ western gulls were in the vicinity of the increased hazing efforts - increased presence of humans, use of dogs and all-terrain vehicles, there would be minor and short term displacement to them during these events. The gulls are generally more adaptable, and it is expected that they may seek other locations to roost or nest. Therefore, there would be no long term adverse impacts.

3.2.5 Other Birds

Bald Eagles- (*Haliaeetus leucocephalus)*

The number of bald eagles in Oregon has risen dramatically in the past decade. In Oregon nesting pairs are up from approximately 20 pairs during the 1950s and 1960s to approximately 700-800 pairs in 2012. Observations of eagles near East Sand Island by research personnel have documented up to 20 individual bald eagles present on the island in a single day and harassing and killing gulls, terns and cormorants on the island (BRNW unpublished data). Bald Eagles were removed from the endangered species list in August 2007 because their populations recovered sufficiently. Bald and Golden eagles are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Brown Pelicans- (*Pelecanus occidentalis)*
East Sand Island is the largest known post-breeding nighttime roost site for brown pelicans, and the only known night roost for this species in the Columbia River estuary (Wright 2005). In 2012, the first brown pelicans were observed roosting on East Sand Island in March and their numbers peaked in late July at about 10,600 roosting birds (Roby et al. 2013). Breeding behavior has been observed by brown pelicans roosting on East Sand Island (i.e., courtship displays, nest-building, etc.) but there was has been no evidence of egg-laying by brown pelicans on East Sand Island (Roby et al. 2013). Brown pelicans were removed from the endangered species list in 2008 and are protected under the Migratory Bird Treaty Act.

Ring-billed Gulls- (*Larus delawarensis*)
Ring-billed gulls, which previously nested on Miller Sands Spit (Collis et al. 2002a), now nest on East Sand Island (1,500 adults counted on colony), and several hundred adults were counted on colony on the beaches on the western portion of Rice Island. The numbers of ring-billed gulls in the Lower Columbia River Estuary have increased since 1998; 2,550 ring-billed gulls were counted on colonies in the Columbia River estuary during a comprehensive count of the birds in the 2009 nesting season compared to less than 100 in 1998 (Collis et al. 2002a). These gulls are protected under the Migratory Bird Treaty Act.

Streaked Horned Larks- (*Eremophila aipestris strigata*)
The streaked horned lark, a candidate for listing as threatened under the Endangered Species Act (ESA), breeds and winters in Oregon and Washington and is associated with bare ground or sparsely vegetated habitats. Nesting streaked horned larks have been documented on Rice Island and Miller Sands Spit in the Columbia River estuary (Figures Pearson and Altman 2005, Pearson et al. 2005). The streaked horned lark nests on the ground in sparsely vegetated sites dominated by grasses and forbs. A key attribute of habitat used by larks is open landscape context (USFWS 2013). Because Rice Island and Miller Sands Spit have suitable habitat and are used by streaked horned larks, the USFWS has proposed both islands be designated as critical habitat for the larks. A final decision has not been made as of May 2013 on this proposed designation.

At East Sand Island, streaked horned larks have only occasionally been observed on the eastern end of the island, in the vicinity of the Caspian tern colony, but no nesting has been suspected or confirmed. The larks are commonly present at Rice Island and Miller Sands Spit. The placement of dredged material support the sparsely vegetated habitat preferred by streaked horned larks (Pearson and Hopey 2005). On Rice Island streaked horned larks have been observed nesting on the plateau region of the Corps dredged material at a higher elevation, several hundred feet above the beach area used by the few loafing Caspian terns that have occupied the island. The placement of dredged material has provided some benefit for the species. The easement the Corps has with the states of Oregon and Washington to place dredged material there has created some suitable habitat for the larks over the years and potentially limited human development. These islands are managed by the states and the USFWS who manages the portion of Miller Sands Spit that is in the Lewis and Clark National Wildlife Refuge.

American White Pelicans- (*Pelecanus erythrorhynchos*)
The first nesting record of American white pelicans in the Columbia River Estuary occurred at Miller Sands Spit during 2010. In 2010 and 2011 approximately 100 adults were counted on a colony in July. In 2012, the colony size was estimated to be 122 breeding pairs based on counts of attended nests visible on aerial photographs taken of the colony near the peak of the incubation period. While estimates of nesting success are unavailable, American white pelicans were successful in raising young at the Miller Sands Spit colony in 2010-2012. In April of 2013, approximately 120 American white pelicans have been observed nesting on Miller Sands Spit. American white pelicans are protected under the Migratory Bird Treaty Act.

Waterfowl-
Mallards (*Anas platyrhynchos*) and western Canada geese (*Branta canadensis moffitti)* are probably the most abundant breeding waterfowl on the islands in the Lower Columbia River Estuary (USFWS 2010). Non-breeding brant (*Branta bernicla*) are observed on East Sand Island during the summer. Nesting waterfowl mainly occur in vegetated areas on the east end of East Sand Island (USFWS 2010). Mallards, geese and brants are protected under the Migratory Bird Treaty Act.

3.2.6 Effects to Other Birds

The following identifies potential direct and indirect impacts resulting from the alternatives.

Alternative A- No Action
No impacts to other birds are anticipated from this alternative. Monitoring of the ring-billed gulls and American white pelicans on Miller Sands Spit in the lower Columbia River Estuary would continue, but this monitoring would be non-invasive relying on boat based surveys and aerial photography.

Alternative B- Integrated Management of Gulls using Non-Lethal and Lethal Methods (Proposed Action)
Access to the observation blinds would have no impact to the other birds listed above. Ring-billed gulls are the only species of bird on East Sand Island expected to be in close proximity of the Caspian tern colony. Shooters would approach the colony by following the water's edge along the shore of the island. Above-ground tunnels constructed (already in place) would allow for access to the blinds without disturbing nesting ring-billed gulls nearby.

Brown pelicans are present on the island but their numbers typically peak in August. On East Sand Island, brown pelicans utilize the southeastern beach portions just above high tide but away from the tern colony. Shooters would access the island on the northeastern portion of the island and use above ground tunnels to minimize the potential to disturb nearby nesting or roosting birds. For these reasons, brown pelicans may be temporarily flushed but there will be no long-term adverse impacts as a result of the proposed action.

Bald eagles are present on East Sand Island and do flush the tern colony, causing terns to leave their colony. Eagles may be hazed temporarily during the shooting and later on may scavenge the carcasses of the gull effigies but the use of non-toxic copper pellets is expected to prevent any short term or adverse or long-term impacts to eagles.

Alternative C- Increased Hazing Efforts at Rice Island and Miller Sands Spit
If other birds were in the vicinity of the increased hazing efforts, the increased presence of humans, use of dogs and all-terrain vehicles would result in a minor and short term displacement to them during these events. Currently only 0.5 acres of habitat suitable for terns on Rice Island is staked with flags to deter nesting. Terns primarily roost on the mud flats/beach areas of Rice Island and Miller Sands Spit and a considerable distance from streaked horned larks and American white pelicans.

Over the past three years, streaked horned larks nest have only been observed on the upper plateau area on the dredged material area, considerably higher than the mud flats along the beaches of Rice Island. American white pelicans are only present on Miller Sands Spit and to date there is little evidence to support a migration of terns to Miller Sands Spit so increased hazing is not expected to be needed. To minimize potential impact to nesting streaked horned larks or American white pelicans, personnel would survey the area to determine if there were any active nests (nests with eggs or chicks) and if so, would stop hazing activities and coordinate with USFWS to determine if a buffer (keeping a certain distance) could be determined to avoid potential impacts or if hazing would need to stop entirely.

3.2.7 Columbia River Basin Juvenile Salmonids

There are five species of Pacific salmon and steelhead (sockeye, chum, Chinook and coho salmon, and steelhead trout) referred to in this document as the Columbia River Basin salmonids, which use the lower Columbia River Estuary in their life cycle. They are listed under the Endangered Species Act (Table 2). The juvenile salmonids migrate through the Columbia River estuary to the Pacific Ocean with peak migration of juveniles in the lower estuary from April to July, coinciding with the nesting season of piscivorous birds on East Sand Island (USFWS 2005a).

Caspian tern consumption of juvenile salmonids is well documented in the Columbia River Estuary. Predation on juvenile salmonids from avian predators is listed as one of the factors potentially limiting the recovery of Lower Columbia River Chinook, steelhead and coho and Upper Willamette River Chinook and coho (NOAA, 2008).

Table 3 Thirteen ESA-listed Columbia River Basin salmonid ESUs

Species, Evolutionarily Significant Unit (ESU)	Status	Juvenile Migration Strategy*
CHINOOK		
Upper Columbia River Spring-run	Endangered	Yearling
Lower Columbia River	Threatened	Sub-yearling
Upper Willamette River	Threatened	Yearling
Snake River Spring/Summer-run	Threatened	Yearling
Snake River Fall-run	Threatened	Sub-yearling
COHO		
Lower Columbia River	Threatened	Yearling
CHUM		
Columbia River	Threatened	Sub-yearling
SOCKEYE		
Snake River	Endangered	Yearling
STEELHEAD		
Upper Columbia River	Threatened	Yearling
Middle Columbia River	Threatened	Yearling
Lower Columbia River	Threatened	Yearling
Snake River	Threatened	Yearling
Upper Willamette River	Threatened	Yearling

Despite failure to produce fledglings, Caspian terns nesting at the East Sand Island colony consumed about 4.8 million juvenile salmonids in 2011 (Roby et al. 2012). In 2012 it was estimated that the total juvenile salmonid consumption by Caspian terns nesting on East Sand Island was 4.9 million, this number is slightly below the average of the previous 12 years for the second consecutive year (Roby et al. 2013).

From 2000 to 2011, the average number of juvenile salmonids consumed by Caspian terns nesting on East Sand Island was 5.3 million per year. One possible cause of this static consumption rate is that failed breeders (those who have lost eggs or chicks) stay in the estuary and use East Sand Island for roosting. While consumption rates on East Sand Island have been relatively static over the past five years, it is important to note that it is still less than half the annual consumption of juvenile salmonids by Caspian terns in the Columbia River estuary prior to 2000, when the breeding colony was located on Rice Island in the upper Columbia River estuary.

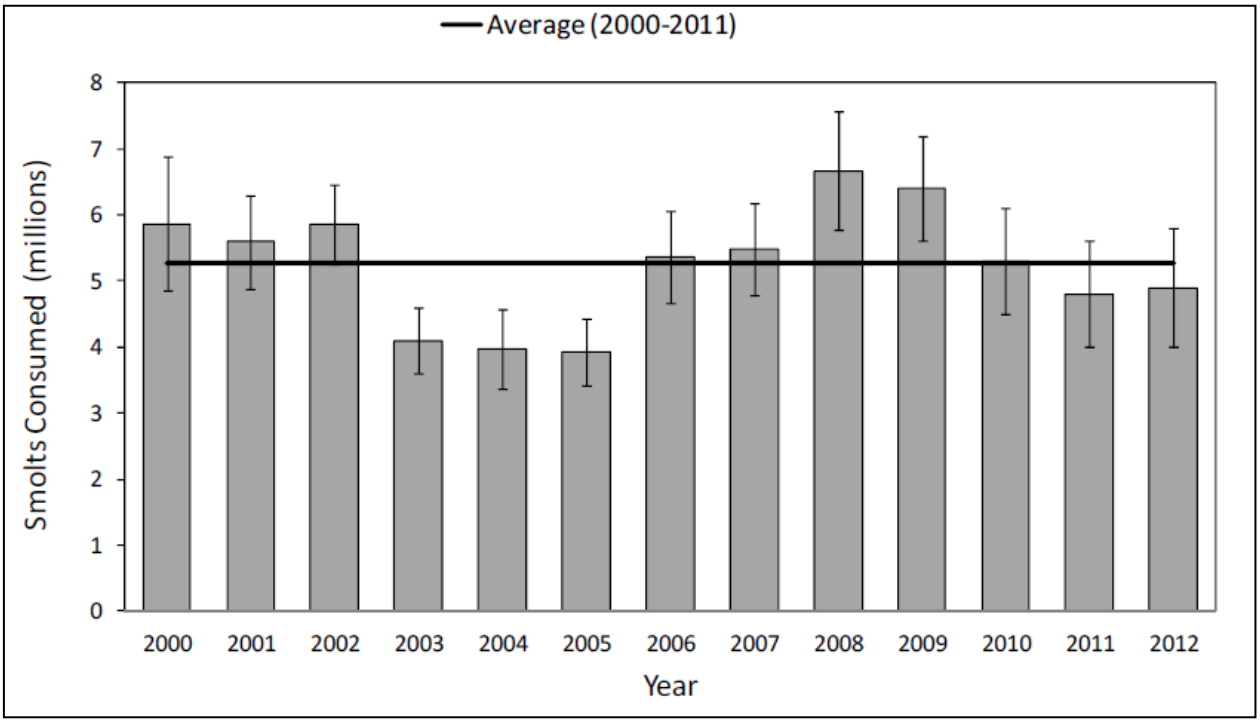

Figure 6. Estimated total annual consumption of juvenile salmonids by Caspian terns nesting on East Sand Island in the Columbia River estuary during the 2000-2012 breeding seasons (Roby et al. 2013)

Of the 4.9 million juvenile salmonids consumed by Caspian terns in 2012, it was estimated that 1.6 million were coho, 0.9 million were steelhead, 1.3 million were sub-yearling Chinook, 1.0 million were yearling Chinook, and 0.02 million were sockeye (Roby et al. 2013). Juvenile salmonids continued to be a large part of the diet of Caspian terns nesting on East Sand Island (Figure 7), comprising 36% of the diet (percent of prey items) in 2011, somewhat higher than the average during 2000-2010 (30%).

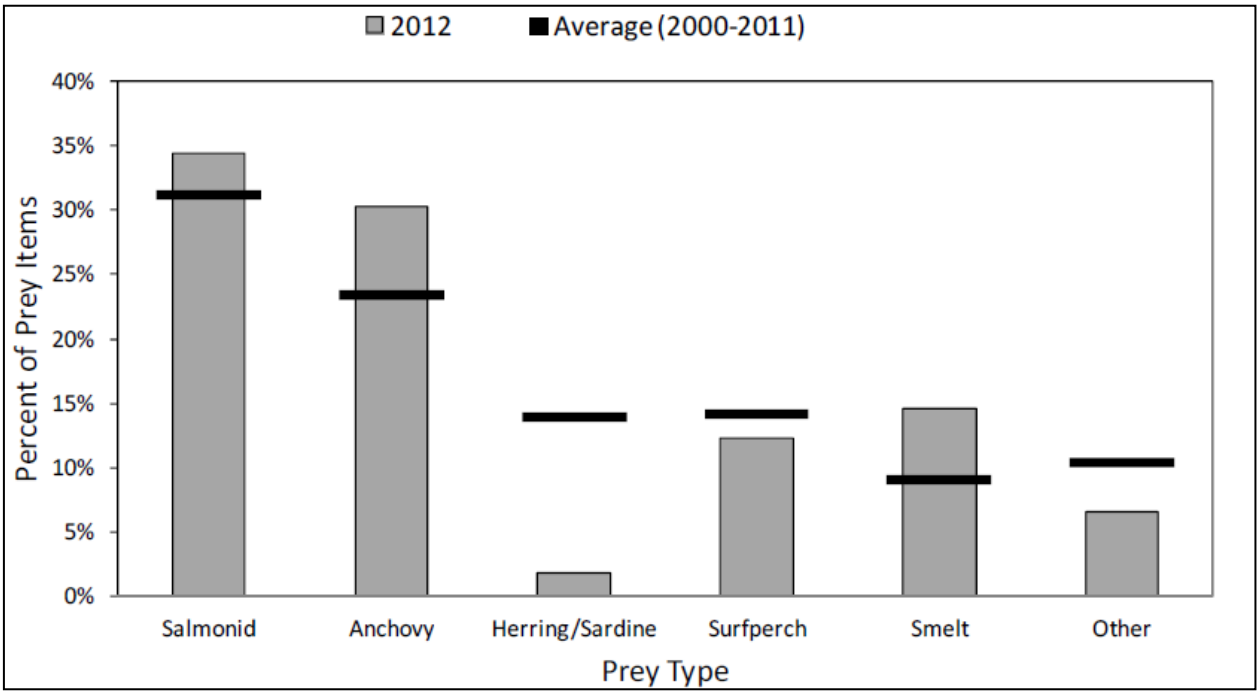

Figure 7. Diet composition of Caspian terns nesting on East Sand Island in the Columbia River estuary during the 2012 breeding season

3.2.8 Effects to Columbia River Basin Juveniles Salmonids

The following identifies potential direct and indirect impacts resulting from the alternatives.

Alternative A- No Action

Should no action be taken to minimize the potential for the tern colony to abandon the East Sand Island colony, it is likely (based on previous years of poor productivity and continued return to the East Sand Island colony) that the tern colony will continue to utilize (either for breeding attempts or roosting) East Sand Island during the 2013 nesting season in spite of pressure from native predators.

Because non-breeding terns continue to utilize East Sand Island their consumption of juvenile salmonids would likely be similar to previous years' average of approximately 5 million, fluctuating dependent upon the other factors influencing predation (river flows and availability of other forage fish). It is also possible that the downward trend of breeding pairs using East Sand Island will continue to decline with each passing year of poor productivity and that consumption of juvenile salmonids could decrease in the long term.

If terns do abandon the colony at some point during the 2013 nesting season, the potential effects on juvenile salmonids is unknown although it can be expected that consumption would be higher if terns overwhelm the current hazing efforts on Rice Island or Miller Sands Spit and establish a colony.

Alternative B- Integrated Management of Gulls using Non-Lethal and Lethal Methods (Proposed Action)
Impacts similar to Alternative A

Alternative C- Alternative C- Increased Hazing Efforts at Rice Island and Miller Sands Spit
Impacts similar to Alternative A however if increased hazing on Rice Island and Miller Sands Spit preclude roosting/foraging from these islands, impacts to juvenile salmonids may decrease slightly as the majority of terns will be confined to utilize East Sand Island for nesting or roosting.

3.3 Cumulative Impacts

Cumulative impacts result from the incremental impact of the action when added to other past, present (Table 4) and reasonably foreseeable future actions (Table 5), regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

Past Actions
The Council on Environmental Quality (CEQ) issued a memorandum on June 24, 2005 regarding analysis of past actions. This memorandum states, "…agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." Thus this section characterizes the existing conditions of the affected resources, identifies the present and reasonably foreseeable future actions that could affect those resources, discusses how the direct and indirect effects from the alternatives considered in this document may contribute to impacts from present and reasonably foreseeable future actions. The temporal scale for this assessment was developed by considering how the resources will be affected by the aggregate of all the actions combined. The geographic scale for this assessment is the Lower Columbia River Estuary; the rationale for this geographic scale is discussed below.

Lower Columbia River Estuary-
The Lower Columbia River Estuary (from the mouth of the Columbia River to the upper estuary islands (Rice and Miller Sands) is a logical geographic scope for a discussion of cumulative impacts because of the great diversity and available habitat for the avian species addressed in Section 3.2.6. The lower Columbia River Estuary is the primary nesting/roosting area for approximately 60% of the regional population of Caspian terns as well as home to large numbers of nesting/ roosting gulls, proposed critical habitat for streaked horned larks, the largest known roost site for brown pelicans and home to increasing numbers of bald eagles. The lower estuary is also a critical rearing habitat for juvenile salmonids as they transition from freshwater to saltwater.

East Sand Island- This Island has been in federal ownership since 1863 when the military occupied the lands for training and defense purposes. As that time it was connected to the larger Sand Island. Because of the diversity of birds on the island the National Audubon Society and American Bird Conservancy recognize it as an Important Bird Area and Western Hemisphere Shorebird Reserve. In 2012 the Corps lethally removed 50 glaucous-winged/western hybrid gulls under permit from the USFWS beginning May 5th and ending June 15th. 40 gulls were removed in May and 10 gulls were removed in June.

Rice Island – Rice Island is under state ownership but was created by placement of dredged material the Corps has placed on it over numerous years. The northwestern portion of the island is in the state of Washington and is managed by the state. The southeastern portion is in the state of Oregon and managed by the state. People use the island recreationally, and some people bring all terrain vehicles out to the island and ride on the dredged material. The USFWS has proposed designating Rice Island as critical habitat for streak-horned larks.

Miller Sands Spit- Miller Sands Spit is under state and federal ownership. The island is located in the state of Oregon and the lower portion is under USFWS jurisdiction as part of the Lewis and Clark National Wildlife Refuge (USFWS 2010). In 2010, the refuge finalized a Comprehensive Conservation Plan which identified the management strategy for the Lewis and Clark National Wildlife Refuge. The area on Miller Sands Spit managed by the USFWS as part of the Lewis and Clark Wildlife Refuge is closed to waterfowl hunting. Public entry on the island is limited to foot traffic only. The USFWS has proposed designating Miller Sands Spit as critical habitat for streak-horned larks.

Table 4. Present Actions in the Lower Columbia River Estuary

Present Actions	Potential Effect of Action to Resources Identified in Chapter 3
In 2013 the Corps, BPA and Navy are funding research and monitoring of Caspian terns and cormorants. These activities include scientific collection of double-crested cormorants for diet studies to determine consumption rates of juvenile salmonids and dissuasion experiments to inform long-term management plans.	Flushing of nearby roosting/nesting gulls and pelicans in the cormorant dissuasion area.
Hazing of Caspian terns who attempt to nest on East Sand Island outside of the designated colony area and at Rice island, Miller Sands Spit and Pillar Rocks.	Adverse impacts to terns as habitat is limited in the estuary. Potential adverse impacts to other avian species as habitat is limited for larks and pelicans from these hazing efforts.
Boat based and pedestrian monitoring of avian species and hazing of terns as described in Chapter 1 is occurring.	Short-term flushing of avian species from pedestrian surveys
People use Rice Island recreationally and sometimes bring all-terrain vehicles out to ride on the dredged material.	Short-term flushing of avian species from people using the island, potentially long-term adverse effects as habitat is limited by human presence.
Corps plans to dispose of dredged material on shoreline of Miller Sands Spit late summer or fall.	Benefit to juvenile salmonids, as habitat for terns is limited by mounding the dredged material. Adverse impacts to terns, streaked horned larks and American white pelicans, as available habitat is limited.

Table 5. Reasonably Foreseeable Future Actions in the Lower Columbia River Estuary

Reasonably Foreseeable Future Actions	Potential Effect of Action to Resources Identified Chapter 3
In 2014 the Corps, BPA and Navy would likely conduct additional research (as described above) for cormorants and continue to monitor terns and prepare habitat in the designated colony area per the Caspian Tern Plan. Monitoring the potential effects of this research on other avian species (pelicans, gulls) would occur in the future.	Flushing of nearby roosting/nesting gulls and pelicans in the cormorant dissuasion area.
Hazing of Caspian terns who attempt to nest on East Sand Island outside of the designated colony area and at Rice island, Miller Sands Spit and Pillar Rocks.	Adverse impacts to terns as habitat is limited in the estuary. Potential adverse impacts to other avian species as habitat is limited for larks and pelicans from these hazing efforts.
Later in 2013 or 2014 the Corps would place dredged material on the northeast portion of Rice Island.	Potential benefits to terns, larks and pelicans as this is preferred habitat type but hazing would likely keep these species away.
Annually the Corps would place dredged material on the shoreline of Miller Sands Spit. This placement typically erodes within a year after placement. The material is contoured to establish mounds that make the habitat less suitable for terns.	Benefit to juvenile salmonids, as habitat for terns is limited by mounding the dredged material. Adverse impacts to terns, streaked horned larks and American white pelicans may occur as available habitat is limited in the estuary.

Cumulative Impacts to Resources

Caspian Terns-

Terns are highly managed on East Sand Island and throughout the Lower Columbia River Estuary. Terns prefer a particular habitat (bare sand, free of vegetation) for nesting, and this makes them less adaptable to the increasing human development and subsequent loss of habitat. The Corps hazes Caspian terns on East Sand Island as part of effort to manage terns on the island and contain the colony. Since 2009 terns have attempted to nest on East Sand Island outside of the colony as their habitat has been reduced. In the last few years, through accretion of new sand being deposited on the southeastern portion of the island, approximately 1.5 acres of new habitat suitable for nesting has become available to Caspian terns. Per the Caspian Tern Plan, dissuasion materials (stakes with flags) are placed on this area to limit Caspian terns from nesting. This dissuasion of terns off of other portions of East Sand Island further reduces their available habitat in the estuary.

One of the goals behind the Caspian Tern Plan was to promote a long term benefit to the regional population through dispersing the mega-colony on East Sand Island and creating a network of smaller colonies dispersed over a wider geographic area that could greater respond to changes in the environment, including natural disasters. While being managed for reduced

numbers on East Sand, the Caspian tern regional population may experience declines as habitat is limited via increased hazing efforts and increased pressure from native predators. The Corps annually maintains and prepares suitable habitat which the terns have continued to use annually and the Corps will continue to make this habitat available. The USFWS monitors the regional population of terns to ensure conservation of the species.

Glaucous-winged/ Western Gulls-
These gulls are highly adaptable, and their numbers are increasing throughout the Pacific region. While there would be direct and adverse impacts from the proposed action, there is limited impact to the population as a whole. Impacts to gulls beyond what is identified in Section 3.2 are not expected to accumulate with any impacts from the reasonably foreseeable future actions identified above.

Other Birds-
Increased hazing on Rice Island and Miller Sands Spit could temporarily flush non-target birds with impacts to ring-billed gulls being impacted most directly because of their proximity to the potential suitable habitat for terns. These impacts will be temporary, expanding the current efforts by a few months and will occur at a distance to avoid any impacts to nesting birds. Future placement of dredged material does create some suitable habitat for streaked horned larks on Rice Island and Miller Sands Spit and given their current sensitive status these impacts are largely beneficial. Streaked horned larks typically occupy dredged material after 2-3 years when vegetation becomes somewhat established.

To minimize disturbance to brown pelicans roosting near the dissuasion area research personnel remain on the cormorant colony until cormorants have dispersed and then immediately return to camp. In 2012 up to 1,500 brown pelicans were observed roosting in the dissuasion area on the western portion of East Sand Island, resulting in 22 daytime disturbances to brown pelicans during cormorant hazing activities; a maximum of 450 individual brown pelicans were flushed on one such occasion (Roby et al. 2013).

Brown pelicans have not been observed using the beaches where dissuasion materials are placed, possibly because these materials (stakes with flags and rope) are placed prior to their arrival on the island. Brown pelicans have primarily used the southern beaches of the island for roosting. No adverse effects to pelicans from tern dissuasion efforts are expected, as they have not used this area in the past and the materials are placed prior to the arrival of pelicans. Research personnel do monitor the effects to brown pelicans on the island and will notify the Corps should there be concerns about the dissuasion materials on individual pelicans.

Columbia River Basin Juvenile Salmonids-
Presently, juvenile salmonids experience substantial pressure as they migrate through the lower Columbia River Estuary. These pressures include degraded habitat for rearing, lack of forage opportunities and predation from piscivorous birds and other fish. Throughout the lower Columbia River Estuary predation from avian predators is a concern of numerous resource managers. Efforts to study the effects of avian predators on juvenile salmonids are ongoing and

the Corps is currently developing long-term solutions to reduce this type of predation throughout the Columbia River.

Appendix A. Summary of Comments Received on the Draft EA and Response

General Comments

1) Comment- The time period for comment was too short and did not allow for meaningful public involvement or full review of the draft EA from all interested parties. No reason was given for this shortened time period.
Response- The Corps exercised its discretion for public comment and availability of NEPA documents. The Corps's NEPA regulations can be found at 33 CFR Part 230. The relevant regulation for Corps' FONSIs is 33 CFR 230.11. The proposed action described in the draft EA was considered under the last sentence of 230.11 "...For all other Corps project actions, a notice of availability of the FONSI will be sent to concerned agencies, organizations, and the interested public."

2) Comment- Concerned about the Corps proposal to intervene in a native process and engage in a never-ending cycle of trying to control nature.
Response- The Corps recognizes the Columbia River Estuary is a highly managed environment that has been heavily influenced by human development in the region over the past several hundred years.

3) Comment- Document is poorly organized, need to restructure the document.
Response- Document is formatted as standard NEPA document (40 CFR 1504).

4) Comment- Clarify “population targets” reflects negotiated or ecological factors.
Response- The “population targets” or number of breeding pairs for the East Sand Island was identified in the Caspian Tern Plan to reduce predation on juvenile salmonids which was written by the lead agency USFWS.

5) Comment- We are concerned about the ever-expanding management of avian species (“…widening web of death…”) the Corps is casting to save salmonids at the expense of other native species.
Response- In the past five years the Corps has funded the construction of 8.3 acres of new habitat specifically for Caspian terns. The total cost for creating this new habitat was approximately 13 million dollars (in construction costs alone) and the Corps currently funds their operation and maintenance as well as annual preparation of habitat on East Sand Island. Terns banded on East Sand Island have been documented to use these newly constructed islands specifically the islands at Malheur, Klamath Basin and Tule Lake National Wildlife Refuges. There is growing concern among tribes, agencies and fish conservation groups that the benefit to salmon and steelhead has not been realized as predicted in the implementation of

these plans as is clearly demonstrated in figure 6 (page 31) and in other comments received on the draft EA.

6) Comment- Question the use of funds in manipulating avian populations…funds should be used to augment habitat and other strategies to address primary causes of salmonids declines such as improving passage at the dams that contribute most to juvenile salmonids mortality.
Response- The Corps spends millions of dollars annually to address declines in salmon and steelhead populations. For a complete list of what activities the Corps is engaged in to help recover salmonids see http://www.salmonrecovery.gov/Home.aspx. Over the past three years, the Caspian tern colony and the double-crested cormorant colony on East Sand Island consumed approximately 20 to 25 million juvenile salmonids each year. This is considered to be a substantial source of morality effecting juvenile salmonids in the Columbia River Basin and is a concern for federal and state fish resource agencies, local communities and area tribes.

7) Comment- Need to reassess the entire Caspian Tern Plan to determine if action is needed to protect the regional population and whether alternative management strategies would be more effective. Need to determine what has been learned since implementation of the plan. Recommend exploration of other factors influencing ecology and behavior of terns and their relationship of this species to salmonids by developing a robust adaptive management program. Need to assess long-term strategies for addressing gull and eagle impacts on nesting terns as well as other species throughout the region.
Response- The federal agencies (Corps, USFWS, NOAA Fisheries, BPA) involved with the Caspian Tern AMT have been meeting to determine how to proceed within an adaptive management framework.

8) Comment- The reason for low productivity and colony failure in 2011 is not clearly connected to any one factor. It could be because of management actions, predation by natural predators, concentration of terns in one area, etc.
Response- The Corps acknowledges there are many dynamic factors influencing productivity of Caspian terns on East Sand Island.

9) Comment- The citation of Cuthbert (1988) is not applicable to Oregon and Washington region as there is no suitable habitat for terns in the region that is available because it is either being hazed or has other predators.
Response- The Corps acknowledges the regional differences between the Great Lakes Caspian tern habitat and Columbia River Estuary habitat.

10) Comment- The failure of the Corps' constructed islands (Table 2 in Chapter 1.) to provide suitable habitat should not be ignored in the context of this draft EA or under the framework of adaptive management. Address the discrepancies between the USFWS and Corps record of decisions.
Response- The Corps has added a section in the final EA identifying the location and acreage available (Table 2 in Chapter 1). The draft EA did note that not all created habitat is suitable

because some islands are not surrounded by water in drought years. Detailing the discrepancies of the USFWS and Corps' records of decision is outside of the scope of this EA.

Comments on the Purpose and Need

1) Comment- Need for action is not supported because Caspian terns have demonstrated unusual nest site fidelity to East Sand Island in spite of hazing, habitat reduction and predation from natural predators (gulls and eagles). There is little evidence to suggest there would be "immediate and permanent nest abandonment" of the tern colony on East Sand Island.
Response- The Corps acknowledges that terns have shown exceptional fidelity to East Sand Island. Despite this there is concern from the Caspian tern AMT that terns will abandon the colony given the number of years of poor productivity and will likely relocate to nearby islands where consumption of juvenile salmonids is known to be higher.
New information received by the Corps during the public comment period questioned the fundamental assumption that Caspian terns likely are to immediately abandon the East Sand Island colony and therefore put into question the Corps' legal authority to take action. This information suggests that most of Caspian terns that come to the lower Columbia River Estuary, whether they are actively breeding or have failed at breeding, continue to utilize East Sand Island throughout their time in the estuary and in spite of consecutive years of low to no reproductive success, the terns continue to exhibit surprising nest site fidelity and continue to nest or attempt to nest at East Sand Island.
Surveys from 2010-2012 show that colony attendance and nesting density have remained high, even during periods of low productivity (measured as egg and chick survival) suggesting that Caspian terns (whether actively breeding or not) are committed to East Sand Island.
The lack of suitable habitat in the estuary is likely one driver for this (i.e.: hazed habitat at Rice Island, Miller Sands Spit and Pillar Rock Island); hence establishment of new colonies upriver is unlikely with on-going management actions. This is further corroborated by the most recent observations from the 2013 nesting season, where in the second week of May it was reported that nearly 9,800 terns have arrived on East Sand Island to initiate nesting (Bird Research Northwest or BRNW 2013). Another likely driver is the proximity of East Sand Island to a large prey base, specifically high availability of marine forage fish. This relationship between colony attendance by breeding adults (those caring for eggs and chicks), proximal foraging range and nesting success has been documented at East Sand Island.
In addition, this new information also confirmed that the bioenergetics models used to estimate consumption of juvenile salmonids captures consumption by Caspian terns actively nesting and roosting on East Sand Island. This information cast some doubt over the concerns or risk of increased predation on juvenile salmonids upriver due to nest failure and immediate colony abandonment during the 2013 nesting season.

2) Comment- Purpose and need should be more concerned about the terns low to no nesting productivity and not only be concerned with salmon.
Response- The purpose statement of a NEPA document is written to address the need for a federal agency action and with that federal agency's authority and mission in mind. The purpose statement addresses the Corps primary role in the context of action as a need to mitigate impacts and promote projects that are beneficial to salmon and steelhead from the continued operation of the Federal Columbia River Power System (see first paragraph of the EA). The Corps' purpose and need to take action is to prevent the potential for terns to abandon the colony on East Sand Island and move up into the Columbia River where their consumption on juvenile salmonids is known to be higher. As a federal agency the Corps operates under certain authorities and funding, these are outlined in Section 1.3 of the EA.

3) Comment- Corps should be more concerned about the fish. Management actions should not be considered that intervene with the natural predators because benefits to salmonids have not been realized and the current tern colony is larger than management objectives identified in the Caspian Tern Plan.
Response- The Corps is very concerned with fish and mortality of juvenile salmonids associated with avian predators throughout the Columbia River Estuary. The Corps is currently preparing an Environmental Impact Statement to determine management strategies on East Sand Island to reduce predation on juvenile salmonids from double-crested cormorants. The Corps makes significant economic investment in implementing the reasonable and prudent alternatives from the 2008/2010 FCRPS Biological Opinion. Hundreds of millions of dollars have been identified from the action agencies (Corps, Bonneville Power Administration and Bureau of Reclamation) to implement the reasonable and prudent alternatives of the 2008/2010 Biological Opinion. Since 2008, the Corps has made investment in improving juvenile salmonid passage at dams, restoring and creating rearing habitat for juvenile salmonids in the estuary and expanding hatchery facilities for conservation. The Corps alone spends millions of dollars annually funding the operations of nine hatcheries within the Columbia River Estuary as mitigation for the Federal Columbia River Power System.

4) Comment- Need to identify long-term strategies to address Bald Eagle disturbance and predation on Caspian terns and other East Sand Island avian species (some suggested shooting eagles).
Response- The draft EA's proposed action was limited to lethal removal of gulls because they are directly responsible for the egg and chick consumption when adult terns are flushed from the colony. Bald Eagles are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, any action to haze or remove eagles would require more stringent review and additional coordination with USFWS and the state wildlife agencies.

Comments on the Alternatives

1) Comment- Clarify the use of toxic shot.
Response- The Corps acknowledges the draft EA had conflicting statements on the use of toxic shot and this generated concern and controversy among those who commented on the document and those who commented after reading Portland Audubon Society's website story. In the description of the proposed action it stated non-toxic pellets would be used. Later in that same section it stated approval of toxic shot and non-standard disposition of carcasses would be needed. The use of a toxic shot was discussed with the Caspian Tern AMT because of a need to have a pellet with enough weight and velocity to be most effective, this was ultimately dropped due to concerns with USFWS permit staff, but the draft EA went out with the contradictory statements regarding approval of toxic shot. The final EA has been revised to clarify that non-toxic pellet would be used for the proposed action and is consistent with the standard condition requiring use of non-toxic shot only per 50 CFR 20.21(j). The Raptor Research Foundation has supported the use of copper pellets and bullets as a safe alternative to lead.
http://www.raptorresearchfoundation.org/wpcontent/uploads/2010/12/2011_lead_poisoning.pdf

2) Comment- Clarify Alternative C as it involves dissuasion and allowable take of up to 100 tern eggs is this feasible because nesting season has begun?
Response- Dissuasion of terns off Rice Island, Miller Sands Spit and Pillar Rock Islands is done on an annual basis (Section 1.1.3). Since 2008, the Corps has been issued a permit to collect tern eggs (up to 100 in total) from these locations. Alternative C would expand non-lethal hazing efforts to allow for personnel to use dogs to flush Caspian terns off the beaches (where their suitable habitat is) and use of all-terrain vehicles to cover the distances efficiently.

3) Comment- If Corps selects Alternative B it should be modified it to reduce the number of gulls lethally removed from 150 to 50 and shorten the time period of their removal and hazing from June 15th to June 1st. If the Corps is unable to modify Alternative B, it is recommended to select Alternative A or C.
Response- The Corps acknowledges the request to modify Alternative B, but did not modify it in the final EA.

4) Comment- Add decision framework that has been developed by Corps staff on when to execute the proposed action.
Response- This decision framework has been added to the description of Alternative B (Section 2.2.2).

5) Comment- Request that a copy of the permit (should one be issued for lethal removal) be made available prior to implementation of the action and a copy of the report on the results be sent out at the end of the nesting season.
Response- The Corps will meet this request.

6) Comment- Prior approval from Oregon Department of State Lands will be required to implement Alternative C- increased hazing on Rice Island and Miller Sands Spit.
Response- Statement has been added to the final EA in Section 2.to reflect this requirement.

Comments on Affected Environment/ Environmental Consequences

1) Comment- Draft EA fails to address possible adverse effects to nesting Caspian terns from the hazing methods and shooting of gulls on their colony. Will terns be inadvertently hazed away from their nests for prolonged periods of time due to hazing and lethal removal of gulls?
Response- Information has been added to the final EA on the effects of the proposed action to terns in Section 3.2.2.

2) Comment- Draft EA does not explain why the Corps has settled on the number of 150 gulls to be removed or why the Corps thinks this strategy will be successful when it didn't seem to be successful in 2012. There is no rationale given to support the use of gull effigies.
Response- As the comment suggests, even with gull removal in 2012, only 400 fledglings were raised on the colony. However, the removal of 50 gulls last year beginning May 5th and ending June 15th is considered to be a reason the colony produced any young at all. In 2012 massive disturbance to the colony occurred during the first part of May, where a major loss in productivity caused near collapse of the colony. Lethal removal of gulls was undertaken to prevent total colony failure as experienced in 2011. The number of gulls considered under Alternative B was recommended by the AMT to be 150 because it was determined this would be the maximum number of gulls that would be necessary to remove in order to prevent colony failure during the peak nesting season. The use of gull effigies has been used on Farallon Island National Wildlife Refuge in California and was determined to be effective at deterring western gulls from depredating the nests of some seabird species of conservation concern.
3) Comment- Draft EA does not address whether other species found on East Sand Island (double-crested cormorants, Brandt's cormorants or brown pelicans) could be adversely affected by the proposed action.
Response- The Caspian tern colony is geographically isolated from the cormorant (double-crested and Brandt's) on East Sand Island by over half a mile and a densely vegetated upland area between the eastern portion of the island where the tern colony is and the western portion of the island where the cormorant colony is. Because the proposed action, the only action alternative on East Sand Island, was limited in scope to professional shooters accessing the island via boat from the northeastern portion and traveling by foot to the tunnels and observation blinds where shooting would occur over a brief time period (one-month) and only with pellet guns that have noise levels less than firearms, for these reasons the Corps determined there would be no effect from the proposed action to the cormorant colony and did not include consider cormorants to be within the affected environment. Impacts to brown pelicans likewise are not expected to be adverse but the species was added to Chapter 3 for a

discussion of environmental consequences since they are closer in proximity to the Caspian tern colony.

4) Comment- Draft EA fails to provide how long lethal control of gulls would occur and whether the action will be repeated in future years.
Response- The Draft EA did identify the time period for action being mid-May thru June 15. Section 2.2.2. Wording was added to state this action was being proposed only for the 2013 nesting season (Section 2.2.2).

5) Comment- Using toxic shot and leaving gull carcasses out where they can be consumed by other birds including eagles shows a reckless disregard for the welfare of avian populations. This could result in illegal take of protected bird species under Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA).
Response- See the above response to comment # 1 under Alternatives. The draft EA contained an error. Final EA clarifies that toxic shot (pellets) would not be used if action is taken under Alternative B. Corps has coordinated with USFWS to confirm the revisions to the proposed action will not cause unanticipated or illegal take under the MBTA or BGEPA.

6) Comment- Please note that streaked horned larks have been proposed by USFWS to be listed under the Endangered Species Act and critical habitat is proposed at Rice Island and Miller Sands Spit. Include a more robust discussion of impacts to streaked horned larks from increasing hazing efforts by using dogs and all-terrain vehicles on these islands. The Corps and USFWS should consider all management activities in the estuary in the context of streaked horned lark recovery efforts and limit any new activities on Rice Island and Miller Sands Spit until protection for the larks can be fully developed.
Response- The draft EA noted the USFWS has proposed the streaked horned lark for listing under the ESA. The final EA includes information on the proposed critical habitat, which does include Rice Island and Miller Sands Spit. The placement of dredged material and easement that the Corps has with the states of Oregon and Washington to place there have created some suitable habitat for the larks over the years. These islands are managed by the states and USFWS. It is ultimately the USFWS's determination to designate critical habitat for listed species.

7) Comment- Explain the static consumption rate on juvenile salmonids (Figure 6- Section 3.2.7) despite the reduction in recruitment on the East Sand Island colony over the last three years.
Response- The Corps considers one possible explanation the consumption rate on juvenile salmonids has not decreased over the last few years in spite of low productivity, reduction in recruitment and decreasing number of breeding pairs could be because non-breeding birds are staying in the Columbia River Estuary and primarily using East Sand Island as a roost site. The impact these non-breeding birds have on juvenile salmonids is documented (via bill load observation) and included in the bioenergetics modeling used to determine consumption rates on terns using East Sand Island.

8) Comment- The Corps should recognize the impacts that may be caused by dispersal of terns and either monitor the effects of their dispersal or provide funding to the effected states or third parties to do the monitoring.
Response- The Corps and Bonneville Power Administration (BPA) monitor terns throughout the estuary. To date virtually all Caspian terns observed in the estuary either nest or roost on East Sand Island. No funding will be provided for monitoring as the Corps continues to monitor terns.

9) Comment- Cumulative impact section should have included the past 2012 Corps action that removed 50 glaucous-winged/western gulls under permit from the USFWS on the Caspian tern colony to minimize impacts from predatory gulls. This omission is deeply troubling given that the Corps lethally removed gulls in 2012.
Response- The final EA has been revised to include this information in several sections (Chapters 1 and 3). The removal of 50 gulls last year beginning May 5th and ending June 15th.

10) Comment- The Corps should address the effects of the hazing efforts of terns on East Sand Island outside of the designated 1.58 acre colony area and its potential effect on brown pelicans.
Response- As noted in the draft EA Chapter 1- background of the Caspian Tern Plan and the Cumulative Impacts section 3.3, the Corps hazes Caspian terns on East Sand Island as part of effort to manage terns on the island and contain the colony. The Final EA was revised to include a discussion on hazing of terns and potential effects to brown pelicans (Section 3.3).

11) Comment- The Draft EA should include a discussion of the socio-economic benefits (increased recreation, tourism and wildlife observation) that is created from having a great diversity of colonial waterbirds in the region.
Response- The Draft EA did not propose to further limit the way colonial waterbirds use the estuary and thereby contribute to eco-tourism. The proposal in the draft EA was to minimize the effect predatory gulls are having on the reproductive success of the Caspian tern colony on East Sand Island.

12) Comment- The draft EA fails to mention Caspian terns are listed on the USFWS's 2008 Birds of Conservation Concern.
Response- The Corps acknowledges the terns are on this list. They, as well as all of the avian species addressed in this list are also listed under the Migratory Bird Treaty Act, which affords them greater protection. Additionally, bald eagles are protected under the Bald and Golden Eagle Protection Act and streaked horned larks are proposed for listing under the Endangered Species Act.

Appendix B: References

Literature Citation

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Appendix C: Applicable Laws and Executive Orders

Law, Regulation, or Guideline	Description and Assessment of Compliance
Migratory Bird Treaty Act of 1918 (MBTA), as amended, (16 U.S.C. 703-711)	The USFWS has the primary statutory authority to manage migratory bird populations in the United States. **-The USFWS has final approval of the lethal removal of migratory birds. The Corps has coordinated with the USFWS on the proposed action**
Endangered Species Act of 1973 (ESA), as amended (7 U.S.C. 136; 16 U.S.C. 460 et seq.)	It is federal policy, under the ESA, that all Federal agencies seek to conserve threatened and endangered species and utilize their authorities in furtherance of the purposes of the Act (Sec. 2[c]). **-While numerous ESA listed salmonids species migrate past this area, there is no work being proposed that would affect a waterway or require in-water (below ordinary high) work. The proposed action will occur from a blind on an island. Transport will occur by boat to the island. The proposed action will have *no effect* to species listed under the ESA.**
National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321-4347)	NEPA requires federal agencies to evaluate the potential environmental impacts of their actions. **- This EA was prepared for compliance with NEPA.**
Executive Order 13186 (EO), Responsibilities of Federal Agencies to Protect Migratory Birds	Directed federal agencies whose actions have a measurable negative impact on migratory bird populations to develop a Memorandum of Understanding (MOU) with the USFWS to promote conservation of migratory birds. **The Department of Defense has executed an MOU with the USFWS (expires July 2013). The MOU is directed at conservation of migratory birds on DoD military lands, bases and installations. East Sand Island was transferred from the U.S. Army to the Civil Works Department of the Army Corps of Engineers, Portland District in 1954. The island is no longer considered military land and is not used for military purposes; therefore the MOU's conditions do not apply to activities on East Sand Island.**
Coastal Zone Management Act (CZMA) of 1972, as amended (16 U.S.C. 1451-1464)	Protects environmental quality of coastal areas. **-Section 304(a) of the CZMA excluded federal lands from the coastal zone. East Sand Island is federal land and**

Law, Regulation, or Guideline	Description and Assessment of Compliance
	there will be no off federal lands effects to a coastal resource from the proposed action.
National Historic Preservation Act (NHPA) of 1966	Requires the effects of a "federal undertaking" to be assessed for their potential to affect historic properties on, or eligible for listing on the National Register of Historic Places, and to consult with the State Historic Preservation Officer when warranted **-Corps archaeologist determined that East Sand Island has formed from dredged materials over the past 30 years, and as such, the action has no possibility of impacting historic properties.**
Executive Order 12898 (EO), Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, 11 February 1994	The purpose of the order is to avoid disproportionately high or adverse environmental or economic impact on minority or low-income populations. All NEPA environmental analyses must include an evaluation of effects on these communities. **No subsistence, low-income or minority communities will be affected by the proposed action as none currently access East Sand Island. The proposed action would not cause disproportionately high and adverse effects on any minority or low-income populations and is compliant with the Executive Order.**
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications. **Coordination with tribal governments has occurred and a letter from the Columbia River Inter-Tribal Fish Commission was sent to the Corps during the public comment period.**