Agenda Item Summary

BACKGROUND

Overview: Pacific razor clams (*Siliqua patula*) occur in sandy beaches along the Oregon coast where they are a popular target for recreational and commercial harvesters. Populations of razor clams are most abundant in the northern section of the coast, and about 95% of the statewide harvest occurs along the 18 mile stretch called Clatsop Beach (Tillamook Head to the mouth of the Columbia River). This area is the most popular region for razor clam harvest in the state, and it is not unusual for 4,000 to 6,000 clammers to be searching Clatsop Beach for the shows of razor clams during the early morning hours on a good low tide.

Summary of Management Regulations: The Oregon coast is normally open to the harvest of razor clams year round, with the exception of an annual summer conservation closure (July 15 to September 30) along Clatsop Beach. The conservation closure was established in 1967 (and extended in 1997) to protect the new sets of small seed or juvenile clams during their critical period of growth. Recreational harvesters must have a Shellfish License, and they are allowed to dig by hand or with hand-powered tools only (*i.e.*, shovel, clam gun, or tube with a diameter no less than 4 inches). Recreational razor clam harvesters may retain a daily catch limit of the first 15 clams regardless of shell size or condition.

Commercial razor clam harvesters must have an Individual Commercial Fishing License, Commercial Shellfish and Intertidal Animal Harvest Permit, and they are limited to collection by hand or shovel (no gun or tube). The minimum shell size of razor clams harvested for commercial purposes is 3.75 inches, and undersized razor clams must be immediately returned to the hole from which they were dug with the hinge oriented toward the ocean.

Razor clam tissues are periodically tested for concentrations of marine biotoxins by the Oregon Department of Agriculture / Food Safety Program. ODFW closes the recreational and commercial harvest of razor clams when the concentration of biotoxins (*i.e.*, domoic acid) is elevated above alert levels and ODA issues a Public Health Advisory.

Monitoring Recreational and Commercial Razor Clam Fisheries: Recreational and commercial razor clam harvest activities are routinely monitored during low tides along Clatsop Beach to assess the levels of harvest effort and characteristics of the catch. ODFW surveys include counts and interviews with harvesters to check for licenses and permits, determine their catch-per-unit-effort, and to record the condition and size of the razor clams. Oregon State Police (OSP) Troopers conduct periodic checks of clamming activities and have responsibility for enforcement of violations. ODFW conducts additional sampling within seafood processing plants to record the dates, sites, and levels of commercial razor clam landings.

Harvest of razor clams along Clatsop Beach typically fluctuates in direct relation with changes in the overall abundance of clams available (Table 1). In general, higher harvests are associated with high abundance of clams while lower harvests

are associated with low abundance of clams. Over the period from 2002 to 2018, recreational harvests averaged 1,065,000 clams per year, and recreational effort averaged 92,000 harvester trips per year. In 2016, recreational harvesters landed a record high of 2,208,000 razor clams and expended a record recreational effort of 157,000 harvester trips. The commercial razor clam fishery also experienced a resurgence of participation and harvest in 2016. An annual average of 129 licensed harvesters made commercial landings during 2002-2018, and the average annual commercial harvest was 249,000 clams. Commercial harvesters landed a record high of 920,000 razor clams in 2016. About 82% of the razor clams harvested along Clatsop Beach are typically taken by the recreational fishery, and about 18% are taken by the commercial fishery.

Table 1: Annual Harvest of Razor Clams along Clatsop Beach: 2002-2018

	Recreational			Commercial		Total
Year	**Harvest (# clams)**	**Effort (# trips)**	**CPUE # clams per trip)**	**Harvest (# clams)**	**Permits**	**Harvest (# clams)**
2002*	1,852,000	146,000	12.7	481,000	255	2,333,000
2003*	460,000	51,000	9.0	105,000	114	565,000
2004	1,916,000	155,000	12.4	286,000	156	2,202,000
2005*	773,000	66,000	11.7	174,000	101	947,000
2006	1,532,000	128,000	12.0	236,000	114	1,768,000
2007	933,000	87,000	10.7	133,000	126	1,066,000
2008	451,000	47,000	9.6	95,000	88	546,000
2009	1,381,000	105,000	13.2	442,000	167	1,823,000
2010	1,061,000	93,000	11.4	277,000	132	1,338,000
2011	752,000	71,000	10.6	82,000	118	834,000
2012	824,000	75,000	11.0	95,000	87	919,000
2013	1,238,000	118,000	10.5	247,000	118	1,485,000
2014	771,000	88,000	8.8	145,000	97	916,000
2015*	1,154,000	85,000	13.6	355,000	145	1,509,000
2016*	2,208,000	157,000	14.1	920,000	176	3,128,000
2017*	203,000	22,000	9.2	67,000	105	270,000
2018	602,000	77,000	7.8	94,000	102	696,000
AVE	**1,065,353**	**92,412**	**11.5**	**249,059**	**129**	**1,312,412**

*Season length impacted by marine biotoxin closure

Annual Razor Clam Stock Assessment: Beginning in 2004, ODFW has conducted an annual stock assessment to determine the status of razor clam populations along Clatsop Beach (Table 2). The ODFW stock assessment is carried out along twelve transects during the summer conservation closure following protocol and techniques identical to those used by the Alaska Department of Fish and Game and the Washington Department of Fish and Wildlife. Data generated by the ODFW stock assessment surveys are used to monitor year-to-year variability in the abundance and spatial distribution of razor clams, to understand the level of recruitment, and evaluate how the previous year's recruit of juvenile clams is converted into mature razor clams.

Razor clam populations vary on a cyclical basis along Clatsop Beach, and stock assessment estimates for the total number of clams have ranged from a low density of 0.17 clams per square meter (2010 & 2013) to a peak density of 2.53

clams per square meter (2015). The high level of variability in the abundance of razor clams indicates that natural mortality is the primary driver of abundance, independent of the number of mature clams in the population.

Table 2: Annual Abundance of Razor Clams along Clatsop Beach: 2004-2018

Year	Juvenile <3"		Mature >3"		Total	
	Density RC/m2	Abundance (# clams)	Density RC/m2	Abundance (# clams)	Density RC/m2	Abundance (# clams)
2004	0.61	3,208,811	0.51	2,710,359	1.12	5,919,170
2005	0.94	6,534,905	0.41	2,890,914	1.35	9,425,819
2006	0.46	3,200,601	0.31	2,185,813	0.77	5,386,414
2007	0.14	1,003,309	0.07	477,432	0.21	1,480,741
2008	0.59	4,166,876	0.74	5,140,092	1.33	9,256,968
2009	0.74	5,108,769	0.31	2,121,822	1.05	7,230,591
2010	0.08	609,309	0.09	527,307	0.17	1,136,616
2011	0.77	5,351,067	0.17	1,166,017	0.94	6,517,084
2012	0.45	3,154,782	0.27	1,885,360	0.72	5,040,142
2013	0.01	75,799	0.16	1,085,311	0.17	1,161,110
2014	1.40	9,843,340	0.90	6,334,847	2.30	16,188,187
2015	1.00	7,004,068	1.53	10,588,299	2.53	17,592,367
2016	0.39	2,665,893	0.82	5,711,862	1.21	8,377,755
2017	0.01	97,276	0.45	3,124,764	0.46	3,222,040
2018	0.62	4,313,748	0.28	1,924,640	0.90	6,238,388

Steps to Minimize Waste of Razor Clams: Razor clams are frequently lost or illegally discarded in the process of harvesting. Some clams are never located by the harvester while digging, and some are illegally discarded due to small size or condition (broken shell) of the clam. This inadvertent loss or intentional discard of clams is commonly known as "wastage" and is considered primarily to be a problem in the recreational razor clam fishery. In contrast, wastage is not considered to be a substantial problem in the commercial razor clam fishery because the commercial harvesters are more experienced and specifically target the larger clams, are restricted to using shovels, and because they take far fewer clams than recreational harvesters.

ODFW first developed estimates of razor clam wastage along Clatsop Beach over the period from 1957-1964 (Demory 1965), and the earlier studies indicate that up to eighty percent of the illegally discarded clams die because they are broken or damaged, have their necks cut off, or are improperly buried back in the sand (ODFW 2004; 2007). Although wastage of razor clams is fundamentally a social issue rather than a biological concern, the illegal discard of unwanted clams generates a high level of attention amongst razor clam harvesters, and many regulations in the razor clam fishery have been enacted to minimize waste. For example, ODFW regulations require retention of the first 15 clams dug (regardless of size or condition). In addition, razor clams may only be taken by hand, shovel, clam gun, or tube with an opening of no less than 4 inches (cylindrical) or 4 X 3 inches (elliptical), and harvest of razor clams is closed along Clatsop Beach from July 15 to September 30 of each year to allow the small clams to grow.

In 2004, the Oregon Fish and Wildlife Commission (OFWC) received a petition from private citizens requesting an emergency closure of razor clam harvesting on Clatsop Beach due to a late 'set' of larvae and the high likelihood for wastage of juvenile clams. Rather than issue an emergency closure, ODFW staff were directed to conduct an investigation of wastage and to initiate an intensive on-site education and outreach campaign. In addition, the OFWC recommended that the OSP increase enforcement activities over the months of May, June and July of 2004.

Since then, ODFW staff have routinely incorporated surveys to estimate the extent of wastage as a component of monitoring the razor clam fishery (Table 3). Wastage surveys include re-digging the holes dug by recreational harvesters to determine if a clam remained in the hole: (1) unintentionally by being missed during digging; or (2) by intentional discard due to small shell size or unwanted condition (*i.e.*, broken). Wastage surveys are conducted April thru July of each year when small clams become available in the fishery and effort and harvest increase significantly. An index of wastage rate is determined from the number clams found divided by the total number of harvester holes that were re-dug to look for remaining clams.

Estimates of wastage rates for razor clams along Clatsop Beach have varied substantially over the period from 2004 to 2018 (Table 3). Overall, the average wastage rate for razor clams was 15.1%. The greatest wastage rate of 31.4% was observed in 2004 and the lowest wastage rate of 6.2% occurred in 2013. On a seasonal basis, the wastage rate for razor clams is typically elevated in July which is particularly noteworthy because only the first 15 days of July are open to harvest.

Table 3: Estimates of Wastage Rates for Razor Clams Harvested Along Clatsop Beach: 2004-2018

Year	APR	MAY	JUN	JUL	Total
2004		27.4%	35.3%	39.0%	31.4%
2005			BIOTOXIN CLOSURE		
2006	19.0%	16.3%	18.3%	12.2%	16.9%
2007		16.3%	11.5%		13.9%
2008		17.5%	26.9%	40.9%	27.2%
2009	6.9%	6.7%	6.8%	10.1%	7.7%
2010	5.5%	10.9%	16.0%	7.6%	11.2%
2011	7.2%	5.9%	9.2%		7.7%
2012	2.8%	9.0%	15.3%	21.7%	13.8%
2013	6.6%	7.5%	2.8%		6.2%
2014	11.7%	21.6%	25%	40.0%	19.3%
2015	10.0%	15.2%	BIOTOXIN CLOSURE		13.2%
2016	5.7%	16%	16.5%	20.5%	16.1%
2017			BIOTOXIN CLOSURE		
2018		11.8%	11.3%	13.5%	12.0%

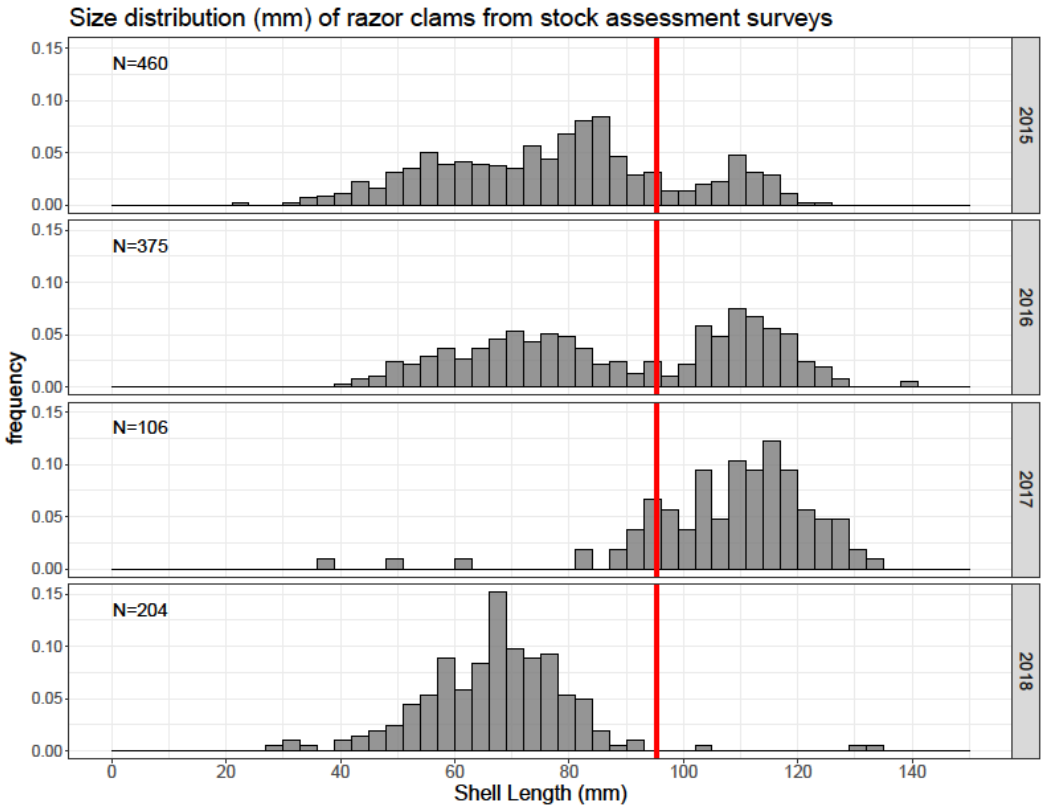
Note for Table 3: Estimates provide an index of wastage rate for razor clams harvested primarily by recreational clammers from the wet and dry sand region of Clatsop Beach. Estimates of wastage rate are not available for commercial harvesters who primarily remove intact clams from the surf zone.

Estimates of wastage rates for razor clams vary on a monthly and annual basis depending upon abundance and timing of the "set" of larval clams. In addition, changes in the overall abundance of mature clams and temporal shifts in the timing of spawning also contribute to variability in the waste of razor clams. For example, after the mature clams spawn, they cease feeding and no longer show as readily, making them more difficult to detect by harvesters. In contrast, the smaller immature clams (*i.e.*, juvenile "set") are still actively feeding and show very readily, making them relatively easy to detect by harvesters.

Recent Management Actions: ODFW staff observed a distinct recruitment event of small razor clams on Clatsop Beach in February 2018. This was the first time that juvenile razor clams were observed on Clatsop Beach since 2015, and the timing of the recruitment event was abnormally late in the season. By spring of 2018, ODFW staff received input from concerned stakeholders about small clams being taken during the harvest, and regarding the potential for increased levels of waste and mortality. By the time the permanent razor clam conservation closure began in July 2018, the average shell size of harvested clams had dropped significantly and the wastage rate increased (Table 3) as a result of the smaller clams becoming the dominant component of the razor clam population along Clatsop Beach.

The annual summer razor clam stock assessment was completed in September 2018, and the survey confirmed that the population was dominated by a large proportion of juvenile clams (shell length 1.8-3.5 inches or 45-90 mm; see Figure 1). Compared to previous years (2015-17), data generated by the 2018 stock assessment indicated that the population was skewed toward very small clams. These small clams were too small for the commercial fishery (minimum size 3.75 inches) and also too small to be desired by recreational harvesters. Based on past analysis staff expected that growth of the small clams would be negligible during the fall and winter months. In response to the small size of the razor clams, ODFW enacted a temporary rule to delay the normal season opening (October 1, 2018) until at least November 1, 2018, to allow time to host a public meeting, discuss the condition of the razor clam populations, and gather feedback from stakeholders on how to proceed with the upcoming season.

Figure 1. Changes in the size frequency distribution of razor clam populations at Clatsop Beach (2015-2018). Note the high proportion of small razor clams (shell length 1.8-3.5 inches or 45-90 mm) for 2018. Red line indicates the minimum shell size allowed for commercial harvest (3.75 inches or 95.25 mm).

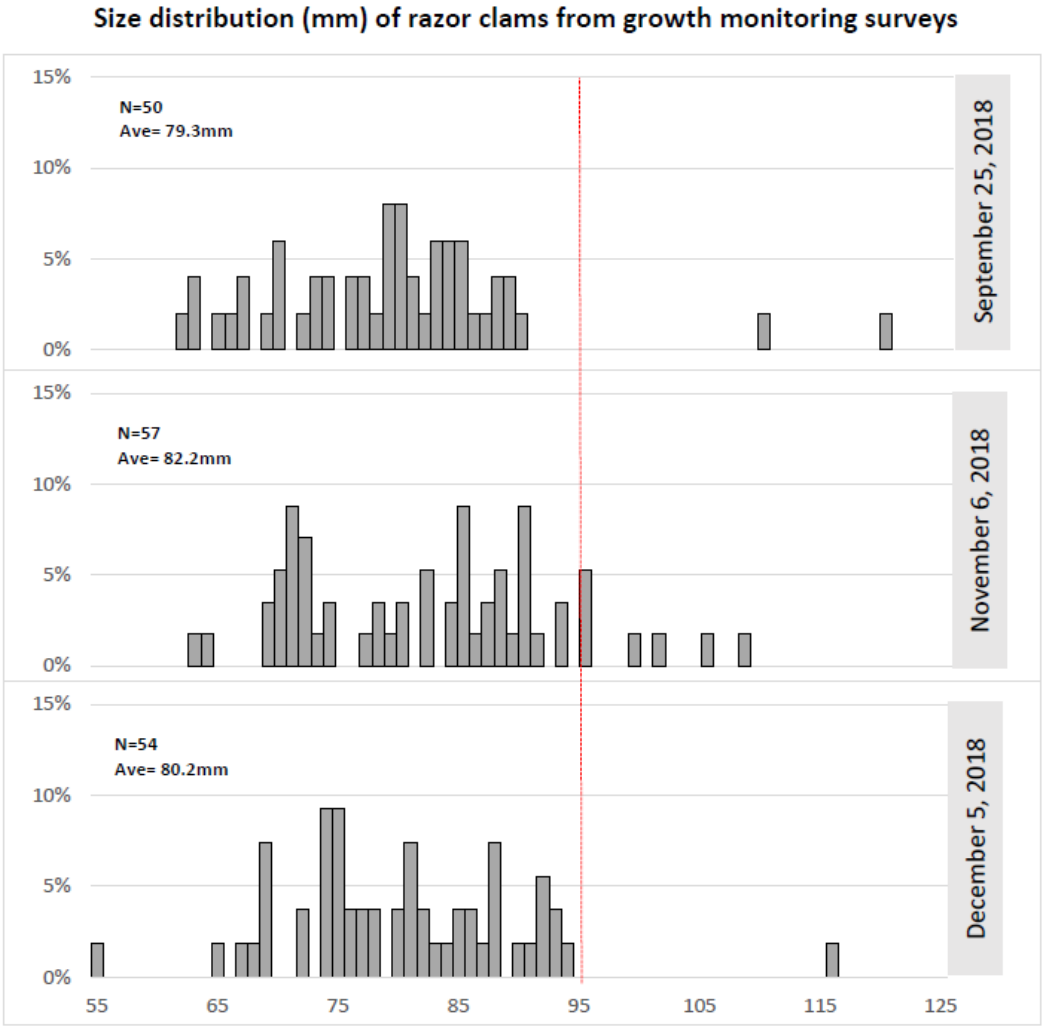


ODFW held a public meeting in Seaside on October 22, 2018, to discuss the condition of the razor clam population and to gather input regarding possible management actions. ODFW staff presented life history information, past and current monitoring data, findings from earlier research studies, and analysis of the new stock assessment survey that provided the impetus for the delay in opening the recreational and commercial harvests. Input and feedback was gathered from 22 stakeholders who participated in the public meeting as well as from additional stakeholders who could not attend in person. Discussion during the public meeting was very productive, and 86% of those who provided feedback expressed their opinion that the razor clam season should be delayed on Clatsop Beach until at least March 1, 2019 to let the small clams grow to a larger size to provide a better harvest experience.

Table 4: Summary of Public Comments regarding Opening of Clatsop Beach Razor Clam Fisheries					
Fishery Options	**Email/Phone**	**Survey Card**	**Meeting Vote**	**Total**	**Percent**
Open ASAP 2018	1	1	0	2	4.5%
Open JAN 1 2019	3	0	0	3	6.8%
Open MAR 1 2019	6	3	13	22	50.0%
Open APR 1 2019	2	8	6	16	36.4%
Open OCT 1 2019	0	1	0	1	2.3%

Based upon staff recommendations, feedback, and public input, ODFW enacted a temporary rule to further delay the razor clam season until March 1, 2019. During this delay, ODFW staff will monitor the growth of the small razor clams to ensure that they will be large enough by the March 1, 2019 opening for commercial harvest (minimum size 3.75 inches) and that they reach a sufficient size to be desired by recreational harvesters. Staff conducted sampling activities from a standardized area along Clatsop Beach where the earlier stock assessment was completed in 2018 and where sampling had occurred on September 25, 2018. Analysis of shell sizes for razor clams collected on November 6 and December 5, 2018 indicate that the small clams have grown little (about 0.25 mm a week) since the end of the stock assessment and last sample in September 2018.

Figure 2. Monthly changes in the size frequency distribution of razor clam populations at Clatsop Beach (Sep-Dec 2018). The small razor clams exhibited substantial variability in size, and they grew very slowly at a rate of about 1.0 mm per month through the fall and early winter season of 2018. Red line indicates the minimum shell size allowed for commercial harvest (3.75 inches or 95.25 mm).



Overall Summary: Current management of the razor clam fisheries in Oregon is largely effective, without substantial conflict among stakeholders, and the levels of harvest appear to be sustainable. No major revisions or modifications to the regulatory framework are identified or proposed at this time. The unusually late set of juvenile razor clams in 2018, small shell size, and slow winter growth exhibited by the dominant cohort at Clatsop Beach prompted the need for ODFW to enact a temporary rule to close the commercial and recreational harvests until March 1, 2019. ODFW are monitoring the razor clam population through the winter of 2019 to ensure that clams will reach a sufficient size for commercial harvest (minimum size 3.75") and desired by recreational harvesters. ODFW plans to continue to manage the razor clam fisheries in Oregon through an adaptive approach that includes: (1) monitoring of recreational harvests and

commercial landings; (2) completion of annual fishery-independent stock assessments; (3) surveys of discards and wastage; (4) outreach and educational activities; (5) cooperative and collaborative research; and (6) networking and professional sharing among the razor clam fisheries management programs throughout the Pacific northwest region. Over the next few years, the ODFW Shellfish Program plans to develop a Fisheries Conservation and Management Plan for Oregon Razor Clams to ensure that razor clam resources are managed in a sustainable manner to provide lasting benefits for Oregonians.

PUBLIC INVOLVEMENT	ODFW hosted a public meeting in Seaside on October 22, 2018.
ISSUE 1	**OREGON'S RAZOR CLAM RESOURCE REVIEW**
ANALYSIS STAFF RECOMMENDATION	N/A.

DRAFT MOTION	N/A
EFFECTIVE DATE	