

Public Correspondence

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as of
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**Concerns Regarding the Oregon Department of Fish and Wildlife's (ODFW)
Developmental Fishery Permit for Flat Abalone (*Haliotis walallensis*)**

Susceptibility of Abalone to Over-exploitation

Abalone species (*Haliotis spp.*), with their large geographic ranges, high fecundities, larval dispersal, and scattered aggregations were once considered resilient to over-exploitation (Roberts and Hawkins, 1999). The rationale was that if local populations were extirpated, dispersing larvae from surviving aggregations would rapidly recolonize the area. However, stock collapses, drastic range reductions, and local extinctions in every species of West Coast abalone subjected to harvest to date underscores the vulnerability of these species to over-exploitation (see review in Hobday *et al.*, 2001). Abalone, being sessile and generally sedentary organisms, have a limited ability to aggregate for increasing or maintaining spawner. Fishing inevitably results in an increased distance among individuals and a decline in spawner densities. Reduced spawner densities diminish the probability that these broadcast spawners will have reproductive success. Over-exploitation thereby leads to recruitment failure and eventual local extinction. Retrospective analyses of past management failures in abalone fisheries (e.g., Karpov *et al.*, 2000; Hobday *et al.*, 2001) have yielded some important lessons regarding inappropriate management strategies. Fisheries were based on annual quotas and minimum size limits based on little or no species-specific information. Moreover, the use of minimum legal sizes (MLS) has proven ineffective when the target species is a long-lived organism with highly variable recruitment. The MLS management strategy is intended to allow for several years of reproduction before an individual is subject to a fishery, but this approach assumes constant environmental and life-history characteristics and regular annual recruitment. Such is not the case for abalone species. While total catch levels may have appeared relatively stable, there was no spatial analysis of the catch data to determine if individual sites or aggregations were being serially fished to extinction. Largely due to underfunded management agencies, there was a lack of sufficient fishery-independent data. For example, spatial monitoring of population size structure, spawner density, and recruitment is essential if over-exploitation and recruitment failure are to be avoided. Finally, monitoring of stock abundance by determination of catch per unit effort (CPUE) is not appropriate for benthic invertebrates such as abalone. While this data can be useful in many fisheries, it is not appropriate where the assumptions of random take, and post-fishing re-aggregation are not met (Ricker, 1954; Jamieson, 1993; Karpov *et al.*, 2000). The CPUE in an abalone fishery can be stable as long as the diver, who has intimate knowledge of the resource and habitat, can find new areas from which to harvest. If the fishery is conducted in concert with another fishery (e.g., an urchin fishery), the time-consuming search for new abalone aggregations can be "subsidized" effectively distorting the CPUE data.

Concerns for the Status of Flat Abalone

The scientific community has expressed general concern over the status of Pacific coast abalone populations (Transboundary Abalone Recovery Group, 2007). Abalone populations have declined dramatically as the result of over-fishing (Karpov *et al.*, 2000; Hobday *et al.* 2001), disease (Chambers *et al.*, 2006), predation (Wendell, 1994; Fanshawe *et al.*, 2003), and potentially ocean warming (Tegner *et al.*, 2001; Hobday and

Tegner, 2002; Vilchis *et al.*, 2005). These declines have precipitated the listing of pink, green, black, and northern abalone as federal Species of Concern (<http://www.nmfs.noaa.gov/pr/species/concern/>). White abalone has been listed as an endangered species under the Endangered Species Act, and black abalone is presently under review in consideration for listing. But for black abalone, over-harvest is considered the principal factor for decline in these abalone species. There is no scientific support for an expectation that the status of flat abalone is faring any better than its congeners, or that this species is any more resilient to exploitation.

Flat abalone is considered a naturally rare species (McMillen and Phillips, 1974; Owen, 2006). Flat abalone traditionally ranged from southern Oregon to Baja California, Mexico; however, the southern extent of this range has contracted considerably since the 1970s. Flat abalone no longer occur south of Point Conception (Owen, 2006), and in central California surveys indicate that flat abalone are no longer present at previously occupied sites, or they have declined 4-fold since the 1970s (Rogers-Bennett, 2007). Where they are present, current densities (0.00625 individuals/m²) may be below minimum density necessary for successful fertilization and population viability (0.33-0.15 individuals/m²; Shepherd and Brown, 1993). In northern California Flat abalone appear to have declined dramatically in abundance since the 1970s, with extensive transects at two marine reserves finding a total of two individuals. Flat abalone are common now in southern Oregon only (Port Oxford, Gold Beach, Brookings, and Charleston). It is possible that the flat abalone occurring in southern Oregon may represent the only remaining healthy aggregations of the species throughout its present range. The potential consequence of over-harvest in the subject developmental fishery not only has obvious implications for the species in Oregon, but it may have dire consequences for the species as-a-whole.

Concerns with the Flat Abalone Developmental Fishery

The present developmental fishery is not adequately monitored, and the available management tools are inadequate to guard against over exploitation. The Annual Harvest Quota and Minimum Legal Size (MLS) are based on little specific information on stock status and life history. As noted above, there is strong concern in the scientific literature that harvest quota and minimum legal size are inadequate management strategies for fisheries on sessile marine invertebrates with episodic recruitment (see review in Hobday *et al.*, 2001). The fishery lacks fishery-independent surveys of stock size, distribution, density and size frequency. It is unknown whether the fishery is impacting recruitment, and the information obtained from the fishery is insufficient to make such an assessment. That the fishery has been able to meet its annual harvest quota since 2001 is of little consolation. Approximately 7,848 kg of flat abalone were landed between 2001-2006 (Rogers-Bennett, 2007). It is unknown whether the harvested aggregations can sustain this level of exploitation. As noted above, total landings data do not convey the spatial information necessary to evaluate whether the resource is being harvested sustainably, whether it is being serially depleted, and whether the harvested aggregations are being maintained at sufficient densities for successful fertilization and recruitment.

Assuming an average weight of 0.408 kg for a legal size (114 mm) flat abalone, approximately 19,228 individual flat abalone have been harvested (Rogers-Bennett, 2007). For comparison, a total of 21,066 threaded abalone were harvested commercially during the 1960s-1980s in California before the fishery was closed. Since closure of the California threaded abalone fishery, the species has not recovered and only 9 threaded abalone individuals have been surveyed south of Pt. Conception. Threaded and flat abalone are both naturally uncommon species, so it is possible that flat abalone aggregations in Oregon may be nearing collapse. Indeed, available catch-per-unit-effort data (in pounds flat abalone landed per hour) suggest that the current fishery is not sustainable. In 2001 the harvester was able to collect at a rate of 44 pounds/hour, while in 2006 this rate had fallen to 23.6 pounds/hour (pers. comm. Brett Wiedoff, Oregon Dept. of Fish and Wildlife). This trend is particularly disturbing considering that the search for new abalone aggregations may be “subsidized” by the urchin fishery (it is my understanding the harvester is also a commercial urchin diver).

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FLAT ABALONE OVERVIEW (*Haliotis walallensis*)

Range & Historical Status Information

- Historical range from Southern Oregon to Central Baja California, Mexico.
- Flat abalone never considered an abundant species (McMillen and Phillips, 1974; Owen, 2006).

Current Status Information (*pers. comm. Dr. Rogers-Bennett, UC Davis*)

- The distribution of flat abalone has contracted since the 1970s with a reduction in the southern extent of its range.
- There is concern that a northern shift in the range of the species would be constrained by the limited dispersal capacity for the species and the limited availability of suitable habitat in the northern portion of its range.
- Flat abalone no longer occur in southern California.
- In Central California, surveys indicate that flat abalone are no longer present or have declined 4 fold since the 1970s. Where present, current densities (0.00625 individuals/m²) may be below minimum viable population thresholds for successful fertilization (0.33-0.15 individuals/m²; Shepherd and Brown, 1993).
- In 1990s a die-off of flat abalone was observed in northern California coincident with warm-water El Nino Events (Owen, 2006). In northern California flat abalone appear to have declined dramatically in abundance since the 1970s, with extensive transects at two marine reserves surveying a total of two flat abalone.
- Flat abalone appear to be common now in southern Oregon only (Port Orford, Gold Beach, Brookings, and Charleston). Dispersal north into Washington may be impeded by their short larval period coupled with the large expanse of sandy habitat in northern Oregon.

Oregon Flat Abalone Fishery

- Year developmental fishery permit first issued **2001**

- Total number of allowed abalone permits **1**
- Annual Harvest Quota **2998 lbs (1.36 tonnes)**
- Minimum Legal Size (MLS) **4.5 in. (114 mm)**
- Ave. Weight @ MLS **14.39 oz (0.408 kg)**
- Areas harvested **4**
- Approx. market value **\$16-\$20/lb.**
- Cumulative landings thru 2006 ~ **17,301 lbs. (7,848 kg)**
- Approx. total number of abalone landed thru 2006 **19,228 abalone**

Table 1. Commercial flat abalone landings in pounds (kilograms), Oregon 2001-2006.

Year	Port Orford	Gold Beach	Brookings	Charleston
2001	1305 (592)	1364 (619)	346 (157)	No fishing
2002	1300 (590)	1197 (543)	502 (228)	No fishing
2003	1300 (590)	994 (451)	90 (41)	597 (271)
2004	987 (448)	1340 (608)	93 (42)	289 (131)
2005	556 (252)	1582 (718)	595 (270)	267 (121)
2006	1102 (500)	1369 (621)	0 (0)	121 (55)
Total	6552 (2972)	7848 (3560)	1627 (738)	1274 (578)
Grand Total	17301 (7848)			

Observations Regarding Experimental Fishery for Flat Abalone

- West Coast abalone academic and management community concerned re: status of flat abalone, and view this experimental fishery as risky.
- Southern Oregon may represent the last “stronghold” for the species
- The species has never before been targeted in a commercial or recreational fishery, so its resilience to exploitation is unknown.
- Annual Harvest Quota and MLS based on little information on stock status or species’ life history. Concern in literature that harvest quota and MLS management strategies are inadequate to manage stocks of sessile marine invertebrates with episodic recruitment (see review in Hobday et al., 2001)
- Life-history characteristics may make flat abalone vulnerable to over-exploitation. For comparison, a total of 21,066 threaded abalone were harvested commercially in the 1960s-1980s in California. Since closure of the fishery there have been only 9 sightings south of Pt. Conception. Threaded abalone and flat abalone may be comparable in that they are both naturally rare/uncommon abalone species.

Data Needs

- Estimates of size at first reproduction
- Estimates of fecundity
- Surveys of stock size, distribution, density, and size frequency (above and below MLS)

**Document Submitted at Developmental Fisheries Board meeting on August 29th, 2007
by Flat Abalone Permit Holder, Kevin Hiersche**

Developmental Fisheries Board
Hatfield Marine Science Center
Newport, Oregon

To Whom It May Concern;

I would like to introduce myself. I am Martin "Dewey" Powers and I live in Gold Beach, Oregon. I am the managing partner of Spinner's Seafood Steak and Chophouse located in Gold Beach.

I knew Kevin Hiersche as a local sea urchin diver. I was not aware that he also had developed a market for abalone until two years ago.

We started offering abalone two years ago as an entrée and featured it as a dinner special.

Neither Kevin nor I could have predicted the popularity of the dish, the amount we would sell at the restaurant or the notoriety it has added to Spinner's Restaurant.

The continuing demand by the guest for abalone was a deciding factor in featuring this dish on our KBSC TV television commercial. There are several guests that comment on the commercial, and have indicated to me that the abalone dish was the main reason to choose Spinner's Restaurant.

The sales of abalone have more than doubled from the first year that we offered this fine dish. There is no question that offering abalone has increased the overall sales volume of Spinner's by at least ten percent.

If we lose the access to abalone there would be a negative affect on Spinner's Restaurant.


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August 23, 2007

Patricia M. Burke
Program Manager – Marine Resources Program
Oregon Department of Fish and Wildlife
2040 SE Marine Science Dr.
Newport, OR 97365

Dear Ms. Burke,

This letter addresses my concerns about the Oregon Department of Fish and Wildlife's (ODFW) Developmental Fishery Permit for flat abalone (*Haliotis walallensis*). My colleagues (Mia Tegner, Alastair Hobday, Glenn Van Blaricom, Laura Rogers Bennett, John Butler, John Pearse to name a few and at least a dozen colleagues in the California Department of Fish and Game) and I have been deeply involved with the efforts to recover the California abalone populations. Some are at real risk of biological extinction and except for a small non-scuba sports fishery in northern California for red abalones, all of our abalone species are past or very close to their "biological tipping points" at which their populations succumb to pressures (other than human take) that prevent their recovery. For example, many if not most seem to be at a point in which the low density Allee Effect kicks in and precludes much reproduction. More subtle, but perhaps more serious, they fall into so called "predator pits" in which normal, perhaps low levels of predation by natural predators such as octopus, cabezon, *Pycnopodia*, and other predators kill many more abalone than settle and survive to reproduce. Sadly I can assure you that once a population has been exploited, they seem to fall into these downward trends that are extremely difficult to reverse. The only exception is a small species in the Indian Ocean of southwest Australia that supports a low level of take, but this species is different because it has a very short larval life span such that local management works. But this has not been true of the eastern Pacific.

For the above reasons I have grave concerns whether your proposed fishery is sustainable. It is no surprise that this is the only commercial abalone fishery in the United States and Canada. Past commercial fisheries on five other abalone species (red, white, pink, green, and northern abalone) invariably resulted in stock collapses and fishery closures, with one species listed as "endangered" under the Endangered Species Act and four species designated as federal "Species of Concern." Not only am I concerned about the potential consequences this fishery may have for flat abalone populations in Oregon, but because *H. walallensis* has

such a weird distribution pattern, a fishery in Oregon may threaten the species as-a-whole. I encourage your agency to re-evaluate whether allowing this developmental fishery to continue is consistent with the available scientific information and in the interest of conserving our precious marine resources.

Thank you for your careful consideration.

Sincerely,

A handwritten signature in cursive script that reads "Paul Dayton". The signature is written in black ink and is positioned to the right of the word "Sincerely,".

Paul K. Dayton
Professor