

Comprehensive Conservation Plan  
Cape Meares, Oregon Islands and Three Arch Rocks National Wildlife Refuges  
November 2006

**I. Comments from public scoping meetings, by meeting received**

1. Newport meeting – November 1, 2006

- Comment that low flying aircraft, including U.S. Coast Guard (USCG), are disturbing nesting seabirds at Yaquina Head Outstanding Natural Area (YHONA).
- Territorial Sea Plan – 1994 – recommendation to close waters around Three Arch Rocks National Wildlife Refuge (TARNWR). Attendee inquired as to whether the 500' seasonal buffer around TARNWR was effective in protecting breeding seabirds and marine mammals? Has an evaluation been conducted to determine the level of protection?
- Attendee is working on an interpretive program called “Birds Spoken Here!” which would be modeled after the successful “Whale Watching Spoken Here!” program. Would like the U.S. Fish and Wildlife Service (USFWS) to be involved in program development.
- Attendee is interested in starting a Citizen Science program that would have volunteers watch seabirds at YHONA and record bald eagle attacks on murrelets. Attendee requested the support of USFWS both in staff time to help initiate and run the program and as a source of funds.
- Attendee expressed support for keeping the Comprehensive Conservation Plan (CCP) in line with current goals and objectives for which each refuge was established. Stay the course, the current goals are good!
- Attendee inquired about red fox management on south coast, specifically what is the status of red fox on the offshore rocks adjacent to Coquille Point Unit of Oregon Islands NWR? Another attendee stated that there are rats at YHONA and urged the USFWS to get in touch with Bureau of Land Management (BLM) about it. Attendee further stated that both mink and weasel had been seen at YHONA and are a potential threat to nesting seabirds.
- Attendee asked if biological data collected over previous years will be available as part of this CCP process (population status of sensitive wildlife and any trends observed by the USFWS ) ; i.e., brown pelican, black oystercatcher)? Recommends this information be put on the Oregon Coast National Wildlife Refuge Complex (OCNWRC) website.
- New Carissa Oil Spill Mitigation Dollars– Attendee suggested developing a mitigation wish list with some of the goals for protection and management of seabirds and habitat.
- Attendee suggested making recommendations on the location of parking lots and roads to minimize environmental impact on sensitive habitat and species.
- Attendee asked if the USFWS had good examples of habitat restoration on its coastal refuges as attendee is working on setting up a network of parks/refuges that highlight habitat restoration. Requested the USFWS be involved.

2. Oceanside meeting – November 2, 2006

- Attendee stated that recreational kayakers are disturbing nesting waterfowl on Cape Meares Lake.
- Attendee noted that there has been a steady increase in the number people hang gliding and paragliding esp. from Cape Lookout, Anderson Point which is near TARNWR.
- Attendee recommended the USFWS contact local kayak guides and rental shops to inform them of wildlife disturbance created by their activity.
- Attendee inquired about how new management ideas and projects that result from the CCP will be funded.
- Attendee stated that invasive species (e.g., tansy ragwort, English ivy) are present and spreading at Cape Meares National Wildlife Refuge and the adjacent State Scenic Viewpoint. Wants the

USFWS to eliminate these invasive species and prefers the USFWS not use herbicides/pesticides to control invasive species, but instead use volunteers to pull the plants.

- Attendee stated that on two occasions in 2006 the USCG caused nesting common murre to flee from Pillar and Pyramid Rocks of TARNWR. Requested the USFWS work with USCG to prevent this type of disturbance.
- Attendee inquired about the TARNWR buffer zone, specifically asking which rocks are included in the protected buffer zone. Attendee also expressed concern about boat disturbance occurring around pillar and pyramid rocks. Attendee then requested the USFWS deploy waters closed buoys around other rocks to protect them and noted that kayaks are becoming a disturbance problem (launching from Cape Meares beach) at TARNWR and recommended the USFWS get in touch with rental guides and inform them of disturbance issues associated with getting too close to nesting seabirds with canoes and kayaks.

### 3. Cannon Beach meeting – November 8, 2006

- Attendee requested the USFWS continue to assist Haystack Rock Awareness Program (HRAP) with protection and interpretation of refuge resources during busy visitation times of spring and summer months and requested additional volunteer/staff assistance.
- Attendee stated the USFWS needs a dedicated law enforcement officer for coast refuges.
- Attendee noted the USFWS needs more funds to manage coastal refuges appropriately.
- Attendee noted the USFWS needs to conduct more public education regarding protection of refuge resources.
- Attendee requested the USFWS increase signage on coast to inform public of wildlife resources.
- Attendee asked the USFWS to delineate the appropriate boundaries for specific seabird and shoreline nesting/breeding bird species. Specifically, how far back do people need to stay from black oyster catcher (BLOY) nests to afford the nesting birds adequate protection.
- HRAP requested the USFWS provide them with guidelines on how to protect/manage all of the natural resources around Haystack Rock. They further recommended a cooperative agreement between HRAP, USFWS, Oregon Parks and Recreation Department (OPRD), and the City of Cannon Beach lifeguards on various roles and responsibilities for the resources around Haystack Rock.
- Attendee requested that the USFWS standardize the friends groups on coast in regards to education, outreach and interpretation.
- Attendee inquired about the USFWS involvement in fishery or MPA management? (*staff comment: I wasn't at this meeting. Was the attendee asking to help conserve refuge wildlife species by involvement in these management areas?*)
- Attendee inquired about the possibility of the USFWS to increase the amount/ number of refuges in Oregon to offset development.
- Attendee recommended the USFWS partner with Universities/agencies to conduct research that currently isn't getting done by Complex Refuge Biologist due to limited staff time and funding.

### 4. Brookings meeting – November 14, 2006

- Attendee recommended that Crook Point remain isolated and kept in an undeveloped state.
- Attendee recommended that the USFWS install a Puffin cam on Goat Island (similar to the Peregrine Falcon cam at Cape Meares NWR) with public viewing in the area of Harris State Beach Park- to increase visitors' awareness of off-shore birds and their sensitivity to disturbance.
- Attendee recommends that the Service get involved in land use zoning issues in the area of Crook Point Unit to reduce the possible impacts to the area from future development.

### 5. Bandon meeting – November 15, 2006

- Attendee inquired about Threatened and Endangered Species especially western snowy plover and marbled murrelet. Are there any strategies by the USFWS to protect these species since they currently do not have habitat within the Oregon Coast NWRC that protects them? Attendee requested the USFWS look beyond its current refuge boundaries to pull these species into the system to give them protection. Attendee requested the USFWS look to add additional acres to the Refuge System on the Oregon Coast.
- Attendee requested the refuge boundary at Coquille Point Unit be expanded to include remaining lands within the approved NWRS boundary (to provide additional interpretation opportunities).
- Attendee requested the USFWS add a public restroom at Coquille Point Unit.
- Attendee asked where do marine fish and seabird food resources fit in to the CCP as it appeared that there was no mention of them for the marine refuges.
- Attendee expressed concern about the lack of funds needed to deploy buoys at TARNWR in the future because of depressed/ flat budgets.
- Attendee stated critical need for the USFWS to collect data on the plant resources on offshore islands. It should be a priority, esp. as concerned with invasive species and their potential effect on seabird habitat.
- Attendee requested the USFWS do something to encourage the return of tufted puffin to Elephant Rock and other offshore rocks at Coquille Point. (i.e. artificial nest sites, decoys)
- Attendee commented that tufted puffins were on offshore rocks at Coquille Point in greater numbers in past (~ 16 birds in the 1970-80's), then saw a decline before the red fox came. Attendee stated that red fox may not have been responsible for extirpation of the puffins at Coquille Point.
- Attendee asked about the appropriate place/forum for the public to comment on proposing the reintroduction of sea otters to Oregon coast. Attendee expressed frustration that the USFWS is limiting itself to only looking at its refuge lands and not the marine ecosystem that affects refuge resources.
- Attendee inquired about what the USFWS is doing to get the word out about aircraft and boat harassment/disturbance of wildlife?
- Attendee requested the USFWS work with the Federal Aviation Administration (FAA) to strengthen the regulations on Above Ground Level aircraft flights of 2000' for pilots/aircraft. Attendee recommended making this a requirement.
- Attendee stated the USFWS needs to remind the USCG about FAA regulations/ recommendations in regards to disturbance of wildlife using Oregon Islands NWR and TARNWR.
- Attendee commented that there is not enough staff/resources to conduct proper management of the coastal refuges.
- Attendee asked about the significance of wilderness designation.
- Attendee asked if there was a phone number to call if a citizen sees a boater disturbing wildlife/seabirds and violating the Migratory Bird Treaty Act.
- Attendee stated that parasailing (powered and non-powered) and kite boarding are recreational activities that need to be addressed in the CCP by the USFWS and their effects on disturbance to birds.
- Attendee stated that global climate change is going to be the biggest factor affecting refuges coastwide in the future and that more research by the USFWS is needed now on seabirds and other wildlife to be able to document future change.
- Attendee recommended that refuges be used to describe the effects of global warming. Attendee stressed that research must be done now to be able to address/discuss these effects in the future.
- Attendee wants the USFWS to increase interpretation on coast through coordination with State Parks (e.g., video, campfire/evening program).
- Attendee expressed that there is a problem with the OCNWRC being based in Newport because the south coast refuges suffer by not having adequate staffing to perform needed management. Attendee requested the USFWS do a better job of coordinating with OPRD on south coast in regards to resource protection.
- Attendee stated the USFWS needs to coordinate more with the Coastwatch Program.

- Attendee stated problems at Coquille Point Unit with dogs off leash and an abundance of dog poop, requested the USFWS get bigger signs stating rules and that bicycles are unsafe on trail. Attendee suggested painting “No Bicycles” on entrances to the interpretation trail.
- Attendee encouraged the USFWS to work with other law enforcement agencies to enforce refuge laws and regulations and to educate them to refuge issues so they are aware.
- Attendee wanted to know if the CCP will address shipwrecks, oil spills and rat spills.
- Attendee stated the USFWS needs more information for the public and researchers on the website (i.e. biological data should be available).
- Attendee wants the USFWS to increase advertisement of National Wildlife Refuges along the coast, thus improving our identity.
- Attendee recommended the CCP address how to manage wildlife populations with adjacent land managers and regulatory agencies. (e.g., South Slough National Estuarine Research Reserve, Oregon Department of Fish and Wildlife, Oregon Parks and Recreation Department, Department of State Lands). Attendee further stressed more coordination is needed between the USFWS and the above agencies, especially on the south coast.
- Attendee stated the USFWS needs to strengthen relationship (*DP comment – is this referring to communication between Refuges and ES?*) with the Ecological Services Division of USFWS for sea otter reintroduction and other endangered species management.
- Attendee inquired about a mandate for the USFWS to support ecotourism, as this would create more jobs that are wildlife dependent. Attendee stated that it should be in the CCP plan.
- Attendee would like to see guided tours at Crook Point Unit of Oregon Islands NWR (even access through Pistol River State Park).
- Attendee stated that more biological research is needed on wildlife of Oregon islands. Attendee stated that the USFWS needs better baseline data for management.
- Attendee asked about West Nile virus/avian flu and stated that the public’s attitude may change about wildlife in the future as a result of these epidemics. The plan should address this – disease mgmt. plan/ contingency plan.
- Attendee recommended the USFWS identify on-refuge or off-refuge (observational) lands that are suitable for research. Research should include erosion, invasive species, geomorphology, global warming, etc.
- Attendee inquired about the return of apex predators (e.g., bald eagle, river otter) to the coast and how will they affect seabird populations.
- The USFWS should have an understanding of the marine seabird ecology; using islands where seabirds nest/ breed as the starting point in their lives and then how they disperse from there. Set up a management program to monitor seabirds when they are off and on refuge (e.g., marking, telemetry studies).
- Attendee asked how does the USFWS work with Division of State Lands (DSL)? Where does the USFWS jurisdiction on pinnipeds/ seabirds begin and end with DSL?

#### 6. Comments received in writing (email/ fax/ letter) following the public meetings

- “Installing tags on the birds at the colony will provide an opportunity to understand how Oregon’s breeding seabirds are connected to the rest of the ocean.” (e-mail rec’d 11/27/16 from Mike Graybill, SSNERR)
- “Through the planning process, the Fish and Wildlife Service (FWS) has an opportunity to assess what is known about global warming and the species and ecosystems that depend on the refuge, what issues need further study, and how this information can be incorporated into management of the refuge.” (11-page fax rec’d 12/11/06 from Defenders of Wildlife)
- “... the opportunity offered by the comprehensive planning process to address the issue of appropriate distance aircraft are required to keep from sensitive locations such as Three Arch Rocks. ...Disturbance of birds by low-flying aircraft is well-documented. We believe that a more appropriate standard would be to *require* aircraft to maintain a minimum distance, *both* laterally and vertically, of 2000 feet.” (letter rec’d 12/12/06 from Audubon Society of Portland)

- "... Refuge staff, as resources permit, have offered training courses for Coast Guard pilots and sightseeing flights. We commend you for this effort and urge that it continue..." (letter rec'd 12/12/06 from Audubon Society of Portland)
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## - **II. Comments sorted by general category or issue**

### Disturbance

- Comment that low flying aircraft, including U.S. Coast Guard (USCG), are disturbing nesting seabirds at Yaquina Head Outstanding Natural Area (YHONA).
- Territorial Sea Plan – 1994 – recommendation to close waters around Three Arch Rocks National Wildlife Refuge (TARNWR). Attendee inquired as to whether the 500’ seasonal buffer around TARNWR was effective in protecting breeding seabirds and marine mammals? Has an evaluation been conducted to determine the level of protection?
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- Attendee inquired about what the USFWS is doing to get the word out about aircraft and boat harassment/disturbance of wildlife?
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### Public use

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### Management

- Attendee expressed support for keeping the Comprehensive Conservation Plan (CCP) in line with current goals and objectives for which each refuge was established. Stay the course, the current goals are good!
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- Attendee noted the USFWS needs more funds to manage coastal refuges appropriately.
- Attendee asked about the significance of wilderness designation.

### Invasives

- Attendee inquired about red fox management on south coast, specifically what is the status of red fox on the offshore rocks adjacent to Coquille Point Unit of Oregon Islands NWR? Another attendee stated that there are rats at YHONA and urged the USFWS to get in touch with Bureau of Land Management (BLM) about it. Attendee further stated that both mink and weasel had been seen at YHONA and are a potential threat to nesting seabirds.
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### Wildlife/ Biology

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- Attendee inquired about the return of apex predators (e.g., bald eagle, river otter) to the coast and how will they affect seabird populations.
- The USFWS should have an understanding of the marine seabird ecology; using islands where seabirds nest/ breed as the starting point in their lives and then how they disperse from there. Set up a management program to monitor seabirds when they are off and on refuge (e.g., marking, telemetry studies).
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- Installing tags on the birds at the colony will provide an opportunity to understand how Oregon's breeding seabirds are connected to the rest of the ocean.
- Through the planning process, the Fish and Wildlife Service (FWS) has an opportunity to assess what is known about global warming and the species and ecosystems that depend on the refuge,

what issues need further study, and how this information can be incorporated into management of the refuge.

### Contingency

- Attendee wanted to know if the CCP will address shipwrecks, oil spills and rat spills.
- Attendee asked about West Nile virus/avian flu and stated that the public's attitude may change about wildlife in the future as a result of these epidemics. The plan should address this – disease mgmt. plan/ contingency plan.

### Interagency coordination/ management responsibility

- HRAP recommended a cooperative agreement between HRAP, USFWS, Oregon Parks and Recreation Department (OPRD), and the City of Cannon Beach lifeguards on various roles and responsibilities for the resources around Haystack Rock.
- Attendee requested the USFWS work with the Federal Aviation Administration (FAA) to strengthen the regulations on Above Ground Level aircraft flights of 2000' for pilots/aircraft. Attendee recommended making this a requirement.
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- Attendee recommends that the Service get involved in land use zoning issues in the area of Crook Point Unit to reduce the possible impacts to the area from future development.
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- Attendee asked how does the USFWS work with Division of State Lands (DSL)? Where does the USFWS jurisdiction on pinnipeds/ seabirds begin and end with DSL?
- Attendee recommended the CCP address how to manage wildlife populations with adjacent land managers and regulatory agencies. (e.g., South Slough National Estuarine Research Reserve, Oregon Department of Fish and Wildlife, Oregon Parks and Recreation Department, Department of State Lands). Attendee further stressed more coordination is needed between the USFWS and the above agencies, especially on the south coast.

### N/A for this CCP

- New Carissa Oil Spill Mitigation Dollars– Attendee suggested developing a mitigation wish list with some of the goals for protection and management of seabirds and habitat.
- Attendee asked if the USFWS had good examples of habitat restoration on its coastal refuges as attendee is working on setting up a network of parks/refuges that highlight habitat restoration. Requested the USFWS be involved.
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Roy W. Lowe, Project Leader  
Oregon Coast National Wildlife Refuge Complex  
2127 SE Marine Science Drive  
Newport, Oregon 97365-5258  
December 5, 2006

Dear Roy:

Please accept the following comments submitted on behalf of the Audubon Society of Portland and its 10,000 members on the Oregon Coast National Wildlife Refuge Complex Comprehensive Conservation Planning for Cape Meares, Oregon Islands, and Three Arch Rocks National Wildlife Refuges. We appreciate this opportunity to share our thoughts with you.

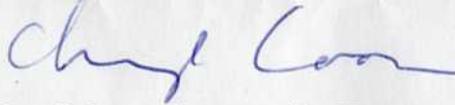
Your announcement indicates that during development of the CCP, a range of alternative management approaches will be explored and evaluated, including current management practices. Substantive issues will include: methods for protecting the resources of Cape Meares Refuge in the long term, while continuing to provide quality opportunities for wildlife-dependent recreation like bird watching; techniques and partnerships for protection of the sensitive and irreplaceable wildlife, habitat, and cultural resources within the refuges; opportunities for the public to enjoy the refuges; and management and extensive inventory, monitoring, and research needs of the refuges.

The Audubon Society of Portland promotes the understanding, enjoyment, and protection of native birds, other wildlife and their habitats. We focus on our local community and the Pacific Northwest. Consistent with our mission, we draw your attention to the opportunity offered by the comprehensive planning process to address the issue of the appropriate distance aircraft are required to keep from sensitive locations such as Three Arch Rocks. It is our understanding that currently, there are no *requirements* for minimum lateral or vertical distance. Rather, aircraft are "requested" to maintain a minimum altitude of 2000 feet.

Disturbance of birds by low-flying aircraft is well-documented. We believe that a more appropriate standard would be to *require* aircraft to maintain a minimum distance, *both* laterally and vertically, of 2000 feet. We appreciate your consideration of this suggestion.

Equally important, we understand that Refuge staff, as resources permit, have offered training courses for Coast Guard pilots and sightseeing flights. We commend you for this effort and urge that it continue, as we believe that an informed public will choose to respect the distance needed to safeguard the birds and their habitat.

Sincerely,



Cheryl Coon, Conservation Programs Manager  
Audubon Society of Portland



11 December 2006

Roy W. Lowe, Project Leader  
Oregon Coast National Wildlife Refuge Complex  
2127 SE Marine Science Drive  
Newport, Oregon 97365-5258

Dear Mr. Roy Lowe:

Thank you for the opportunity to provide comments as you develop the Comprehensive Conservation Plan for the Oregon Islands National Wildlife Refuge. Defenders of Wildlife is a non-profit, public interest institution with one million members and supporters nationwide, including 15,288 in Oregon. Defenders has been a long-time advocate for the Refuge System and continues to take a special interest in the Refuge System planning process. We published the *Citizen's Wildlife Refuge Planning Handbook* to encourage the public to become more involved in refuge planning. Defenders also publishes an annual report on the state of the Refuge System, *Refuges at Risk*, and this year's report featured the impacts global warming are and will be having on the Oregon Islands National Wildlife Refuge.

We are generally supportive of the current management direction of the refuge. One of the most profound, looming issues facing the refuge is global warming. Through the planning process, the Fish and Wildlife Service (FWS) has an opportunity to assess what is known about global warming and the species and ecosystems that depend on the refuge, what issues need further study, and how this information can be incorporated into management of the refuge. In fact, this assessment is all but required. Interior Secretarial Order 3226, states that

Each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or when making major decisions regarding the potential utilization of resources under the Department's purview. Departmental activities covered by this Order include, but are not limited to... management plans and activities developed for public lands...

**National Headquarters**  
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In addition, in May, 2006, Congress passed House Concurrent Resolution 398 "expressing the sense of the Congress that the United States Fish and Wildlife Service should incorporate consideration of global warming and sea-level rise into the comprehensive conservation plans for coastal national wildlife refuges, and for other purposes." The resolution states that:

(1) the United States Fish and Wildlife Service should incorporate consideration of the effects of global warming and sea-level rise into

the comprehensive conservation plan for each coastal national wildlife refuge;

(2) each such comprehensive conservation plan should address, with respect to the refuge concerned, how global warming and sea-level rise will affect--

- (A) the ecological integrity of the refuge;
- (B) the distribution, migration patterns, and abundance of fish, wildlife, and plant populations and related habitats of the refuge;
- (C) the archaeological and cultural values of the refuge;
- (D) such areas within the refuge that are suitable for use as administrative sites or visitor facilities; and
- (E) opportunities for compatible wildlife-dependent recreational uses of the refuge; and

(3) the Director of the United Fish and Wildlife Service, in consultation with the United States Geological Survey, should conduct an assessment of the potential impacts of global warming and sea-level rise on coastal national wildlife refuges.

To assist the FWS in the identification of issues to address in the CCP, we have the following comments on how Pacific upwellings are impacted by warming oceans and changing winds, and the effects of global climate change on plankton, fish (rockfish and salmon), sea birds (tufted puffins, auklets and murre), and marine mammals (Steller sea lions, harbor seals, elephant seals, and gray whales). We also include recommendations for management of the refuge based on these findings.

**I. The CCP should incorporate information on how Pacific Ocean upwellings are affected by changes in temperature and wind pattern**

Rising ocean temperatures off the coast of California have suppressed the upwelling of cold, nutrient-rich, plankton-sustaining waters and altered the food available to fish and birds. Some prey species have declined in number. Others have moved north to cooler, more productive waters and have been replaced by species from the south. Ocean climate shifts have been correlated with North Pacific Ocean ecosystem changes in recent decades (Trites et al 2006).

The Pacific Ocean follows strong and important seasonal changes. The mean sea surface temperature (SST) off the coast of Oregon is approximately 14 degrees Celsius in the summer. During the spring and summer, coastal currents and a southward flow of water develop as northern surface winds blow south along the coast. Upwelling occurs when these currents and upper surface waters bring deep cold ocean water to the surface (Huyer 2001, Lubomudrov 1997). As a result, SST decreases to approximately 9 degrees Celsius in the winter (Oregon Coastal Atlas 2000). During the fall and winter, southwest winds move surface waters towards the north and shore, downwelling occurs, and the water warms once again (Huyer 2001).

El Niños create large interannual variability and can provide insight into how future climate change could affect Pacific Ocean ecosystems. The El Niño Southern Oscillation (ENSO), occurring every 2-7 years, and the positive phase of the Pacific Decadal Oscillation (PDO), which alternates with the negative phase every 20-30 years, are associated with

warm, nutrient- poor Pacific waters (Gjerdrum 2003). The strongest El Niños of the century took place in 1982-1983 and 1997-1998. In 1982-1983, the warmth continued long after the tropical signal passed and negatively affected Pacific marine ecosystems. Oregon coastal waters were significantly warmer between July 1997 and September 1998 than 1961-1971 averages (Huyer 2001).

Large SST changes off the Western United States have occurred during the past 80 years and the frequency of warm events has increased since 1977 (McGowan 1998). Increased SST reduces the upper water layer's density, raises the amount of work required to elevate deep isopycnals (a surface of constant water density), decreases the depths from which water is mixed, stirred, or upwelled, and delays the delivery of nutrients to the surface layer. As a result, ecosystems that rely on coastal upwellings suffer; plant nutrient rates, natural zooplankton, kelp, vertebrates, and possibly saline decline, and the benthic, intertidal community structure shifts (Korso et al 2006, McGowan 1998).

For the first time ever recorded, the onset of 2005 spring conditions occurred 50 days late off Newport, Oregon, leaving surface waters over the Oregon shelf warm for an extra seven weeks until mid- July. The upwelling of deep cold water occurred by May 24<sup>th</sup>, but the outer shelf gave no indication until two months later on July 13, 2005. Scientists believe this unexpected two month delay between the arrival of the late spring transition and the final surfacing of the upwelled water in mid- July could be correlated with surface wind stress and heating and should be studied further (Korso et al 2006).

More frequent Pacific El-Niño- like conditions are predicted as greenhouse gas concentrations increase in the atmosphere (Timmermann et al 1999). It is essential to understand how and why oceans change and how entire ecosystems will respond in order for the FWS to effectively prepare for climate change (Huyer 2001, McGowan 1998).

## **II. The CCP should incorporate information on how zooplankton are affected by changes in temperature and wind pattern**

Plankton blooms when spring wind and water currents saturate the sea surface with nutrients from deep within the ocean depths. As the water moves south during upwelling, nutrients are recycled and zooplankton thrives. Zooplankton, such as euphausiids (shrimp-like krill), eat phytoplankton and form the basis of the Pacific Ocean's food web. Zooplankton biomass and the abundance of larval fish declined between 1958 and 1960 coinciding with a warming trend of the California current. In 1977 the California zooplankton population declined by greater than 70% and has never recovered, potentially due to reduced upwelling driven by warming SST (McGowan et al 1998).

Plankton abundance is determined by climate-driven variations in water transport from the north. If the water circulation is forceful, zooplankton abundance increases and if the circulation is weak, there is less zooplankton (McGowan et al 1998). An increase in SST reduces the upper water layer's density. As a result, the depths from which water is mixed, stirred, or upwelled becomes shallower and plant nutrient rates and zooplankton decline (McGowan et al 1998).

Almost all of the predicted climate change effects on the Oregon Islands can be linked back to change in cold to warm zooplankton species or a decrease in overall zooplankton in the Pacific Ocean.

### **III. The CCP should incorporate information on how fish are affected by changes in temperature and wind pattern**

#### *Rockfish*

An absence of krill afflicts entire food chains since the prey fish that many other species rely on for survival consume zooplankton. In 1975 during a central California Current cool phase, rockfish were highly abundant, but after the 1976-1977 warm phase regime shift, rockfish declined. They continued to decline, hitting extreme lows in the 1990s. A cool regime returned in 2001 leading rockfish populations to rebound to numbers similar to those in the 1970's (Miller et al 2004). Global warming is expected to increase the frequency and severity of warm phases, negatively affecting rockfish abundance.

#### *Salmon*

The Oregon coho salmon population dropped in the 1990's and hit the extreme low of 14,000 in 1997, a 99% decline from historic levels. They started a slow recovery in 2000, and peaked in 2002 with an estimated 200,000 individuals. Despite the 2002 increase, coho salmon have been on the decline again since 2003 and federal scientists predict that they will continue this path. The recent removal of Oregon coho salmon's federal endangered species protection by the National Marine Fisheries Service could further their decline (Earth Share of Oregon 2006).

According to a variety of studies, changes in climate and ocean conditions, especially during the first year of life, play a critical role in the survival and abundance of salmon. A 2003 study reports that Oregon coho salmon had a higher marine survival rate when SST was cooler the winter prior to smolt or during the winter following smolt migration, possibly because of either improved feeding conditions or reduced predation (Logerwell et al 2003). One can extrapolate that warmer temperatures could correspond with lower coho survival. In addition, a later transition between winter downwelling and spring upwelling led to poor coho survival, while lower spring SST increased coho survival because nutrients were easily transported from below the surface (Logerwell et al 2003).

In 1982-1983, one of the most dramatic El Niño years, the average weight of Coho salmon in Oregon fisheries was the lowest on record (McGowan 1998). Between 1992 and 1998, low coho survival was associated with warm coastal SST (Logerwell et al 2003). Logerwell et al hypothesized that their prediction for 1999 salmon numbers was higher than the actual observed amount because subarctic zooplankton was unable to rebound from the low abundances that previously occurred in warmer El Niño years. Although lower than predicted, the situation reversed itself in 1999, supplying more evidence that temperatures can severely influence Oregon coho salmon survival (Logerwell et al 2003). When the Pacific Ocean temperatures decreased in 1999, zooplankton species changed and baitfish (smelt, anchovy, herring and sardine) increased (Emmett et al 1999). Emmett et al (1999) proposed that baitfish abundance can positively affect salmon survival by acting as 'alternative prey' and decreasing salmon predation rates.

#### **IV. The CCP should incorporate information on how sea birds are affected by changes in temperature and wind pattern**

An estimated 1.2 million sea birds nest on the Oregon Islands, more than on the Washington and California coasts combined. Dramatic declines have been noted in pigeon guillemots, common murre, and two species of cormorants. These seabirds share the same primary food source- the declining, nonmigratory rockfish.

##### *Common Murres*

Approximately 700,000 common murre nest on the Oregon Islands, nearly two-thirds of the total nesting population south of Alaska. Last year a radically different weather pattern during the breeding season resulted in the largest ever die-off of the common murre, the refuge's most populous seabird resident.

Although the principal prey item of the common murre is juvenile rockfish and their diet patterns correlate with rockfish abundance, studies show that adult common murre will switch from one prey to another depending on availability (Ainley et al 1996). One study suggests that murre rely on euphausiids during the pre-breeding period and then switch to juvenile rock fish later in the year when the fish reach sufficient size (Ainley et al 1996). Both rockfish and euphausiids may both suffer declines as SST rises, but adult murre may be able to adapt to changes in prey availability. For example, the use of rockfish by adult murre dramatically declined after 1989. In the 1980s' after the 1967-1977 PDO warm shift, rockfish numbers decreased, murre foraging habitat moved towards the coast, and anchovies became a more common food. The use of rockfish then rebounded in 2001, a few years after the cool regime, with 2002 numbers close to those during the cool 1970s (Ainley et al 1996, Miller et al 2004). Close correlations between the birds' use of rockfish and El Niño, La Niña, and intra-decadal climate patterns (such as PDO) make climate "a compelling explanation" to the observed variability in prey (Miller et al 2004).

Murre chicks may not adapt as well to changes in prey availability. Unlike adults' diverse diets, nestling murre must be fed prey that is less than 40mm (Manuwal et al 2002). If euphausiids and juvenile fish decrease, parents may not find adequate food for their young.

Although common murre prey upon euphausiids and juvenile rockfish, both not fished by humans, possible commercial future exploitation of adult rockfish and their alternate prey, herring and anchovies, could be detrimental for murre (Ainley et al 1996).

##### *Cassin's Auklet*

Although studies of Cassin's auklets have not been completed on the Oregon Islands, many have been carried out on California's Farallon Islands. This population of auklets is unlikely to adapt to a sudden loss of its main food source, krill, and has dropped 75 percent. In fact, 2006 is the second year in a row that almost none of the 20,000 nesting pairs raised a healthy chick. Researchers on the Farallon Islands agree that the decline of krill and Cassin's auklets corresponds with a 3-5 degree increase in California ocean temperatures (Wohlsen 2006).

A study on the Southeast Farallon Island concluded that upwelling and SST play a part in the availability of krill during the auklet chick-rearing time period. Auklets in the study were able to adapt to changing ocean conditions and prey availability by modifying

their time of breeding, but when ocean conditions worsened subsequent to breeding, auklets could not adapt, and nestling growth and productivity deteriorated (Abraham et al 2004).

If Cassin's auklets responded negatively on the Farallon Islands to climate-driven prey variability, they are likely to respond the same way on the Oregon Islands.

#### *Tufted Puffins*

A study conducted on Triangle Island, a small Pacific island north of Vancouver Island, British Columbia, suggests that warm SST corresponded with earlier tufted puffin breeding, advanced hatching dates, and decreased fledgling success and growth rates (Gjerdrum et al 2003). When average breeding-season SST exceeded 9.9 degrees Celsius, puffin fledgling growth rates dropped to virtually zero, implying that fledglings are particularly sensitive to higher SST (Gjerdrum et al 2003). Changes in SST likely caused prey species to become poorly distributed and harder to find as they escaped the warmth and emigrated to deeper water (Gjerdrum et al 2003).

Gjerdrum et al (2003) expect climate changes to cause dramatic effects on Pacific marine life, making Triangle Island, in particular, an unsuitable breeding ground. Since tufted puffins are a long-lived species that are not likely to show population declines until it is too late, it is especially important to start research now to see if the Oregon Island populations will be impacted like the ones on Triangle Island. Gjerdrum et al (2003) recommend more research to better-test the hypothesis that puffins will not switch to a new prey species if primary prey disappear.

### **V. The CCP should incorporate information on how marine mammals are affected by changes in temperature and wind pattern**

#### *Steller Sea Lions*

An estimated 800 threatened Steller sea lion pups are born on the Oregon Islands NWR each year, more than on any other site south of Alaska.

Steller sea lions are split into two categories: The Western Stock (includes Western Gulf of Alaska and Aleutian Islands) and the Eastern Stock (includes Eastern Gulf of Alaska and Western US). The western population declined by more than 80% between the 1970s and early 1990s, but may be stabilizing. Following a decrease in levels early this century, the Eastern population seems to be recovering (NSF 2005).

One hypothesis for the western stock's decline is that their diets shifted to lower quality food as the result of cool to warm Northern Pacific Ocean climate change (Fritz et al 2005). This change in water temperature and currents influenced Steller sea lions' quality prey species' numbers and abundance; less nutritious prey became more abundant and more nutritious prey became less abundant. Steller sea lions accommodated these changes by shifting to a less nutritious diet and scientists contribute nutritional stress to their decline (Fritz 2005). Decreased nutrition leads to less healthy individuals, which can lead to decreased birth and increased death rates (NSF 2005). Compared to adults, juveniles are especially susceptible to less nutritious food since they have higher metabolic rates compared to the size of their stomachs and may not be able to consume the necessary amount of food (NSF 2005).

While a dietary shift to less nutritious food can not solely be blamed for the drastic declines in western Steller sea lions, scientists have noted that western climate-induced ocean changes occurred simultaneously with pronounced sea lion declines. Similarly, the greatest abundance of Steller sea lions occurred during the Little Ice Age, while the end of the Little Ice Age coincides with a population reduction (NSF 2005). It is important to recognize that cooler temperatures favor Steller sea lions while warmer temperatures do not.

Additional research is required where the Eastern Steller sea lions forage since it is likely that the Eastern population will react the same way to changes in ocean temperatures and currents.

### *Harbor Seals*

Harbor seals have been thriving in Oregon since the passing of the Marine Mammal Protection Act in the 1970's and The National Marine Fisheries Service report that their populations are increasing at a rate of about 7% per year since then. There are approximately 10,000 harbor seals off the coast of Oregon, making them the most abundant pinniped found in Oregon's coastal and marine waters (Brown et al 2005).

Scientists hypothesize that the Farallon Islands in California experienced an increased harbor seal population during El Niño because warmer temperatures forced the seals to leave traditional areas of shallower waters in search of food in cooler, deeper water (Sydeman et al 1999). Additionally, Brown et al (1983) noted that harbor seals in Oregon moved from coastal to more estuarine regions in search of food during poor foraging conditions. These examples illustrate that population count numbers need to be scrutinized so differences in immigration numbers and internal population additions can be looked at separately (Sydeman et al 1999).

Unlike many of the other species discussed, harbor seals may not suffer extreme population losses due to climate change because they are opportunistic feeders, seem to migrate towards cooler locations, and will prey on a variety of benthic and epibenthic fish, including anchovy, smelt, herring, flatfish, cottids, gadids, sculpins, rockfish, sand lance, salmonids, and cephalopods (NMFS 1997).

### *Elephant Seals*

In 1993, Northern elephant seals started giving birth at Shell Island, Cape Arago, Oregon Islands NWR, the world's northernmost Northern elephant seal pupping site and the only place in Oregon that elephant seals regularly visit. Surprisingly, Shell Island, which often floods during storms, is not an ideal pupping site since pup survival is primarily dependent on the weather (Hodder 1998). Unfortunately, elephant seals may be relying on areas such as Cape Arago as they continue to migrate to the cooler north.

Quality breeding habitat may already be limiting the Northern elephant seal breeding population on South Farallon Islands' Sand Flat Beach. The 1983 El Niño storms washed away a majority of the sand and there have been substantial declines in breeding females at that location ever since (Sydeman et al 1999). If increased storms caused elephant seal problems in California, there is reason to believe that climate change could also cause many Oregon Island pups to perish, especially since Shell Island has a tendency to flood.

Elephant seals are negatively affected by decreases in nutritious prey as well (McMahon 2005). One study suggests that elephant seal pup weaning masses are important

to their survival (McMahon 2005). If krill numbers continue to decline, nursing elephant seal females will not be able to access appropriate foods and the pups may fall victim.

### *Gray Whales*

Visitors come to the Oregon Islands every year to witness gray whales' annual migrations. Gray whale populations, nearly extinct in the 1850's, seem to be flourishing; calves migrating along the West Coast increased by 8% since 2005 (Latifi 2006). Gray whales access their Arctic benthic food during periods when ice is less abundant and less likely to block nutritious food. It is especially important that pregnant adult females fatten up on small crustaceans and other small animals in the ocean's sediment prior to migration since they eat little during their migrations south. One study found that years with low calf production were associated with Arctic feeding seasons that were shortened due to extensive seasonal ice and suboptimal available nutrition (Perryman et al 2002). On the surface, it seems that less Arctic ice could lead to more accessible food and increased gray whale reproduction and survival.

Although warm- cold Arctic cycles are normal and do not necessarily reflect global warming, Wayne Perryman, A NOAA biologist, reports that gray whales are presently feeding further north than they were in the 1980s due to warmer Arctic temperatures and less overall ice (Rodgers 2006). Despite the fact that plankton-eating gray whale populations are increasing, global warming and diminished ocean upwellings could eventually decrease nutritious plankton and impair the whales' chances of survival (Dedina 2000).

## **VI. Recommendations**

Defenders urges the FWS to include the above information in the description of the refuge's resources and resource challenges within the CCP and in the "affected environment" section of the accompanying environmental impact statement. In addition, we have the following recommendations to be included in the CCP.

The refuge should conduct research and monitoring and encourage partners (universities, other government agencies) to conduct research on the ongoing and emerging ecosystem changes wrought by global warming.

Though there is overwhelming scientific consensus that the earth is warming and that the primary cause of this warming is human-caused increases in greenhouse gas emissions, much less is understood about the complex effects global warming will have on ecosystems and wildlife. We believe the National Wildlife Refuge System, and Oregon Islands NWR in particular, should develop a comprehensive research and monitoring program to function as an early warning system for climate-induced changes. As the steward of the majority of coastal rocks and islands along the Pacific Coast of the United States, the FWS has a unique role and opportunity to integrate research and monitoring throughout the Pacific coastal ecosystem, with a particular focus on nesting sea birds and marine mammals. Change detected at Oregon Islands NWR may not be enough to inform management decisions. A comprehensive program throughout refuges along the Pacific coast will be able to discern population level changes in abundance or distribution. The FWS should work closely with other owners and managers of coastal habitat on the Pacific, particularly the National Park

Service and the Bureau of Land Management. This will help fulfill the FWS requirement “to monitor the status and trends of fish, wildlife, and plants in each refuge” (16 U.S.C. §668dd).

The refuge should develop management actions to cope with climate-driven change.

Through the planning process, the FWS is required to identify and describe:

- Significant problems that may adversely affect the ecological integrity or wilderness characteristics and the actions necessary to correct or mitigate the problems; and
- Significant problems that may adversely affect the populations and habitats of fish, wildlife, and plants (including candidate, threatened, and endangered species) and the actions necessary to correct or mitigate the problems.

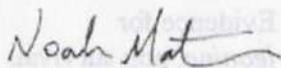
(602 FW 3, *Service Manual*). We hope this letter helps the FWS identify the significant problems affecting the refuge as a result of global warming. These problems are extremely complex, and involve interactions throughout the refuge ecosystem and food chain. Understanding climate-driven changes in real-time will be essential to allow the FWS to adapt management strategies to conserve the wildlife resources the refuge was established to protect. The FWS should incorporate adaptive management strategies based on research and monitoring into the CCP that will help alleviate the effects of global warming.

The refuge should include information about the effects of global warming on the refuge ecosystem in its environmental education and interpretation programs.

Tens of thousands of visitors enjoy wildlife watching, environmental education and interpretation at the Oregon Islands NWR. Environmental education and interpretation are priority public uses of the refuge system and when compatible, support the refuge system’s mission by building public understanding and support for wildlife conservation. According to the FWS General Guidelines for Wildlife Dependent Recreation (605 FW 1, *Service Manual*), recreational uses should provide “an opportunity to make visitors aware of resource issues, management plans, and how the refuge contributes to the Refuge System and Service mission.” As described above, global warming is one of the largest resource issues facing the refuge. It is incumbent upon the FWS to ensure the public is informed about the climate-driven changes occurring to the wildlife they have come to enjoy and learn about at Oregon Islands NWR. The FWS should develop brochures, interpretive panels, websites, and education and interpretation programs that include the vulnerabilities of the refuge’s resources to climate change.

We hope our comments have been helpful in the development of the Oregon Island NWR CCP and we look forward to participating in the planning process.

Sincerely,



Noah Matson  
Director, Federal Lands Program

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cc:  
Subject: Tags for Oregon Seabirds?

FYI

The attached announcement reminded me of the conversation we had in Bandon at the Public hearing for the Oregon Islands refuge management plan.

Installing tags on the birds at the colony will provide an opportunity to understand how Oregon's breeding seabirds are connected to the rest of the ocean.

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