AGENDA ITEM SUMMARY

BACKGROUND

The Oregon Department of Fish and Wildlife (ODFW) Shellfish Program provides regulatory oversight, management, and monitoring for a diverse group of recreational and commercial fisheries. Amendments to management regulations are periodically needed to address changes in environmental conditions, fluctuations in populations of target shellfish, shifts in fisheries efforts, and other perturbations. Management actions are recommended at this time to address changing ocean conditions related to sea star and green crab populations, and sustainability of commercial clam harvest.

Changing ocean conditions impact recreational shellfish: Regional shifts in the marine and estuarine environment along the Pacific coast of North America over the past decade have resulted in changes to habitats, ecological communities, and populations of shellfish. A massive marine heatwave persisted along the west coast (2014 to 2016) and subsequent shorter-term warming events occurred in 2019, 2020, and 2021. All of these events were driven by changes in atmospheric conditions and contribute to regional shifts in ocean conditions; periodic marine heatwaves are projected to be a recurring ocean manifestation of climate and ocean change.

Concurrent with the prolonged marine heatwave, and presumed to be related to ocean change, many species of sea stars experienced an unprecedented die-off attributed to "Sea Star Wasting Disease" (SSWD) along the coast from Alaska to Baja, California (2013 to present). In Oregon, most species of sea stars experienced a catastrophic mass mortality that greatly decreased populations in intertidal and subtidal habitats. Although sporadic recovery of sea stars has been observed for a few species at a limited number of sites (*i.e.* ochre stars in the rocky intertidal zone), populations of sea stars generally remain very low for many species along the Oregon coast. While incidental or targeted harvest of sea stars occurs infrequently and is likely not a significant threat to the populations, the drastic change in sea star populations warrants attention and management action.

European green crab (*Carcinus maenas*; also known as "green crab") are a non-native species that has rapidly colonized temperate coastlines at several locations around the world where they are an aggressive invader that has the potential to disrupt communities of native shellfish (other crab, clams, oysters, etc.). Populations of green crab initially became established in San Francisco Bay before 1989, and then spread rapidly along the west coast over the period of 1996 to 1999. The numbers of green crab remained relatively low in Oregon bays and estuaries from 1997 to 2015, followed by a steady increase along the coasts of California, Oregon, Washington, and British Columbia during the period of changing ocean conditions and elevated seawater temperatures associated with the recent marine heatwave (2015 to 2021). Populations of non-native green crab have now become established in many bays and estuaries in Oregon, and evidence suggests that they have the capability for self-recruitment to sustain populations along the Oregon coast. Recent reports about the increased abundance of green crab have raised concern about the ecological impact of this non-indigenous predator to local ecological communities, and prompted public requests to allow a greater level of harvest by recreational crabbers.

Changes to commercial shellfish fisheries: Current regulations for commercial harvest of bay clams specify that clams may only be sold to a licensed wholesale dealer or buyer, and require submittal of fish tickets to document landings of bay clams. Staff use landing data from fish tickets to ensure the fishery does not exceed annual landing caps; harvest attainment of the caps can occur quickly during the short season. Fish tickets are currently due to the Department within five working days of the date of landing and constitute the landing records for the commercial fisheries. The five-day period allowed for submittal of fish tickets is in addition to a 48-hour period between the time of harvest and the time of sale to a shellfish dealer. Combined with other factors, such as a delay in delivery of paper tickets via conventional mail, the total time period between harvest and data entry into the ODFW database can be two weeks or more, making in-season management of the harvest cap difficult. Electronic fish tickets were implemented by temporary rule in 2021, with good results for improving the harvest information for management of the harvest cap.

Most commercial harvest of bay clams takes place in Tillamook Bay. However, commercial clammers sometimes explore opportunities to harvest bay clams from other bays and estuaries. For example, in 2018 clam divers working in Yaquina Bay harvested 103,400 pounds of gaper clams over a short period of less than four months. This level of harvest raised concern about the need to identify an appropriate harvest area and associated annual landing cap for the commercial gaper clam fishery in Yaquina Bay. In a proactive effort to manage the level of commercial harvest from the subtidal zone, a temporary rule was adopted in 2019 that designated the harvest area and established an annual landing cap of 20,000 pounds for gaper clams. The temporary rule was amended and has since expired. A permanent rule is now needed to designate a commercial harvest area, establish an appropriate annual landing cap, and continue the management actions required to maintain sustainable populations of gaper clams in Yaquina Bay.

PUBLIC INVOLVEMENT

Issue 1. Prohibit Recreational Harvest of Sea Stars: Several members of the public asked ODFW to consider prohibition of the recreational take of sea stars when their populations initially declined along the Oregon coast following the coastwide mass mortality event (2014 to 2015). The Department has not allowed commercial harvest of sea stars since 2014. During the public review process for revision of the Oregon Territorial Sea Plan / Rocky Habitat Management Strategy (2021), the Rocky Habitat Working Group received numerous requests and recommendations to prohibit the recreational take of sunflower sea stars.

Issue 2. Increase Daily Catch Limit for Recreational Harvest of European Green Crab: Recreational crabbers frequently capture green crab and bring them into ODFW coastal offices, place phone calls to staff, or send email messages with questions about what to do with their catch and what steps may be taken to control this non-native species. Several members of the public have asked that the Department increase the recreational daily catch limit so they can help "eradicate" the invasive species from Oregon bays and estuaries. During the recent public comment period associated with the Oregon Dungeness Crab Fishery Management Plan (2021), the Department received over 100 public comments regarding management of recreational and commercial crabbing activities. Of these, four commentors specifically recommended increasing the recreational daily catch limit for the European green crab.

Issue 3. Require Electronic Fish Tickets for Commercial Bay Clam Fisheries: The Department has been actively engaged with transitioning seafood dealers away from paper fish tickets and towards the electronic ticket submission system over the past several years. Staff from the ODFW Licensing Program routinely hold training sessions every year to help dealers understand this system, answer questions, and assist with the transition to electronic submissions. This effort to modernize the fish ticket submission system has been overwhelmingly positive, and every dealer that began working electronically has expressed the desire to continue working with the electronic ticket submission system. The legislatively-created Tillamook Bay Clam Advisory Committee (TBCAC) includes eight representatives from the commercial bay clam fisheries, recreational harvesters, and conservation interests. The purpose of TBCAC is to develop recommendations about new rules, amendments to current rules, and other actions to improve management of bay clam fisheries in Oregon bays and estuaries. TBCAC held discussions in 2021 regarding the proposal to initiate electronic fish tickets for the commercial bay clam fisheries. Input provided by TBCAC and participants in the commercial bay clam fisheries was considered during development of the proposed rules.

Issue 4. Designate Harvest Area and Annual Landing Cap for Commercial Bay Clam Dive Fishery in Yaquina Bay: TBCAC has discussed several topics related to establishment of commercial annual landing caps for harvest of bay clams from the intertidal and subtidal zones of Tillamook Bay and other bays. Direct contact was made to seek input from the commercial clammers who historically conducted harvest activities in Yaquina Bay (2017 to 2021). Designation of a commercial harvest area and annual commercial landing cap for the commercial bay clam dive fishery in Yaquina Bay as a temporary rule (2019) included considerations for conservation of the gaper clam population, provision of opportunities for commercial and recreational harvest, boater safety, and utilization of shared resources in Yaquina Bay.

ISSUE 1

Prohibit the Recreational Take of Sea Stars

ANALYSIS

ODFW Sport Fishing Regulations for the Marine Zone (2022) currently allow for the recreational take of "starfish" (also known as sea stars) at a daily limit of 10 (in aggregate) per person per day under the broad category of "Starfish, Urchins, Snails, Shore Crabs, and all other marine invertebrates not listed." It is our understanding that the recreational take of any species of sea star is currently very low along the Oregon coast, although some sea stars are probably taken on occasion for drying as souvenirs. However, due to recent drastic population declines of some sea star species due to Sea Star Wasting Disease (SSWD), staff recommend prohibition of recreational harvest of sea stars as a prudent management action that will help convey the Department's commitment to conservation of living marine resources along the Oregon coast.

Recent mass mortality of sea stars along the Pacific northwest coast (2013 to present) has been attributed in part to shifts in ocean conditions associated with climate change, and SSWD greatly reduced the abundance for multiple species of sea stars in the intertidal and subtidal zones. Although some recovery of the ochre star (*Pisaster ochraceus*) has been observed in rocky intertidal habitats, new information indicates that populations of sunflower sea stars (*Pycnopodia*

helianthoides) have not shown any signs of recovery in Oregon or California. Decline of sunflower sea stars is estimated at over 90% coastwide throughout their greater biogeographic range (AK to Baja CA), and about 98% for the outer coast regions of WA, OR, and northern CA. In Oregon, datasets to characterize populations of sunflower sea stars are available over the period from 2009 to 2020 (Figure 1), and a comparison between densities before (*i.e.*, 2009 to 2013) and after (2018) the mass mortality event also indicate a decline of about 98%. Due to the significant and widespread declines, this species was recently placed on the IUCN Red List as Critically Endangered (International Union for Conservation of Nature; Gravem *et al.* 2021). Sunflower sea stars are currently under consideration by NOAA Fisheries for federal-level protection as a threatened or endangered species (pending 2022). Monitoring information for several other species of sea stars indicates that recovery rates are low (*i.e.*, *Leptasterias*, *Evasterias*, *Orthasterias*, *Dermasterias*, *Henricia*) or that data are not available to determine recovery (*Pisaster brevispinus*, *Solaster* spp., *Stylasterias*, and others). Multiple species have yet to recover and the at-risk status of the regional population of sunflower sea stars is under consideration by NOAA Fisheries. The Department may be required to take further action (as needed) pending the outcome of the federal-level review regarding the at-risk status for sunflower sea stars.

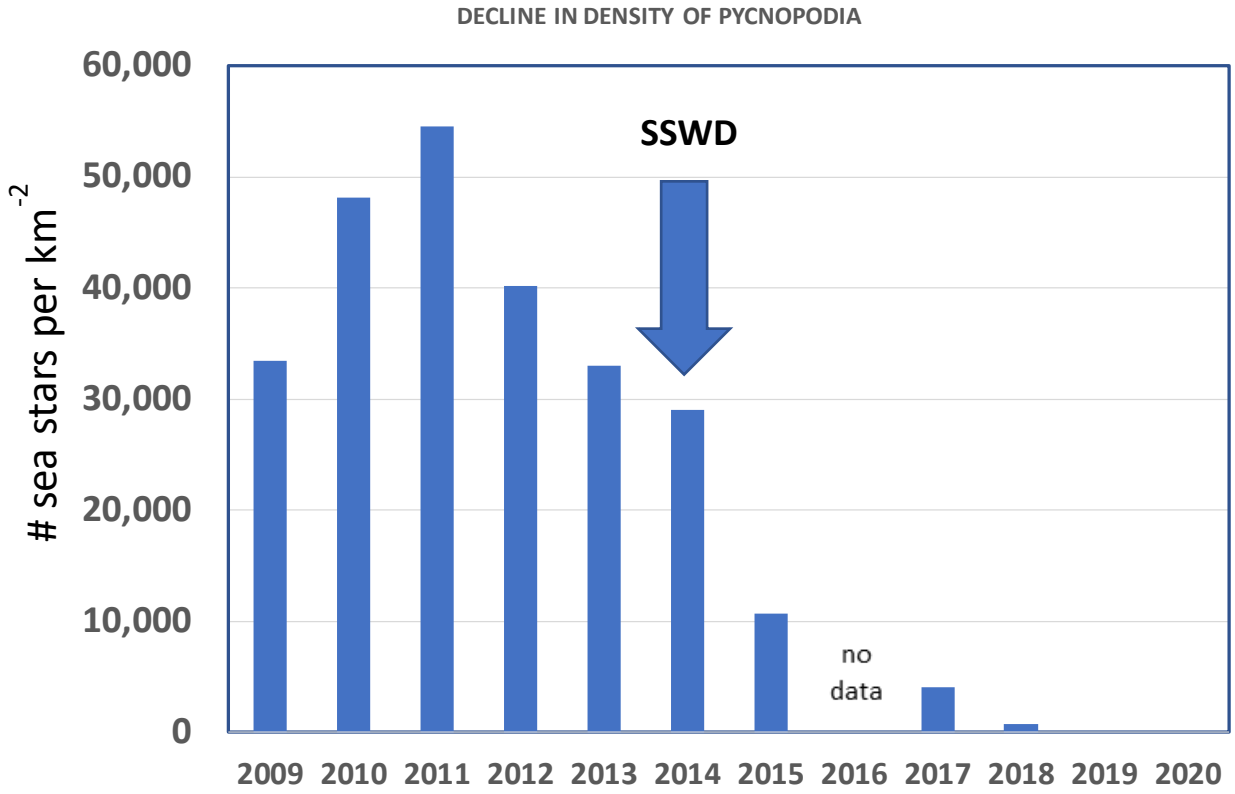

Figure 1. Substantial decline of sunflower sea stars (*Pycnopodia helianthoides*) along the Oregon coast over the past decade (2009 to 2020). Density values are derived from multiple field surveys conducted by the ODFW Marine Reserves Program, ROV surveys, and PISCO, and arrow indicates initial observations of mass mortality attributed to Sea Star Wasting Disease (SSWD). These estimates indicate that sunflower sea stars have experienced an overall population decline of 98.4% along the Oregon coast (data derived from: Gravem *et al.* 2021).

Staff recommend to broadly prohibit recreational take of all sea stars in Oregon at this time.

Literature cited:

Gravem, S.A., W.N. Heady, V.R. Saccomanno, K.F. Alvstad, A.L.M. Gehman, T.N. Frierson, S.L. Hamilton. 2021. *Pycopodia helianthoides*. IUCN Red List of Threatened Species 2021.

ISSUE 2

Increase Daily Limit for Recreational Harvest of European Green Crab

ANALYSIS

Populations of non-native European green crab (also known as "green crab") have become established in estuarine areas from California to British Columbia, including many bays and estuaries along the Oregon coast. Key characteristics to identify green crab include three bumps between their eyes and five spines on each side of the carapace (Figure 2). ODFW Sport Fishing Regulations for the Marine Zone have never included a specific reference for the recreational harvest of green crab. Currently, recreational harvest of green crab is allowed under the broad category of "Starfish, Urchins, Snails, Shore Crabs, and all other marine invertebrates not listed" at the aggregate daily limit of 10 per person per day. We recommend an increase in the daily catch limit to 35 crab per person per day, while maintaining the limits on gear and other management measures to be consistent across crab species.

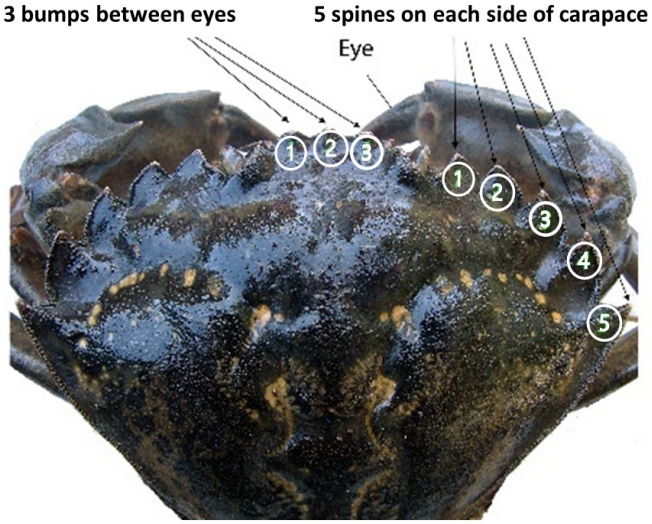

Figure 2. European green crab (*Carcinus maenas*) are identified by three distinct bumps between their eyes, and five pointed spines on each side of the carapace. These morphological features (three bumps / five spines) should be easy to remember because they are closely associated with the recommended daily catch limit of 35 crab per person per day. California limit on green crab is also 35 crab per day.

Increased abundance of European green crab long the west coast has been attributed to shifts in ocean currents associated with changing ocean conditions. New information generated by the monitoring of green crab in Coos Bay over the past 20 years (Figure 3; Schooler *et al.* 2021) indicates that the population has steadily increased in abundance over the past five years. Similar increases in abundance of green crab have been observed in other Oregon bays and estuaries

(*i.e.*, Netarts Bay, Yaquina Bay, Alsea Bay). Increased public awareness about the growing abundance of green crab in Oregon bays and estuaries has prompted numerous comments and requests for ODFW to raise the daily catch limit for this species. Monitoring data show that the Catch-Per-Unit-Effort for green crab captured in popular Fukui and/or crayfish traps deployed in the intertidal zone of Coos Bay currently averages about 5 to 6 crab per trap per day (Schooler *et al.* 2021). Similarly, standardized crab sampling conducted by the ODFW Shellfish Program has also documented an increase in the bycatch of green crab captured along with along with native Dungeness and red rock crab in the subtidal channels of Yaquina Bay. Unlimited harvest of the non-native green crab is not recommended due to public uncertainty regarding species identifications and likelihood for damage to red rock crab and undersized Dungeness crab. The Department believes that adherence to the current gear restriction of three traps, pots, snares, etc. (established for Dungeness crab and red rock crab) is recommended to prevent increases in gear impacts on habitat, derelict gear, and complication of monitoring and enforcement of the sport fishing regulations.

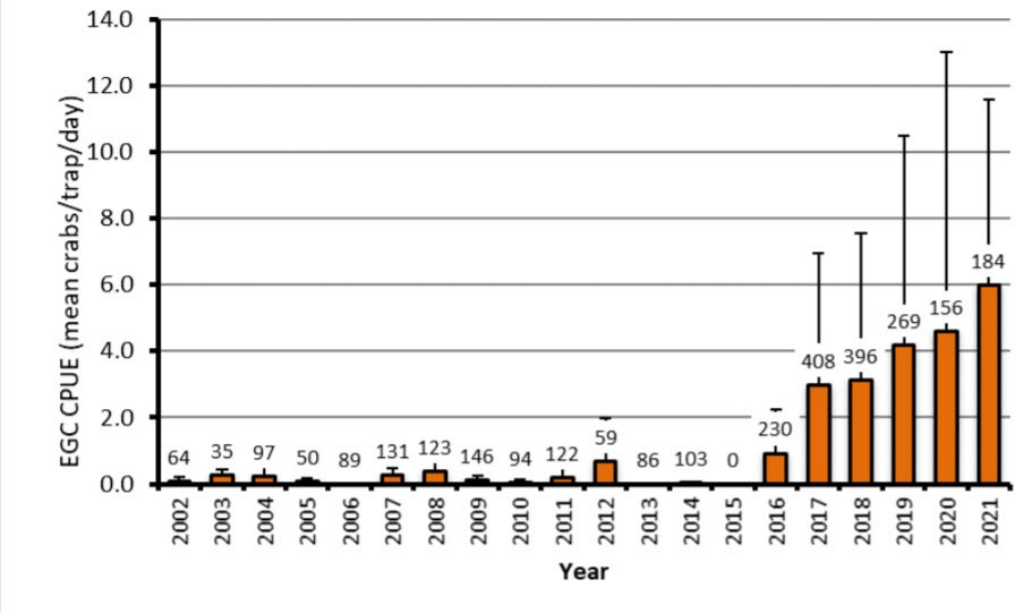

Figure 3. Time-series for catch of European green crab (EGC) over the past 20 years within the Coos estuary, OR. Values shown by bars are Catch Per Unit Effort (CPUE; mean # crab caught per trap per day) for green crab captured in baited Fukui traps deployed along the shoreline. Values above bars indicate the total number of traps deployed, and error bars indicate standard deviation in CPUE (from Schooler *et al.* 2021).

There are multiple benefits to increasing the bag limit, even though it is unlikely that recreational harvest activities will occur at a sufficient level to substantially reduce the populations of green crab in Oregon bays and estuaries. The increased daily catch limit will provide recreational crabbers with a greater opportunity to catch more green crab. In addition, allowance of the higher daily catch limit may also provide an opportunity to increase public awareness about the diversity of crab that may be caught in bays and estuaries, help educate recreational crabbers about the anatomic features used to correctly identify the different species, and provide the Department with an opportunity to collect enhanced monitoring information and spatially-relevant harvest data.

Staff recommend increasing the recreational daily catch limit for green crab to 35 crab (of any size or sex) per person per day.

Literature cited:

Schooler, S., S. Stansbury, S. Yamada, K. Andreasen. 2021. Status of Green Crabs in Coos Bay: Monitoring Report 2021. Tech. report; South Slough National Estuarine Research Reserve, 12 pp.

ISSUE 3

Require Electronic Fish Tickets for all Commercial Intertidal and Bay Clam Dive Fisheries

ANALYSIS

Timely and accurate information about commercial landings of bay clams is needed to track species-specific annual landing limits and make appropriate management decisions about opening and closure of commercial intertidal and bay clam dive fisheries. Commercial harvest of bay clams is tracked by monitoring information contained in logbooks and fish tickets. Each commercial harvester is required to record the landings from each clamming trip in a logbook, and they must sell their catch to a licensed shellfish dealer within 24 hours (when clams are sold for human consumption) or 48 hours of harvest (when clams are sold as bait). Shellfish dealers are required to fill out a paper fish ticket to record each purchase of bay clams, and to submit the fish tickets to ODFW within 5 working days of the date of landing. Paper fish tickets are typically associated with at least a 10-day delay before they are received by ODFW in the mail and entered into the agency database. Consequently, the existing system to track commercial harvests of bay clams can contribute to a substantial time-delay (up to two weeks) for fishery managers to access and monitor information contained within the fish tickets.

It is anticipated that the electronic fish ticket system will substantially reduce the time-delay, increase accuracy of tracking, and improve management of Oregon's commercial intertidal and bay clam dive fisheries. This requirement for electronic fish tickets was adopted earlier as a temporary rule in 2021 that expired at the end of December 2021. Shellfish dealers associated with the commercial intertidal and bay clam dive fisheries routinely submitted electronic fish tickets for the harvest seasons in 2021 as required by the earlier temporary rule, and it is anticipated that they will not experience difficulties as they continue to submit electronic fish tickets in the future in compliance with a permanent rule.

Staff recommend a permanent requirement for electronic fish tickets for the commercial bay clam fishery, submission required within one working day of the landing, and submitted electronically through the existing Pacific States Marine Fisheries Commission / West Coast E-Ticket System.

ISSUE 4

Designate a Harvest Area and an Annual Catch Limit for Commercial Dive Harvest of Gaper Clams in Yaquina Bay

ANALYSIS

Yaquina Bay is a popular coastal embayment that supports mixed uses including commercial fishing, charter boat operations, recreational clamming and crabbing, sailing, operation of research vessels, U.S. Coast Guard activities, kayaking, SCUBA diving, watching marine mammals, and other activities. During most years, commercial harvest of bay clams from Yaquina Bay is very low (< 500 lbs; average 336 lbs during most years of low harvest). However, in 2018 commercial harvesters identified a productive area and removed about 103,400 lbs of gaper clams from the subtidal zone over a period of four months. This elevated level of harvest represents a 300X increase over the typical level for low harvest years. Department fishery managers were concerned when commercial clam harvest of gaper clams increased substantially in 2018, and it became evident that regulatory guidelines were needed to aid development of a sustainable commercial fishery that is appropriate given the limited biomass of gaper clams and within the current mix of activities that occur in Yaquina Bay.

Table 2. Time-series records for the commercial harvest of gaper clams from the subtidal zone of Yaquina Bay (2008 to 2021). Commercial harvest of gaper clams generally occurred at a low level (< 500 lbs / yr), with the exception of 2018 when the annual harvest of gaper clams exceeded 103,000 lbs.

YEAR	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
HARVEST (lbs)	372	74	0	271	0	0	0
YEAR	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
HARVEST (lbs)	0	0	575	103,388	0	390	0

Following the unusually high commercial harvest of gaper clams in 2018, Department staff conducted a series of underwater surveys (2019; Figure 5) with contracted SCUBA divers and video (with a small Remotely Operated Vehicle (ROV)) to determine the general spatial distribution and abundance of gaper clams in the subtidal regions of Yaquina Bay. Significant populations of gaper clams were observed in some subtidal areas of Yaquina Bay, while other areas contained very few clams. Information generated by the ROV surveys was coupled with datasets from earlier underwater surveys to designate an appropriate commercial harvest area and develop an annual landing limit for the commercial harvest of gaper clams, in a manner that would provide the opportunity for commercial harvest while ensuring conservation of the clam population and minimizing conflicts with other user groups and stakeholders in Yaquina Bay.

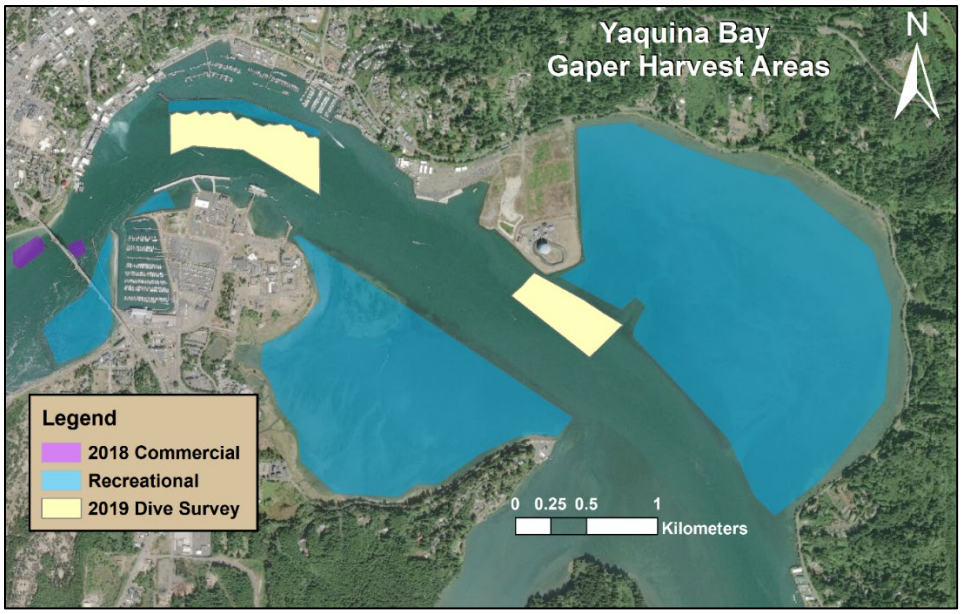

Figure 5. Map of the lower, marine-dominated region of Yaquina Bay, indicating the areas (purple polygons) where commercial clam divers harvested a substantial number of gaper clams from the subtidal zone in 2018. In 2019, ODFW conducted SCUBA and underwater video surveys (yellow polygons) to determine the status and abundance of gaper clams. Popular areas for recreational clamming (blue polygons) are indicated in the intertidal zones of the bay.

As a result of this analysis, the Commission adopted a 2019 temporary rule establishing the harvest area (Figure 6) and a harvest cap of 20,000 pounds, as an appropriate cap that would allow a modest and sustainable level of take. The Commission adopted a revised temporary rule in 2021 with the same designated harvest area and harvest cap, which expired in December 2021.

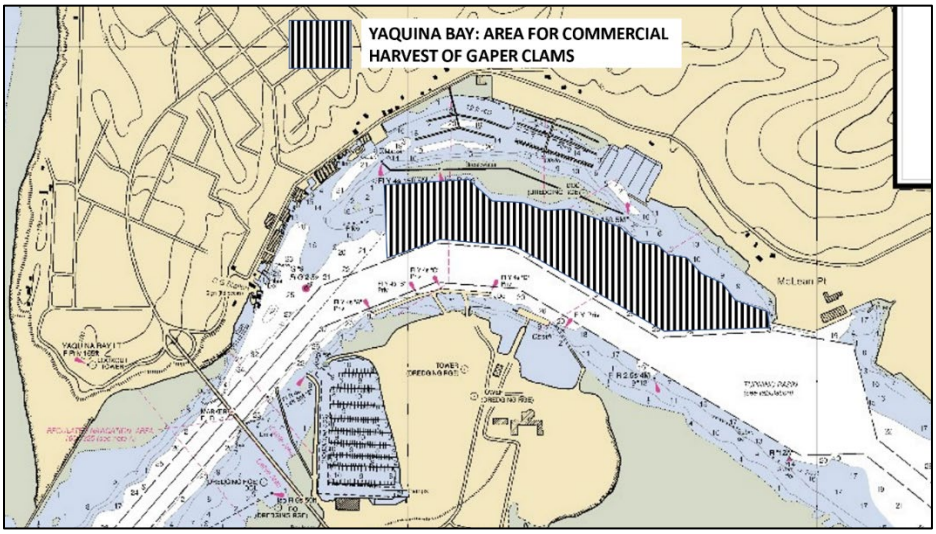

Figure 6. Map of the lower, marine-dominated region of Yaquina Bay, indicating the proposed area in the subtidal zone for the commercial harvest of gaper clams (hashed zone located north of navigational channel). The annual commercial landing limit for this area is 20,000 pounds of gaper clams.

Staff recommend that the designated commercial harvest area and annual commercial landing cap are permanently adopted into rule.

OPTIONS

1. Adopt staff recommendations:

    ISSUE 1 – Prohibit the recreational take of sea stars;

    ISSUE 2 – Increase daily limit for recreational harvest of non-native green crab to 35 per person per day;

    ISSUE 3 – Require electronic fish tickets for all commercial bay clam fisheries;

    ISSUE 4 – Designate the harvest area in Yaquina Bay and annual catch limit of 20,000 pounds for commercial dive harvest of gaper clams.

2. Modify staff recommendations.

3. Status quo.

STAFF RECOMMENDATION

1. Option 1.

DRAFT MOTION

I move to amend OAR Chapter 635, Divisions 005, 006, and 039 as proposed by staff in Attachment 3 to establish regulations for the commercial and recreational shellfish fisheries.

EFFECTIVE DATE: Upon filing