Bull Kelp Working Group Meeting #3
April 26, 2021, 11:00 to 2:00 pm via Microsoft Teams
Meeting Summary

Welcome, introductions, announcements

Participants

Name	Affiliation
Kirsten Ramey	CA Dept. of Fish and Wildlife (CDFW)
Adam Frimodig	CDFW
Rebecca Flores Miller	CDFW
Gina Contolini, Ph.D.	CDFW, Sea Grant
Susan Ashcraft	CA Fish and Game Commission
Corinna Hong	CA Fish and Game Commission, Sea Grant
Doug Bush	The Cultured Abalone Farm (kelp harvester representative)
James Jungwirth	Naturespirit Herbs, LLC (edible seaweed harvester representative)
Cyndi Dawson	The Pew Charitable Trusts (Castalia Environmental)
Tom Ford	The Bay Foundation
Rietta Hohman	Greater Farallones Association
Janet E. Kübler, Ph.D.	CA State University, Northridge
Eliza Harrison	Ocean Rainforest

- The Intertribal Sinkyone Wilderness Council (ITSWC) posted their Tribes' April 2021 draft proposal for amending commercial kelp and seaweed regulations on their webpage at https://sinkyone.org/news

Guest speaker – Meredith McPherson, Ph.D. Candidate, University of California, Santa Cruz to discuss her research "Large-scale shift in the structure of a kelp forest ecosystem co-occurs with an epizootic and marine heatwave"

- Research based on bull kelp in Sonoma and Mendocino counties using a 30+ year (1985 – 2019) satellite imagery time series dataset, and model developed to determine dominant drivers selecting for large scale (e.g., oceanographic features), local scale (e.g., temperature, nitrogen, wave height), and biological factors (e.g., purple sea urchin density).
  - 2014-2019 large bull kelp decline, and the range narrowed. Some evidence bull kelp may have improved a bit in 2020 but still low.
  - Historically bull kelp was resilient, rebounded quickly after the 1997-98 large El Nino, however more recently since 2014 has remained at historical minimums.
  - Lack of predator diversity reduced ecosystem resilience; did not have sunflower star declines in the past and interestingly started seeing loss in sunflower stars prior to 2014.

        - Combination of both predator/prey and temperature/nutrients is important for recovery and to consider for restoration strategies.
        - Management recommendations: Prioritize time-series measurements of remotely sensed and *in situ* data for biological and environmental parameters. Develop environmental forecasting models.
    - Also working on a project to determine bull kelp canopy biomass using remote sensing techniques. Conducted a one-time study of sites in Mendocino and Monterey counties with drone multi-spectral imagery flights and diver surveys. High site variability challenged the ability to consistently predict canopy biomass regardless if bull kelp or giant kelp.
        - Management recommendations: Determine priorities (canopy area is a great tool), feasibility of a long-term study design, and potentially develop relationships at specific sites in lieu of long-term monitoring.
    - Discussion:
        - Until developed relationships, can we use a range of coefficients (between bull kelp canopy area and biomass)? Meredith, Rietta, Sara Hutto are working on estimates in the Blue Carbon report for the Greater Farallones.
        - BKWG member asked for Meredith's opinion, considering the bull kelp collapse how should we consider harvest? For harvest and not knowing the scale of harvest it seems concerning to harvest (in Sonoma and Mendocino counties) because there is little kelp there and bull kelp is an annual.
            - Response by BKWG member: Every spore matters.
        - Confirmed 95% is the average bull kelp loss for Sonoma and Mendocino counties prior to the marine heatwave beginning in 2014, not just from 2008. Concern was expressed that this is not the case for bull kelp in Humboldt and Del Norte counties, and researchers do not know why Oregon as well as Humboldt and Del Norte counties did not experience the same declines.
        - Long-term monitoring is important. Areas of interest to harvesters are different than biological interests. Consider this for sites within the network of ecological monitoring. Landsat series is good to consider trends but is difficult to find more spatial detail. Prioritize time series and other higher resolution sensors to supplement Landsat, and look into biological connectivity.

CDFW proposed approach (including data review), continued from March meeting

- Proposed changes are based on current status of bull kelp using best available data discussed during the last BKWG meeting and revisited during this meeting.
    - Satellite imagery does not differentiate between giant and bull kelp. Cannot use the data south of San Francisco to consider bull kelp status where both kelps co-exist.
- CDFW's proposed regional management approach north of San Francisco:
    - Proposed changes would have a sunset date of potentially 3-5 years or until the Kelp Restoration and Management Plan (KRMP) is completed

        - Based on a precautionary approach due to significant declines in bull kelp in northern CA, suggest a prohibition on all bull kelp harvest in Mendocino and Sonoma counties regardless of intended use.
        - Prohibit bull kelp harvest in Marin county due to concerns of harvest shifting to this county where kelp abundance is historically low.
        - In Humboldt and Del Norte counties, limit number of harvesters to the two existing companies who harvest in that area, maintain the current harvest limit (2 tons/year/license) and human food only use.
        - Hiatus on accepting applications for new kelp leases for the three lease-only beds along the north coast. This would be an administrative change, not regulatory.
- CDFW presented data on the annual maximum canopy from 1984- 2020 derived from satellite imagery of giant and bull kelp by region and for counties north of San Francisco. 2020 data reflects the maximum canopy from the first three quarters, the last quarter data is not available.
    - Same data as previously shared, but the scale is different due to a conversion error (fixed in the graphs). Same trends.
    - North coast has natural fluctuations in bull kelp over time until 2014 when populations dropped and in Sonoma and Mendocino counties remained low for a longer period of time than ever recorded.
    - Kelp abundance in Del Norte and Humboldt counties do not drop and remain low starting in 2014 as in Mendocino and Sonoma but show similar variability as in prior years. Interestingly, kelp canopy increased in 2016 during the marine heatwave. Most recently, Del Norte county kelp decreased in 2020 compared to 2019.
    - Mendocino and Sonoma counties dramatic bull kelp reduction has persisted since 2014.
    - CDFW received updated data with the last 2020 quarter for some sections of Mendocino and Sonoma counties (Point Arena to Jenner), still does not show recovery.
- CDFW presented the percent of bull harvest for those who harvest other edible seaweed from 2002 to 2020. The data only considered those harvesters who have historically harvested bull kelp. Data was presented statewide and for the north coast counties.
    - Del Norte County commercial bull kelp take consistently 50% or greater of all edible seaweed take from 2015 to 2019.
    - Historically, bull kelp is not commercially harvested consistently in Humboldt County, at most there has been one harvester for the three years which harvest occurred (2010, 2011, 2015).
    - Mendocino and Sonoma combined commercial bull kelp take is under 10% of harvest for most years. Between 2014 and 2020 the percent of bull kelp harvest ranged from 0% in 2019 to 7% in 2015. Historically, bull kelp is not commercially harvested consistently in Sonoma County,

at most there has been one harvester for three years which harvest occurred (2010, 2011, 2017).

- Discussion
    - BKWG member observed an increase in kelp canopy in Del Norte in 2020, maximum kelp canopy in Del Norte tends to be in the winter. Mentioned an interim report stated an increase in bull kelp in 2020. Other BKWG member clarified the drone data is still being processed and is not final. Anecdotally some more kelp than previous year, but cautious to say it is recovery.
    - CDFW provided the percent harvest graphs to consider any closure impacts to businesses, to help determine how much harvest is reliant on bull kelp.
    - BKWG member stated harvesters did not harvest when kelp was low in Mendocino and Sonoma.
    - Is there a species shift in harvest since less bull kelp has been taken? Harvest is generally based on projected sales through niche markets for specific species that have been developed over years. CDFW has not yet considered harvest shifts for other species but will be important to consider during the edible seaweed working group.
- Harvester recommendations (James Jungwirth and Doug Bush)
    - James provided an overview of “Bull Kelp Stakeholder Presentation 3.25.2021” developed by several harvesters. Document available upon request from rebecca.floresmiller@wildlife.ca.gov.
        - Did not discuss making regulations more user friendly for harvesters, may be a future topic.
    - Doug provided an overview of “Bull Kelp Commercial Stakeholders Counter” developed by several harvesters. Document available upon request from rebecca.floresmiller@wildlife.ca.gov.
        - Disagrees every spore is precious. Not an accurate representation of a dynamic living resource, natural spore loss.
        - CDFW has the opportunity to use technology (e.g. Landsat) to develop a management program to make real-time decisions on harvest quotas based on canopy biomass.
        - CDFW has not made the case we can expect to see recruitment increase if harvest is closed.
        - Concern that the public thinks harvesting is the cause of bull kelp loss instead of the heatwave, and the ITSWC proposal states that the number one impact of bull kelp loss is due to harvest.
        - BKWG member feedback, can we (allow) harvest when there is currently a catastrophic loss? Has any fishery done that? Biological data supports closure in Mendocino and Sonoma counties as well as Marin to prevent shifting effort. Data supports continuing to allow current harvest levels in Del Norte and Humboldt. Close lease only beds. Shouldn’t have a single

lease on a bed, multiple harvesters. Change regulations instead of administrative change.
    - In BKWG member experience closed beds do not open.
    - NGOs are calling for KRMP review to include small scale harvesters sending signal that California is never looking for large-scale operators.

Wrap up, next steps

- Next meeting agenda topics: ITSWC proposal, harvest methods and logs