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To: [Sissi Bruch](#)
Subject: Initial Survey Instructions: DNWR Shoreline Survey
Date: Thursday, April 22, 2021 3:47:46 PM
Attachments: [2019 Update WMNWRC ISI DNWR Shoreline 3 19 19.pdf](#)

Sissi,

Please find attached the Initial Survey Instructions (ISI) for the Dungeness National Wildlife Refuge Shoreline Survey. These standard operating procedures guide reconnaissance and Level 1 monitoring/surveys conducted to collect diversity and abundance of wintering wildlife within the survey area, for use in oil spill response. Level 1 represents a less intensive or robust type of survey, and as a result, does not provide statistically based results.

Surveys were conducted in 2014 and 2015 and covered a small portion of the proposed aquaculture lease area. Incidental observation of disturbance vectors were noted, but the survey was not intended to identify the quantity, magnitude, or duration of overall impacts from disturbance. The initial survey instructions do not identify the desired magnitude of detectable change, acceptable error rate or appropriate area as would be necessary to statistically determine disturbance impacts, because disturbance data collection was not the focus of this survey.

I hope this description provides a better understanding of the purpose and limitations of the monitoring associated with the ISI. As we discussed during our last meeting, a research project with a BACI design may be an appropriate way to collect scientific information needed for assessing the effects of aquaculture activities on species you have selected to monitor.

Hope your day is going well.

-jennifer

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[~~Dungeness NWR](#)~[Protection Island NWR](#)~[San Juan Islands NWR](#)~[Copalis NWR](#)~[Flattery Rocks NWR](#)~[Quillayute Needles NWR](#)~~



U.S. Fish and Wildlife Service
WASHINGTON MARITIME NATIONAL WILDLIFE REFUGE COMPLEX -
Refuge Specific Initial Survey Instructions
3/19/19 update



DNWR Shoreline Survey (T2)

Refuge(s): Dungeness NWR

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Background: According to the U.S. Coast Guard, Dungeness Spit (Spit) is one of the top five high-risk areas in the U.S. for oil spill events due, in part, to its prominent location within the Strait of Juan de Fuca and proximity to the high level of shipping traffic within the Salish Sea (Krusmann 2001). Approximately 17 billion gallons of oil are shipped through the Strait of Juan de Fuca each year in over 1,000 tankers; any spill from these tankers could potentially be devastating to refuge wildlife and habitats. In fact, predominantly westerly currents transported oil and/or oiled birds to the Refuge during the most recent spill in Port Angeles Harbor from the T/V Arco Anchorage in 1985.

Various surveys have been conducted within the nearshore habitat of DNWR. Those include the Marine Ecosystems Analysis (MESA) surveys conducted from 1978-1979, staff surveys conducted between 1977 and 1994 and the Puget Sound Seabird Survey (PSSS) in 2014. However, the PSSS consistently under-represents diversity and abundance of overwintering wildlife on DNWR because the PSSS defined a survey window of 4 hours around high tide. Yet the Spit is essentially inaccessible at tidal levels above 6'. In addition, it identified three survey points on DNWR near the base of the Spit which do not accurately represent diversity or abundance of most species that use the nearshore habitats on the Refuge. Finally, the PSSS focuses on seabirds while this survey is designed to collect data on all birds and marine mammals using the nearshore habitat around the refuge. While staff surveys conducted between 1977-1994 were more representative of the abundance and diversity of wildlife on the refuge, the methodology was not recorded and cannot be repeated.

Survey Objective(s): The objective of this survey effort is to collect baseline data on marine wildlife use of Dungeness NWR from October through April for use in marine spatial planning and to support Natural Resource Damage Assessment mitigation and restoration actions. This survey effort helps to meet two objectives within the Dungeness NWR CCP: 2.3 Protect and maintain barrier lagoons and mudflats of Dungeness Harbor and Dungeness Bay and 2.2 Protect and maintain the barrier beaches on Dungeness and Graveyard spits by providing current data for rapid response in the event of an oil spill (USFWS 2013). Results from this survey will provide a broader scope of inference when combined with the Midwinter Waterfowl Survey on DNWR by expanding the focus of that survey to all overwintering birds using nearshore habitats during the nonbreeding period. In addition, it provides data for use in assessing effects of the public use closure in these habitats.

Survey Design: This is a point count survey conducted once per month from October – April. Survey points are located at 1-mile increments which correspond to established mile marker (MM) signs 1-4, as well as at one point at the base of the trail (MM0) and one point 0.8 miles east of MM4 (MM5; see coordinates below). In order to limit human disturbance on this refuge, the survey point at MM5 is located

in a closed area yet out of sight of a known marine mammal haul out. No other closed areas are included in this survey effort. It is highly recommended that the surveyor have a GPS unit available to accurately locate the “MM5” point as well as other mm in which signs may have been washed away.

Observation Points			
Survey Point	Latitude	Longitude	Areas
MM5	48.183800	-123.105360	Strait only; @ 4.8 mi, shy of tip to reduce disturbance to haul out
MM4	48.177850	-123.123680	Strait & Bay
MM3	48.175358	-123.145243	Strait & Harbor
MM2	48.167350	-123.160790	Strait & Harbor
MM1	48.156790	-123.175060	Strait & Harbor
MM0	48.145790	-123.187680	Strait & Harbor
ToDS	48.183992	-123.100301	Strait & Harbor

Survey Areas		
Name	Area	Acreage
MM0	Harbor	8.2
MM0	Strait & Harbor/Lagoon	34.9
MM1	Harbor	36.1
MM1	Strait	33.8
MM2	Harbor	36.1
MM2	Strait	33.8
MM3	Harbor	36.3
MM3	Strait	33.6
MM4	Bay	36.6
MM4	Strait	33.2
MM5	Strait; point at 4.8 mi, shy of tip to reduce disturbance to haul out	36.3
ToDS	Strait and Bay	63.1

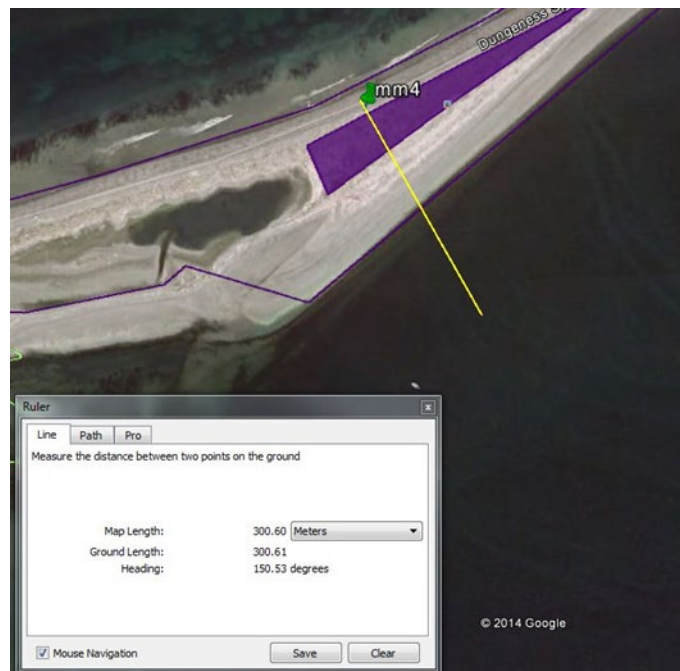
Survey Methods: The survey follows the methodology developed for the PSSS with a few basic exceptions (conducted at every mm along the Spit and within a tidal range of 2.5-6’).

Survey points are divided into Strait or Bay/Harbor areas following the table below. The Strait and Bay/Harbor side of each mm are surveyed separately to reduce the potential to miss a bird landing in the survey area or under water. A primary observer counts wildlife within a 300 m radius of the point, including all birds or marine mammals on land and in the water, for a maximum of 15 minutes each (i.e. 30 minutes and MM 4 = 15 minutes on the Strait and 15 minutes on the Bay side). Since birds in flight cannot necessarily be attributed to use of the land or water adjacent to the Refuge, do not spend time counting them unless they land in the current survey area. If a dedicated recorder is available, they should try to keep track of movement in the larger (Bay/Harbor area) noting approximate number, species, time and direction flown. This can then help reconciled birds already counted in one area that have flown to an adjacent, uncounted area.

This effort will be conducted once per month when the tidal window allows access to the Spit for 4 hours during the day. Given the restriction on access, the best survey conditions occur during an incoming tide

between 2-5.5/6'. Optimally, surveyors will begin at MM5 on an incoming tide and work toward the base of the spit so that if the water levels are higher than expected, they will not be stranded. To avoid double counts or missed individuals, one primary observer is responsible for the count, while the secondary observer will record data and alert the primary observer to movements in to or out of the radius of the count circle. Or, if time and optimum tidal conditions are limited, two observers could survey the count circle together with each taking a side (Strait or Bay/Harbor) and acting as their own recorders.

Each observer should familiarized themselves with 300m distance on shore using a measuring tape and/or selected permanent markers (i.e. Refuge sign and piling) to visually mark 300m prior to participating in the survey for the first time. This distance estimation can be tricky to remember every month, especially over the open water. It is highly recommended to recalibrate your visual estimation of 300m using a measuring tape or pre-established permanent markers. A 50m measuring tape is available from the office for this use.



If at all possible, surveyors should use a pair of binoculars of 8-10x or better along with a spotting scope of 20X or better to positively identify similar species at the extent of the 300m radius.

Every effort should be made to avoid double counting:

- Whenever possible, birds should be differentiated by distinguishing features and location.
 - Distance from shore or other marker and direction of drift/movement
 - Group size, species richness
 - Proportion of adults vs juveniles
- If a movement of birds occurred, only those birds within 300m should be recorded and only if the observer was reasonably certain that they were not counted previously.
- Wait to record birds in flight until after the survey period and only record them below the count totals on the spreadsheet.

In addition, record the following survey conditions were recorded for the entire survey period (not each point):

- Weather: Clear, Partly Cloudy, Overcast, Fog
- Precipitation: Rain, Snow, None
- Sea State: Calm, Rippled, Choppy, Wavy, Rough
- Beaufort Wind Scale
- Visibility: Excellent - able to count and id all; Good - able to count and accurately id most except for large flocks, birds at limit of range or similar species; Poor - unable to id or count accurately.
 - o Reason: Glare, Sea State, Weather, Other _____
- Tidal Movement: Low, Low Raising, Low Falling, Mid, Mid Raising (see figure below)
- Disturbance: List disturbance factors noted (e.g. walkers, power boat, kayak or hunting raptors).
- Effects of Disturbance: Provide a very general description of the response from the majority of the birds to the disturbance (e.g. none; birds move away or flush gradually; flush and return).
- Conditions prior to survey that may have affected results: Note passage of storms prior to survey that may have altered abundance (ice storm; wind storm; 4-day storm).

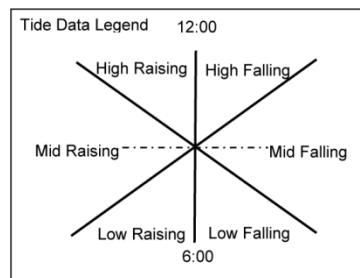
It can be difficult to see birds in rough, stormy waters. If possible, reschedule your survey effort to another day.

Figure. Beaufort Wind Scale

Force	Speed			Name	Conditions at Sea	Conditions on Land
	knots	km/h	mi/h			
0	< 1	< 2	< 1	Calm	Sea like a mirror.	Smoke rises vertically.
1	1-3	1-5	1-4	Light air	Ripples only.	Smoke drifts and leaves rustle.
2	4-6	6-11	5-7	Light breeze	Small wavelets (0.2 m). Crests have a glassy appearance.	Wind felt on face.
3	7-10	12-19	8-11	Gentle breeze	Large wavelets (0.6 m), crests begin to break.	Flags extended, leaves move.
4	11-16	20-29	12-18	Moderate breeze	Small waves (1 m), some whitecaps.	Dust and small branches move.
5	17-21	30-39	19-24	Fresh breeze	Moderate waves (1.8 m), many whitecaps.	Small trees begin to sway.
6	22-27	40-50	25-31	Strong breeze	Large waves (3 m), probably some spray.	Large branches move, wires whistle, umbrellas are difficult to control.
7	28-33	51-61	32-38	Near gale	Mounting sea (4 m) with foam blown in streaks downwind.	Whole trees in motion, inconvenience in walking.
8	34-40	62-74	39-46	Gale	Moderately high waves (5.5 m), crests break into spindrift.	Difficult to walk against wind. Twigs and small branches blown off trees.
9	41-47	76-87	47-54	Strong gale	High waves (7 m), dense foam, visibility affected.	Minor structural damage may occur (shingles blown off roofs).
10	48-55	88-102	55-63	Storm	Very high waves (9 m), heavy sea roll, visibility impaired. Surface generally white.	Trees uprooted, structural damage likely.

11	56-63	103-118	64-73	Violent storm	Exceptionally high waves (11 m), visibility poor.	Widespread damage to structures.
12	64+	119+	74+	Hurricane	14 m waves, air filled with foam and spray, visibility bad.	Severe structural damage to buildings, wide spread devastation.

Figure. Tidal stage chart used for the DNWR Avian Shoreline Survey.



Personnel: Sue Thomas, Wildlife Biologist, coordinates the survey and refuge volunteer involvement, serves as the primary observer, compiles and processes data. Refuge volunteers help conduct the survey as secondary observers. Roughly 2/3rds of early surveys conducted by Refuge volunteers & OPAS members.

Data Management and Analysis: Metrics: Index counts of all shorebird, waterbird, waterfowl, avian predators and marine mammal species within the surveyed areas on DNWR barrier beach and mudflat habitats, including open water within a 300m radius. Data are processed in an Excel database and saved to the main server for the Complex office. This server is backed up monthly to an external hard drive.

Other Important Information:

<http://www.seattleaudubon.org/sas/WhatWeDo/Science/CitizenScience/PugetSoundSeabirdSurvey.aspx>

Equipment:

Protocol & Survey Area Map(s)
 Datasheets & clip board with elastic band to hold down data sheets in the wind
 Pencils or Permanent Ink Pen
 Binoculars, Scope and tripod
 GPS and/or measuring tape
 Tally Counter
 Watch
 Sunscreen
 Water
 Field guide
 Gloves, hat, hand warmers

Krusmann, J. 2001. Final CAP report for the Dungeness National Wildlife Refuge. Sequim, Washington: USDI Fish and Wildlife Service. Unpublished report. 10 p.

