



## **Dungeness (ko'ses) and Rock Crab (kerh-kerh): A Case Study of Inconsistent Levels Of Protection (LOP) Model Assumption Applications**

### **Introduction:**

The Science Advisory Team (SAT) informed the Yurok Tribe that the Levels of Protection (LOP) marine model take assumptions applied universally to all marine species, that they could make no exception for Native American Harvesting or special consideration of Native American Species. A review of the record shows favorite species were, in fact, treated differently, and the model take assumption was not applied. A fair science process requires a consistent application of universal model assumptions. The application of the LOP model take assumptions was used to classify kerh-kerh (rock crabs) as having a low level of protection and, hence, could not be harvested in conservation areas. Using the same method, Dungeness crabs would not qualify to be harvested either. The SAT simply did not apply the LOP take assumption so that Dungeness crab would be eligible to be harvested in a marine conservation area.

The Yurok Tribe had eighteen (18) coastal villages and five coastal suburbs, spread over approximately 7.5% of the California coastline. Tribal members have harmoniously harvested fish, crab, seaweed and other creatures since time immemorial. The Yurok Tribe has incorporated analytical methods into these traditional marine harvesting practices and has regularly scheduled meetings between Yurok Tribal staff scientists and scientists from federal and state agencies including the California Department of Fish and Wildlife. The Marine SAT prevented the Yurok Tribe from presenting expert opinion on marine matters by excluding the Tribe from the agenda.

The SAT developed models for the spacing of reserves and habitat replication following the independent peer-review process. The SAT also internally developed a model to determine the benefits of Marine Reserves for different species. The SAT referred to this model as Levels of Protection (LOP). However, the LOP model was not independently peer reviewed as required by statute and by a good scientific process. This comparison will focus on the take harvest assumptions as it was applied to Rock and Dungeness Crabs. The LOP model, as developed by the SAT, was assumed to be an immutable universal scientific principle that "take" for all species is the **maximum amount allowed by federal and state law**.<sup>1</sup> The SAT was inconsistent in applying this assumption between Rock and Dungeness crab.

The State of California has 1,157,000<sup>2</sup> recreational sport license holders who are eligible to harvest the limit every day. This must be counted in determining the maximum amount

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<sup>1</sup>When you adopt across the board the laws of a society they reflect the values of the dominant culture and many questions how appropriate such laws are for use in a scientific model. However, the SAT, so adopted them.

<sup>2</sup> The exact number of FTE license holders and the method of calculation are available upon request.

allowed by federal and state law. If all recreational license holders catch the legally allowable limit of each species every day, the result is so great that nearly all species within the scope of the model assumption become potentially overharvested. This overharvest then justifies a marine reserve or marine conservation area as being effective. Similarly, the success of the reserve is assured since such a mythological high harvest number can never happen in reality.<sup>3</sup> The impossibility of the heavy predicted harvest itself insures the assumption cannot be proved false since such high levels can never be achieved in nature for comparative research purposes.

**Yurok: Kerh-kerh (ROCK CRAB)**  
**Romaleon antennarium (formerly Cancer)**

It would be instructive to apply the take assumption to a native harvested crab like the Rock crab and compare the application of them to the popular Indo European Dungeness crab. For native harvested Rock crab, the limit is 35 crabs per person per day,<sup>4</sup> multiplied by 1,157,000 sport license holders creating a harvest of 40,495,000 crabs of both sexes daily, or 14,780,675,000 Rock crabs a year within the proposed marine reserve.<sup>5</sup> No established catch data, population data, surveys, commercial landing, or similar reserve data is allowed by the SAT to refute the assumption or the unrealistic catch number calculated using the assumption. Estimated harvest in California for 1999 was 790,000 pounds and has averaged 1.2 million pounds per year from 1991 to 1999. This annual catch is 3% of the quantity the model predicted for a single day.<sup>6</sup> Half of this calculated catch would be female crab, and on this basis, there would be insufficient females to perpetuate the species. If the LOP assumption were accurate, the Yurok fishery would have devastated the species. Instead, the Yurok has a 10,000 year history of sustainable Rock crab harvesting.<sup>7</sup> The model assumption means a reserve is *a priori* justified for Rock crab anywhere and anytime along the ancestral territory of the Yurok Tribe. The LOP model assumption completely prevents the harvesting of native species such as Rock crab in marine conservation areas or reserves.

**Yurok Ko'ses (DUNGENESS CRAB)**  
**(METACARCINUS MAGISTER FORMELY *Cancer magister*)**

Dungeness crabs, unlike Rock crabs, have a long overharvest history for commercial operations. By 1895, reports were made to the State Board of Fish and Game Commissioners that Dungeness crab yields were falling because of excessive commercial fishing. The general

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<sup>3</sup> Such a rate of harvest would completely destroy the current marine environment and would not be allowed. The Yurok Tribe was prepared to show the take rate of harvest was impossible to achieve and therefore could never be part of a scientific experiment.

<sup>4</sup> Fish and Game Rule 29.80 (7) (b)

<sup>5</sup> The SAT avoided plausibility issues by never actually running the math species estimates under the LOP model. It is also pause for thought that any species with a recreational catch could be assumed to be a low level of protection and need the benefit of a reserve without the need to do any calculations.

<sup>6</sup> SAT member Craig Strong: "I mean the assumption of the maximum allowable take on the north coast is simply not real and so it renders the whole structure subject to question." January 13, 2011 SAT meeting, Transcripts p 62 lines 1-4. This was the last SAT meeting.

<sup>7</sup> No scientific study exists showing harm to the Ocean fishery from Yurok harvesting in ancestral territory.

approach has been to restrict the days of harvest, the crab size, the number of crab pots, and the sex of crab (male only). The regulations of the commercial fisheries have been remarkably successful in protecting crab populations whereas recreational fishing regulations are more lenient than commercial regulations. But crab population abundance<sup>8</sup> is minimally impacted because the actual recreational catch is small. The LOP assumption calculates the recreational catch differently. A recreational license holder is allowed ten (10) Dungeness crab per day.<sup>9</sup> This, multiplied by all 1,157,000 recreational license holders in California, results in 11,570,000 Dungeness crab, including both sexes, being harvested per day. This means, that with the season, which is November 5 through July 30 (or 266 days), a yearly catch of crab would be 3,077,620,000. Under the Fish and Wildlife regulations, the commercial restriction against harvesting females does not apply to recreational harvesting.<sup>10</sup> The removal of 135 million female Dungeness from breeding would completely devastate the crab fishery.<sup>11</sup> The number of Dungeness crabs projected by the LOP model to be caught is 405.264 million annual pounds of crab by recreational catch. By comparison, the actual commercial catch in pounds statewide totaled a mere 27.5 million pounds.<sup>12</sup> For the Northern California Region that overlaps Yurok territory, the commercial harvest was only 8.4 million pounds versus the LOP projected recreational harvest of 405.264 million pounds. According to the LOP take assumption, the rating for Dungeness crab would be low, meaning it needed protection and harvest would not be allowed in marine conservation areas. The SAT faced a dilemma that the LOP take assumption meant Dungeness crab, which are a very popular Indo European species, could not be harvested in marine conservation areas.

The SAT solved the dilemma **by ignoring the LOP assumption**. The SAT never did establish a potential take level. Secondly, the SAT only considered the commercial catch data in its calculations while completely excluding recreational license holder data. The LOP recreational harvest take assumption was applied in all other instances except for Dungeness crab.<sup>13</sup> The SAT based the entire analysis upon the commercial rule prohibiting the taking of female Dungeness crabs.<sup>14</sup> In all other marine take instances the SAT declared such fish and game regulations so unreliable that they would be disregarded.

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<sup>8</sup>The importance of regulating the commercial catch is common for most California fisheries and marine harvest issues have been known over one hundred years. The LOP assumption however reverses this and is primarily concerned with the recreational fishery. This is a direct result of the high number of recreational license holders.

<sup>9</sup>Fish and Game Code 29.85 (a) (3)

<sup>10</sup>Recreational Harvest description: **“anglers can take 10 crab of either sex per day.”** Status of Fisheries MLPA Dungeness crab p 2-2 California Fish and Wildlife. The restriction against commercially harvesting females dates back to legislation dating 1878 but only applies to commercial harvesting.

<sup>11</sup>In order to translate the recreational catch number to the number of pounds used for the commercial crab industry it was determined the average crab weighs 1.5 pounds. This is a conservative number and the Yurok Tribe believes the number could become higher.

<sup>12</sup>“It is estimated that 80 to 90 percent of legal sized males are removed by the fishery each season and so landings data are relatively accurate index of crab abundance. Ibid., Status of Fisheries Report 2011, pp 2-8-2-9. If females were counted at 50% there are simply not enough crabs that exist to meet the LOP projected catch numbers after even one day of fishing.

<sup>13</sup>“I see inconsistency in, for certain species such as mussels. We’ve been told that there is no consideration of fisheries management current take regulations yet for others such as Dungeness crab there is because that’s a male only fishery.” Yurok Scientist Mike Belchik, Transcripts SAT meeting January 13, 2011, p 83, lines 5-9.

<sup>14</sup>“...is that it’s male only fishery” Co-chair Borkstedt: p 68 lines 12-13. Transcripts, SAT meeting January 13, 2011.

The commercial rule prohibiting the taking of female Dungeness crabs<sup>15</sup> was used while the recreational regulatory provision to allow both crab sexes to be harvested was ignored.<sup>16</sup> On this basis, there would be enough females to be impregnated by the remaining males.<sup>17</sup> The recreational take was defined as less than 1% and, on this basis, the safety of a Dungeness crab harvest within marine conservation areas could be assured.<sup>18</sup> If the LOP assumption was used as for other species including Kelp crab, this could not be allowed. As the Yurok Tribe stated to the SAT at the time, the types of data used were the exact types that the Yurok Tribe had tried to introduce, but were prohibited from doing so as catch data was excluded, as subject to change. Recreational survey data used by the SAT had also been prohibited for use by the Tribe with the observation it was subject to change and would be contrary to the LOP model assumption of take being the maximum amount allowed by federal and state law.<sup>19</sup> Of course, such a rationale applied to Dungeness crab data as well. This process was fabricated and inconsistent with the LOP assumption.

This example exemplifies the cultural bias of the SAT proceedings in that species popular with the dominant white culture were treated differently than species of interest to Native Americans. What the LOP defined to be a universal scientific principle was changed to favorably accommodate popular harvesting demands.

The treatment of Rock Crab demonstrates the inverse correlation of the LOP take assumption from Fish and Wildlife Commission decisions based upon the latest best available science. Rock Crabs have never had an overharvesting problem. Since there had been no problem, the best available science before the Fish and Game Commission supported a very high catch rate of 35 crabs per person per day for the entire year. Dungeness Crabs had a lower harvest limit because of prior overharvest problems. The result of the recreational multiplier of 1,157,000 license holders is Rock Crabs were shown to have the highest potential of overexploitation. These factors were aggravated by the refusal of the SAT to allow Tribal marine experts to present alternative assumption language, marine facts, and denying over 200 peer reviewed marine scientific papers to amend the LOP assumptions. This exclusion both maintained and

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<sup>15</sup> California has a long history of banning the commercial harvest of Dungeness Crab females starting with legislative in 1878 prohibiting the harvest of females. While in the real world commercial fishing has traditionally needed to be heavily regulated to protect the Dungeness crab from over harvest in the LOP assumptions the recreational numbers of sport fishing licenses creates a multiplier that is so high the commercial catch is almost insignificant. Both sexes can be harvested under the recreational regulations. The SAT proceedings consistently utilized only the Commercial catch regulations restricting harvest to only male crabs. For Example: The Master Plan Science Advisory Team Bio economic Model Evaluations of Blue Ribbon Task Force recommended Marine Protected Area Proposal for the North Coast Study Region January 21, 2011 states: "A seventh species, Dungeness crab, also was modeled under a separate scenario representing the unique male-only fishery for that species." P.1. The explanation that the entire SAT panel including Fish and Wildlife employees were unaware of state law and got it wrong was rejected by the Yurok Tribe as too remote a possibility to consider. The Yurok Tribe pointed out this flaw in the analysis to SAT members. (Documentation can be provided). In addition this was directly caused by not letting the Yurok Tribe on the agenda to correct the record.

<sup>16</sup> On the basis of the commercial and male only take the bio-economic model was amended to reflect the new approach. P 54 transcripts, January 13, 2011 SAT meeting.

<sup>17</sup> Estimate in the Fish and Wildlife MLPA Status of Fisheries report as 90% male removal.

<sup>18</sup> Transcripts of the January 13, 2011 SAT meeting.

<sup>19</sup> Studies of other reserves such as Fong and South Africa were dismissed as anecdotal. Thirty years of Redwood National Park data were also rejected as being anecdotal.

strengthened the disparate impact of the SAT LOP model assumptions between ethnic groups. Lastly, the complete inconsistency of SAT proceedings and assumptions used to establish Levels of Protection models compromise LOP model claims to scientific objectivity. The SAT invented rules along the way to justify pre-determined conclusions.