



Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Re: Sea otter foraging patterns

19 messages

Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Fri, Jul 8, 2016 at 11:22 AM

To: Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov>, Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Hi Jessie,

I hope the summer is treating you well. We'll be heading out to the OCNMS to do dive surveys again in August, will you be out counting otters and monitoring foraging habits?

I'm writing, because we are working on writing up our results from last year's diving surveys and we had a few thoughts about incorporating otter data. We have two time lines we're working toward: first, we'd like to get a draft together before we go out and do surveys again in the middle of August and then a longer timeline for finishing the paper up. So, we were first wondering if you happen to have the raw data that went into the density maps across the decades that you shared with us last year? We would be interested in the annual counts of adults and pups at each survey site (see example data sheet attached). We see the data from WDFW for years 2001-2013, but we were hoping to get the historical data also (i.e. 1977 - 2001). With the first timeline in mind, we'd be happy to get anything that you have in hand to begin working with - the idea is to look at changes in otter counts over time that we can compare with the subtidal data from historical work by Rick Kvitek in the 80's and 90's and our current work. I've attached an example data sheet with the type of data we are hoping to find.

On the longer time horizon, we'd love to chat with you more about which otter survey sites would be most appropriate to consider in relation to our dive sites (e.g., does Giants Graveyard represent the otter population that would affect our surveys at Teawhit Head?) and to get your take on how foraging patterns may have changed over time. All of this, would of course make you a co-author on any publications that come from this data.

Thanks for any thoughts and hope to hear from you soon!

Kelly

On Sat, Oct 17, 2015 at 4:01 PM, Kelly Andrews <kelly.andrews@noaa.gov> wrote:

Thanks Jessie! I'm out at sea right now, but will get back to you with any questions.

Kelly

Sent from my alarm clock

On Oct 15, 2015, at 7:19 PM, Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov> wrote:

Hi Kelly-

Attached are the kernel density maps for each decade. There is a map for the 1980s, 1990s, 2000s, and 2010s. The maps include sea otter count and location through 2012. The surveys weren't quite annual, so each map summarizes a slightly different number of years.

It looks like there is some overlap between my foraging observation sites and your dive sites- I have made observations at Giants Graveyard (by Teawhit Head) and from the mainland near Destruction Island (between Ruby Beach and South Beach Campground). I will be making observations at Cape Alava, Koitlah Point (in Makah Bay), and Point of Arches soon. I am definitely interested in presenting my work, but I don't have many foraging analyses to present as I have been focusing on my population model and foraging data collection. Maybe a later date would be better anyway because I will have added more observation sites!

Jessie

On Tue, Oct 6, 2015 at 10:31 AM, Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov> wrote:
Hi Jessie,

The maps of kernel density each decade would be great to see! We don't necessarily need the GIS data at this time. Attached is a map showing the location of each of our dive sites. We're mostly interested in knowing whether the otters are actually feeding in these shallow kelp forest locations where we collected data...i.e. do the otters dive and forage in these really dense kelp forests in about 15-20 feet or do they spend more time around the edges or in deeper reaches of the kelp beds. For example, if we didn't see any urchins in these shallow kelp beds, is it reasonable to assume that is because otters forage at these sites and limit their abundance or should we be thinking about other processes.

Anyway, I think we'd all be interested in hearing about the foraging observations that you're making also, especially if there is any overlap with our sites. Would you have any interest in presenting any of this work? We have every-other-week meetings on Mondays where one of us, or an invited speaker, comes in and gives a rather informal talk on the current state of their research. If so, let me know and I'll see if any of the open dates work with your schedule.

Thanks!

Kelly

On Mon, Oct 5, 2015 at 2:29 PM, Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov> wrote:
Hi Kelly-

What areas did you survey? I don't have active foraging areas mapped, but I do have kernel densities of sea otters mapped based on the annual survey data. The kernel density is essentially a measure of sea otter "impact" and accounts for sea otter persistence in an area (i.e. how many years they have been present, and likely foraging) and how many sea otters have been counted in an area. Part of my thesis is looking at how sea otter diet varies over this gradient of impact.

Most areas of historical sea otter presence still have sea otters, but just more of them now- I think once a site becomes part of the established sea otter range it remains. Whether or not sites are active or inactive foraging sites I don't think would change, except for in the Strait of Juan de Fuca where sea otters moved in in 1995 and back out. Steve Jefferies and Ron Jameson would likely be able to provide more information on this than I would.

I make foraging observations at 8 or so sites, but perhaps there is some overlap between my sites and where the dive surveys were done and I can provide some insight!

I am happy to send my maps as well. I have the kernel density summarized as maps for each decade so you can see how the sea otter impact has changed since their reintroduction. I would have to ask permission to give you the GIS files since the data isn't mine, but I imagine it would be fine since the data is published in the survey report which is public.

Maybe there is some potential for collaboration, looking at how sea otter diet and benthic communities change across a gradient of sea otter impact!

Jessie

On Thu, Oct 1, 2015 at 4:01 PM, Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov> wrote:
Hey Jessie,

We've started thinking more about the kelp forest surveys that we did in the Sanctuaries this summer and have a few questions about whether sea otters were still actively foraging in the areas we surveyed.

Do you have active foraging areas mapped out in the Sanctuary? Do you happen to know whether these foraging areas have changed over time? I assume so, but I was wondering if there are any maps or GIS files that you might be able to share with us? We just want to make sure that we understand how foraging varies across our sites and whether that spatial variation has changed over time.

Thanks for any help!

Kelly

On Tue, Aug 25, 2015 at 11:44 AM, Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov> wrote:

Hi Jessie,

It was great to meet you earlier in the month.

I talked with Liam about this at the end of our fieldwork and he told me that you were compiling a cross-correlation list of indicators in the document with indicators and attributes that the Sanctuaries are specifically interested in. I was thinking I might be able to get the guts of the spreadsheets to you faster if I saw which components, attributes, and indicators you were most interested in - i.e. many or most of them may already be cleaned up and available.

Anyway, if you want to send that along, that might be a faster route to getting what you want from me!

Thanks,

Kelly

On Mon, Jul 27, 2015 at 10:07 AM, Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov> wrote:

Hi Kelly-

Thanks for the speedy response! It would be great if you could send me them when they are finalized. I will be evaluating the report for all of the habitat types except the estuarine habitat.

Thanks again!

Jessie

On Mon, Jul 27, 2015 at 9:37 AM, Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov> wrote:

Hi Jessie,

I can certainly share them with you, but we're still putting the final touches on them - they're a little difficult to follow all the way through at the moment. As we get them finalized, I will pass them on to you. Are there particular habitats that you are interested in or just all of them?

Thanks,

Kelly

On Mon, Jul 27, 2015 at 9:21 AM, Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov> wrote:

Hi Kelly-

I am working with Liam Antrim to evaluate the state ecosystem indicator report for the Olympic Coast National Marine Sanctuary. I wasn't able to find links to the appendices mentioned in the report on the WA Marine Spatial Planning website. Is that something you can share with me?

Thank you!

Jessie Hale

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<Density 80s.jpg>

<Density 90s.jpg>

<KDEs and Cumulative Density.jpg>

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**Example sea otter data.xlsx**

33K

Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>
To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Tue, Jul 12, 2016 at 8:58 AM

Any word back yet?

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Kelly Andrews <kelly.andrews@noaa.gov>
To: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Tue, Jul 12, 2016 at 12:53 PM

Nada

[Sent from my alarm clock](#)

[Quoted text hidden]

Me via Boomerang <jameal.samhouri@noaa.gov>
To: jameal.samhouri@noaa.gov

Thu, Jul 14, 2016 at 3:54 PM

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Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Fri, Jul 22, 2016 at 11:02 AM

To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Cc: Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov>

Hi Jessie,

Just checking in, in case this email was lost in summer fieldwork fun. Let me know if you have a few minutes to chat by phone if that is easier!

Jameal

[206-962-0984](tel:206-962-0984)

[Quoted text hidden]

--

Jameal Samhouri

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Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Mon, Aug 1, 2016 at 9:58 AM

To: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>, jrh33@uw.edu

Cc: Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov>

Hi Jessie,

I just realized that maybe you don't check this NOAA email account very often anymore. See below for a couple questions we have about collaborating with you.

Thanks!

Kelly

[Quoted text hidden]

Jessica Rhian Hale <jrh33@uw.edu>

Thu, Aug 4, 2016 at 6:13 PM

To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>, Jessica Hale - NOAA Affiliate <jessica.hale@noaa.gov>

Hi all-

Thanks for reaching out! I will have to ask permission from Ron Jameson and Steve Jeffries to share the raw sea otter count data with you for your paper. Sounds like a very interesting and important project incorporating Rick Kivitek's work as well as yours and the sea otter counts - I am interested in collaborating and coauthoring.

As far as which otter survey sites would be most appropriate to consider in relation to your dive sites, I am happy to provide insight on that. Based on the average travel distance of 5km between resting and foraging locations and the average sea otter home ranges by sex, I can estimate if your dive sites would fall within an appropriate radius for the survey/foraging observation sites in GIS. Something to keep in mind is that the survey reports summarize the counts by site (i.e. 100 otters at Giant's Graveyard etc.), while in reality those sea otters may have been counted in slightly different positions during the survey. The true positions (not just the sites the correspond to) are reflected in the raw count data, so they would provide more accurate details on sea otter use of your dive survey areas/sites.

I have only done some cursory analyses looking at how sea otter diet has changed over time - I will be doing the bulk of this analysis this fall using data from the 1990s and 2010s, and this will make up the bulk of my thesis on sea otter foraging (in addition to the population modeling portion).

Will get back to you when I know more!

Jessie Hale

[Quoted text hidden]

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Jessica Hale

Nancy Foster Scholar, NOAA's Office of National Marine Sanctuaries

PhD student, University of Washington

<http://fosterscholars.noaa.gov/scholars.html>

<http://halejessie.wordpress.com/>



Follow National Marine Sanctuaries:



Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Fri, Aug 5, 2016 at 9:12 AM

To: Jessica Rhian Hale <jrh33@uw.edu>

Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Hi Jessie,

Thanks for getting back to us and it's great to hear you're interested! We're trying to finalize plans today with diving beginning on Monday, so if it's possible to get any insight today or over the weekend, that would be great! We have five general sites picked out: Destruction Island, Cape Johnson, Cape Alava, Tatoosh Island, and Neah Bay, but we haven't settled on exact diving locations within these sites. However, we will likely be wanting to dive within the "persistent kelp beds" identified in the attached maps. I realize these maps don't have lat/longs on them, but hopefully you could give us some idea of the overlay of otter foraging/resting radii with these kelp beds.

Thanks in advance for any information we could use to narrow down our exact diving locations!

Kelly

[Quoted text hidden]

 **Kelp-maps.docx**
760K

Jessica Rhian Hale <jrh33@uw.edu>

Sat, Aug 6, 2016 at 3:02 PM

To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Hi Kelly and Jameal-

Okay, here are some thoughts on the overlay of otter foraging/resting areas with those kelp beds. I don't have access to GIS at the moment (I'm not on my work machine), but hopefully this helps you finalize your dive sites!

Destruction Island: The kelp bed on the N/NE side will overlap well with sea otter rafting areas. Otters have consistently been counted there in the multiple hundreds. Otters are also consistently counted at the W end near the expanded kelp bed indicated on your map - in the low hundreds or below. It is unclear to me though if they are actively foraging in that area anymore and I haven't been able to access the island to do foraging observations. It is unlikely that that area alone

can continue to support that many otters persistently. From my cumulative density analysis, it has the highest cumulative density of otters in WA - 204 otters/km² (densities of otters each year, summed between 1977-2014).

Cape Johnson: When I was in that area in June 2015 to count sea otters (from Bluff Point, the point just to the N of Cape Johnson) the otters were rafted by the reef to the west of Bluff Point - named "Bluff Point reef" on the WDFW survey reports. That is also where they have been counted most in recent years during surveys. I think that rafting area (and possibly foraging area) would overlap well with the farthest west kelp bed indicated on your map (the one with only a little bit of green persistent kelp bed). Chilean Memorial (just south of Bluff Point by .25 miles) has a cumulative density of sea otters from 1977-2014 of 47.36 otters/km².

Cape Alava: When I observe sea otters foraging and rafting in this area they are just west of Cannonball/Tskawahyah island (connected to the mainland with a small isthmus). I would try to dive in that persistent kelp bed just west of the island on the east side of the reef there. Cannonball has a cumulative density of 59 otters/km² from 1977-2014.

Tatoosh Island: This is a relatively low density site (cumulative density of 1.33 otters/km² from 1977-2014). Otters have been counted there in recent years on the west side of the island, right about where that small green persistent patch is on the west side in your map. So that would be my pick for a dive site.

Neah Bay: This area is a very low density site (cumulative density of 0.02-0.07 otters/km² from 1977-2014). When I observe sea otters foraging in that area I can observe them from Baada Point (between there are Waadah Island) and at Koitlah Point. The largest densities of otters I have seen there are by Koitlah Point (just west of Waadah Island). I would pick a dive site near Koitlah Point if possible. They forage very close to the point there - it is the only place in WA where I have had to worry about spooking the otters from land!

I am not sure I fully understand what you are going for with your site choices (other than that you want to pick dive sites representative of the sea otter survey sites), but hopefully this helps you decide on your dive sites. Are you resampling the Kvitek subtidal sites? And/or are you looking at subtidal communities across a gradient of sea otter occupation?

I am also curious how large of a role the otter data would play in your paper. I am not sure if I will get the OK to share the raw data, and am thinking of other options to still look at changes in otter counts over time to compare with the subtidal data from historical work by Rick Kvitek and your current work.

I will be camping at Pacific Beach state park for sea otter foraging observations Monday-Friday, so if you happen to be in/near that area for the dive surveys let me know! Best of luck with the surveys!

Let me know if you have any other otter questions!

Jessie

[Quoted text hidden]

Kelly Andrews <kelly.andrews@noaa.gov>
To: Jessica Rhian Hale <jrh33@uw.edu>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Sat, Aug 6, 2016 at 11:21 PM

Thanks a lot for details Jessie! We'll be in touch once we get back to the office.

Kelly

Sent from my alarm clock

[Quoted text hidden]

Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
To: Jessica Rhian Hale <jrh33@uw.edu>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Tue, Aug 16, 2016 at 2:49 PM

Hi Jessie,

Well, we had a good week of diving along the coast last week. Thought I'd quickly touch base and let you know where we ended up sampling:

Destruction Island: We dove mostly along eastern slope of the island, in some of the "expanded normal bed" and the southernmost sections of the "persistent bed". We only saw a handful of otters during the whole day.

Cape Johnson: We dove in the furthest west "persistent bed" where you mentioned would overlap well with the Bluff point otter counts.

Cape Alava: We dove between the Bodelteh Islands and Tskawahyah Island, a little closer to the Bodelteh Islands in the patchy "persistent beds" shown on the map.

Tatoosh: We didn't dive along west side due to the prevailing swell and typically more difficult conditions over there, so we dove in that most northern "persistent bed" on the map. Lots of sea urchins there! Only a handful of urchins at the three other southern sites combined!

Neah Bay: We dove in the "persistent beds" just southeast of Koitlah point, so I think we may be good there as far as otters go also.

I'm not sure how big a role the otter data will play, but it would certainly be great to get it at the lower spatial resolution that you mentioned is available in the raw counts. Otherwise, the data that you show in those density maps would be useful. We weren't specifically resampling the Kvitek sites this year, as we wanted to think a little more broadly for long-term monitoring and what we can get done in a week with our team. However, the first paper that is being written right now will likely focus on big-picture changes that we observed at the Kvitek sites and whether that might have anything to do with otters (in particular that we saw very, very few inverts that would usually be considered otter food).

Anyway, hope observations went well for you last week and please let us know as soon as possible whether the raw data can be used for this work or whether we can just use the data from the density maps. We can then schedule a call to chat about all of it.

Thanks!

Kelly

[Quoted text hidden]

Jessica Rhian Hale <jrh33@uw.edu>

Wed, Aug 17, 2016 at 12:16 PM

To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Cc: Jameal Samhoury - NOAA Federal <jameal.samhoury@noaa.gov>

Hi Kelly-

Great to hear you had a successful week! Interesting about the urchins at Tatoosh - were they large urchins?

There is not a lot of support for me giving out the raw unpublished sea otter count data, so I won't be able to give it to you. But I think an appropriate variable might be my density surfaces (in various years) for the select sites you are looking at (i.e. "when Kvitek sampled these sites, otter density was X, when we resampled and observed fewer large inverts, otter density was Y"). Does that make sense for the paper? Ideally you could cite me (my thesis chapter) with the density surface rather than publishing them first, but I realize your timeline may be shorter than mine, so maybe there is some work around where you can cite me as Hale et al. in prep.

I also think it may be appropriate to include both Ron Jameson (USGS, retired) and Steve Jeffries (WDFW) on the paper if sea otter data is included, since I did not collect the sea otter count data myself.

Would you be able to provide your subtidal survey data to me for inclusion as a variable in my model or for part of one of my PhD chapters?

That would be great if we can schedule a call to chat about all of it. I am in the field the 22nd-26th but am otherwise mostly available the next couple of weeks. Let me know what works for you. My number is (206) 499-8167.

Jessie

[Quoted text hidden]

Jameal Samhoury <jameal.samhoury@noaa.gov>

Thu, Aug 18, 2016 at 3:15 PM

To: Kelly Andrews <Kelly.Andrews@noaa.gov>

What do you think?

Most of the data through 2013 are available online...

Begin forwarded message:

From: Jessica Rhian Hale <jrh33@uw.edu>
Date: August 17, 2016 at 2:16:38 PM CDT
To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>
Subject: Re: Sea otter foraging patterns

[Quoted text hidden]

Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
To: Jameal Samhouri <jameal.samhouri@noaa.gov>

Thu, Aug 18, 2016 at 4:50 PM

I think it makes sense to just use her density surfaces values - no need to get all the other sea otter folks involved - but, I may be missing something as I don't think I have a full picture of the outline of the paper.

K

[Quoted text hidden]

Jessica Rhian Hale <jrh33@uw.edu>
To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Fri, Nov 11, 2016 at 10:50 AM

Hi Kelly and Jameal-

I wanted to follow up about the possibility of collaborating with you on your paper and including some metric of sea otter occupation. How is the paper coming? Do you still want to schedule a call about it? I am going to be out of the country November 17th-27th but am otherwise available. I am working on analyzing my foraging data now (across a gradient of sea otter occupation) and am aiming to have those results published around the new year.

Jessie Hale

[Quoted text hidden]

Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
To: Jessica Rhian Hale <jrh33@uw.edu>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Thu, Nov 17, 2016 at 4:32 PM

Hi Jessie,

Thanks for following up. We're a little delayed on the paper, but should be getting back to it over the next couple of months. I think we're going with data available in the available documents, but we'll chat a little more to make sure that data is sufficient and get back to you. Enjoy being out-of-country and I hope your foraging analyses go well!

Talk to you soon,

Kelly

[Quoted text hidden]

Jessica Rhian Hale <jrh33@uw.edu>
To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Mon, Nov 28, 2016 at 5:32 PM

Hi Kelly-

Okay, best of luck on the paper! Let me know if you need anything from me.

Talk to you soon,

Jessie

[Quoted text hidden]

Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>
Cc: Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>

Wed, Nov 30, 2016 at 10:02 AM

Yo,

Hope I captured the overall thoughts on the sea otter data needs here with Jessie. Let me know if there anything I can do to help the paper along.

K

[Quoted text hidden]

Jameal Samhouri - NOAA Federal <jameal.samhouri@noaa.gov>
To: Kelly Andrews - NOAA Federal <kelly.andrews@noaa.gov>

Wed, Nov 30, 2016 at 10:04 AM

yup

[Quoted text hidden]