Wild Stock: Oregon Bay Clams

Butter clam

Gaper clam

Cockle

Native littleneck clam

Popular Targets for Recreational and Commercial Harvests
Wild Stock: Razor Clams

Managed by ODFW / Shellfish Program
Wild Stock: Oregon Oysters and Mussels

Olympia oyster: native  California mussel: native

SPORT HARVEST PROHIBITED

Managed by ODFW / Shellfish Program
Management of Bay Clam Harvests

• **Recreational Harvest:**
  - Sport license, daily catch limits
  - Creel interviews on tide flats, clammer counts
  - Estimates of catch-per-unit-effort, annual take

• **Commercial Harvest:**
  - Intertidal Rake Fishery
  - Sub-tidal Dive Fishery
  - Commercial permits, fishing license, landing limits, species, sizes, dates, harvest take (lbs), logbooks
Stock Assessment of Bay Clam Populations

Shellfish and Estuarine Assessment of Coastal Oregon (SEACOR)

Established in 2008:

- Supported by Recreational Shellfish License Fund (2004)

Goals:

- Stock assessments for bay clams (species, distribution, counts & biomass)
- Estuarine habitat mapping
- Long-term monitoring to determine temporal & spatial changes in shellfish populations
ODFW – SEACOR Bay Clam Stock Assessment Surveys: 2010-2014

Netarts Bay 2013-14

Tillamook Bay 2010-12

Legend
- RAM (Habitat only)
- DAM
- Subtidal
Recreational Bay Clam Harvests in Tillamook and Netarts Bays

Steady Landings Over Past 7 Years
Oregon Commercial Bay Clam Fishery

Target Species:
- Cockles
- Gaper clams
- Butter clams

Market:
- Bait for Dungeness crab fishery (majority of harvest)
- Human consumption (small % of harvest)
Steady increase in Tillamook Bay

Recent increase in Netarts Bay

Commercial Bay Clam Landings in Tillamook, Netarts, and Coos Bays
Recent History of Cockle Harvests From Netarts Bay

Sharp increase in commercial harvest
Commercial Mariculture of Oysters and Clams

Pacific oyster
Kumamotu oyster
Olympia oyster
Manila clam

Managed by ODA / Seafood Program
Commercial Shellfish Harvesters and Growers who Harvest for Human Consumption are Limited to ODA Classified Shellfish Growing Areas

1. Clatsop Beaches
2. Tillamook Bay
3. Netarts Bay
4. Yaquina Bay
5. Umpqua Triangle
6. Umpqua Estuary
7. Coos Bay
8. South Slough

Water Quality Monitoring: fecal indicator bacteria
Approved and prohibited shellfish harvest areas identified by the Oregon Department of Agriculture

Approved and prohibited areas based on:
- shoreline septic survey
- water quality parameters
- fecal indicator bacteria (*E. coli* & *Enterococcus*)
Commercial Oyster Mariculture Techniques

Bottom

Rack & Bag

Stake

Long-line

Rack

Buoy Line
# Identification of Ecological Impacts and Best Management Practices for Shellfish Mariculture in Pacific Northwest Bays and Estuaries:

<table>
<thead>
<tr>
<th>Study</th>
<th>Impacts Study Type</th>
<th>Site Location</th>
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</thead>
<tbody>
<tr>
<td>Everett <em>et al.</em> 1995</td>
<td>Impacts of Stakes &amp; Racks</td>
<td>South Slough NERR</td>
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<td>Pregnall 1993</td>
<td>Recovery after Removal</td>
<td>South Slough NERR</td>
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<tr>
<td>Trianni 1995</td>
<td>Harvest Dredge Impacts</td>
<td>Humboldt Bay</td>
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<tr>
<td>Rumrill &amp; Christy 1996</td>
<td>Impacts of Bottom Culture</td>
<td>South Slough NERR</td>
</tr>
<tr>
<td>Schreffler <em>et al.</em> 1999</td>
<td>Impacts of Bottom Culture</td>
<td>Tillamook Bay</td>
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<tr>
<td>Dumbauld <em>et al.</em> 2001</td>
<td>Impacts to benthic communities</td>
<td>Pacific Northwest</td>
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<tr>
<td>Rumrill &amp; Poulton 2004</td>
<td>Impacts of Long-Line Culture</td>
<td>Humboldt Bay</td>
</tr>
<tr>
<td>Dumbauld <em>et al.</em> 2004</td>
<td>Harvest Dredge Impacts</td>
<td>Willapa Bay</td>
</tr>
<tr>
<td>Dumbauld <em>et al.</em> 2009</td>
<td>Summary of Ecological Impacts</td>
<td>Pacific Northwest</td>
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<tr>
<td>Cohen <em>et al.</em> 2011</td>
<td>Ecological services</td>
<td>multiple sites</td>
</tr>
<tr>
<td>Ruesink <em>et al.</em> 2012</td>
<td>Impacts from multiple stressors</td>
<td>Pacific Northwest</td>
</tr>
<tr>
<td>Rumrill 2015</td>
<td>Shellfish-eelgrass interactions</td>
<td>Pacific Northwest</td>
</tr>
</tbody>
</table>
Restoration of Native Olympia Oysters in Netarts Bay

Restoration work undertaken by The Nature Conservancy, NOAA, and the Whiskey Creek Shellfish Hatchery
Restoration of Native Olympia Oysters in South Slough

Restoration work undertaken by ODSL / South Slough NERR, NOAA, and the Whiskey Creek Shellfish Hatchery
Restoration of Native Olympia Oysters in Coos Bay

- Restoration work undertaken by Oregon Department of Fish and Wildlife / Shellfish Program
- Research carried out by Univ. Oregon / Oregon Institute of Marine Biology
• Harvest of wild stock and cultivated shellfish are both important in Oregon.
• The Oregon Shellfish Initiative can provide an avenue to improve sport and commercial harvests, mariculture operations, and restoration activities.
• Public ownership of submerged and submersible lands in Oregon presents a special challenge to ensure fair and equitable use among diverse shellfish stakeholders.
Commercial Mariculture of Pacific Oysters in Tillamook Bay: Long-line Culture
Oregon Recreational Bay Clam Fishery

- **Management Actions:**
  - Sport Shellfish License (required)
  - Daily Catch Limits (quotas)
  - Gear Restrictions (by hand or hand-powered tools)
  - Reburial Restrictions (reduce by-catch mortality)
  - Area Closures (shellfish preserves)
Commercial Bay Clam Rake Fishery

Intertidal Fishery:
- Commercial Shellfish Permit & Intertidal Animal Permit
- Unlimited Permits
- No quotas
- No minimum size
- Logbook required
- Fish tickets to track landings
Commercial Bay Clam Dive Fishery

Dive Fishery:

- Limited entry permits (15)
- Gear restrictions (*i.e.*, by hand)
- Depth (< MLLW)
- Area restrictions (human consumption, reserve area)
- Seasonal Gaper clam restriction (spawning time)
- Annual harvest limits (quota)
- Minimum Size (2 ¼” for cockles)
- Logbook required
- Fish tickets to track landings
## Stock Assessment of Bay Clam Populations for Netarts and Tillamook Bays (2012-2014)

<table>
<thead>
<tr>
<th>BAY</th>
<th>Bay Clam Species</th>
<th>Intertidal Biomass (lbs) *</th>
<th>Sub-tidal Biomass (lbs) *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Netarts Bay</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Cockle</em></td>
<td>149,713</td>
<td>166,338</td>
</tr>
<tr>
<td></td>
<td><em>Gaper</em></td>
<td>37,980</td>
<td>N.A.</td>
</tr>
<tr>
<td></td>
<td><em>Butter</em></td>
<td>1,529,440</td>
<td>N.A.</td>
</tr>
<tr>
<td><strong>Tillamook Bay</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Cockle</em></td>
<td>470,590</td>
<td>1,859,760</td>
</tr>
<tr>
<td></td>
<td><em>Gaper</em></td>
<td>919,500</td>
<td>2,350,380</td>
</tr>
<tr>
<td></td>
<td><em>Butter</em></td>
<td>195,000</td>
<td>4,569,340</td>
</tr>
</tbody>
</table>

*note: biomass values are lower 95% confidence interval for bay clam stock assessments*
Pattern toward harvest of cockles earlier in year

Cumulative Dive Harvest of Cockles from Tillamook Bay

- 2008-2010
- 2011-2014
- 2015

90,000 lb cap
Proposed extension of commercial closure line from Buoy 13 to Hobsonville Point.
Proposed 548 ac Designated Commercial Rake Area: (open to sport & commercial harvest)

All remaining areas of Netarts Bay open to sport harvest & closed to commercial harvest

ODFW Shellfish Preserve (closed to sport & commercial harvest)
### Summary of Proposed Commercial Bay Clam Rule Adjustments

<table>
<thead>
<tr>
<th>Bay Clam Issue</th>
<th>Current Rule</th>
<th>Proposed Rule</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> New stock assessment data for bay clams</td>
<td>90,000 pound annual landing limit on cockles only, no limits for gapers or butters</td>
<td>Increase annual landing quotas for cockles in Tillamook dive fishery:</td>
<td>Increased opportunity for commercial clammers, allow cockle harvest to continue longer, reduce harvest pressure on gaper clams</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 185,000 pounds for cockles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 235,000 pounds for gapers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 225,000 pounds for butters</td>
<td></td>
</tr>
<tr>
<td>New fishery monitoring data for sport &amp; commercial harvests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Harvest of small cockles &amp; low meat yield in small cockles</td>
<td>Dive cockles must be 2 ¼”. No size limit for intertidal cockles</td>
<td>Increase minimum size of cockles to 2 ¾”</td>
<td>Increased protection of spawning stock</td>
</tr>
<tr>
<td>By-catch mortality of undersized gaper clams in Tillamook Bay</td>
<td>4” size limit on gaper clams for divers</td>
<td>Apply cockle size limit to intertidal harvest</td>
<td>Increased opportunity for sport clammers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remove 4” size limit for gaper clams</td>
<td>Decrease by-catch mortality for undersized gaper clams</td>
</tr>
<tr>
<td><strong>3</strong> Clarify location of closed area</td>
<td>US Coast Guard tower to buoy 13</td>
<td>Extend line to Hobsonville Point to clearly designate &amp; slightly expand commercial closure area</td>
<td>Eliminate confusion about location where commercial clamming is prohibited &amp; protect spawning stock</td>
</tr>
<tr>
<td><strong>4</strong> Increased commercial harvest of cockles &amp; conflict between user-groups in Netarts Bay</td>
<td>Only cockles may be harvested commercially from Netarts Bay</td>
<td>Restrict commercial harvest of cockles from Netarts Bay to designated 548 ac area; Establish 22,000 lb landing limit; Eliminate dive fishery</td>
<td>Conservation of cockle populations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Decreased conflict among stakeholders</td>
</tr>
<tr>
<td><strong>5</strong> Regional decline in populations of native littleneck clams</td>
<td>Commercial harvest of littleneck clams is allowed</td>
<td>Statewide prohibition on commercial harvest of native littleneck clams</td>
<td>Precautionary measure to ensure conservation of native littleneck clams</td>
</tr>
</tbody>
</table>
Regional Decline of Native Littleneck Clams (*Leukoma staminea*) in the Pacific Northwest

Substantial declines in populations:
- Southeast Alaska
- British Columbia
- Puget Sound / Willapa Bay
- Oregon (Tillamook, Yaquina, Coos)
- Northern California (Humboldt, Bodega)

Possible reasons for decline:
- mariculture of manila clams (competition & hybrids)
- harvest pressure (sea otters & humans)
- non-native species (oyster drills, green crab)
Local Decline in Densities of Native Littleneck Clams in Hobsonville Channel; Tillamook Bay, OR

Densities of clams during 1984-1996 were about 30X greater than 2012.
Oregon Recreational Bay Clam Fishery

**Management Actions:**
- Sport Shellfish License (required)
- Area Closures (shellfish preserves)
- Gear Restrictions (by hand or hand-powered tools)
- Daily Catch Limits (quotas)
- Reburial Restrictions (reduce by-catch mortality)

**Sport Shellfish License:**
- 180,000 sold in 2011-13 ($1.27 M / yr)
- Allocated to ODFW (50%), ODA (16%) & OSP (34%)
- Dedicated funds for shellfish management
Oregon Commercial Bay Clam Fishery

Primary Species:
- Cockles
- Gaper clams (recently)

Market:
- Bait for Dungeness crab fishery

Two Distinct Fisheries:
- Sub-tidal dive fishery
- Intertidal rake fishery