Memo To:
Pacific Fishery Management Council –
Mr. Dave Ortmann, Chair & Dr. Donald McIsaac, Executive Director & Council
Members

From: Karen Carlson, Graduate Student, Master of Public Policy - California State University, Monterey Bay, Department of Health, Human Services & Public Policy and the Panetta Institute.

Re: Pacific Sardine (Sardinops sagax) Federal Management Alternatives

Karen M. Carlson
208 Roosevelt Terrace
Santa Cruz, CA 95060
Problem
The onset of “derby” competition in the Pacific sardine (*Sardinops sagax*) fishery is threatening the viability of the existing high-volume, low-value sardine fishery and preventing development of a lower-volume, higher-value domestic fishery.

Background
The Pacific sardine (*Sardinops sagax*) is a small schooling fish with populations extending from Baja California in Mexico to British Columbia. Described as a coastal pelagic fish due to its movement throughout a large range, the sardine is the largest volume fishery in the Western Hemisphere. Well-documented population appearances and disappearances show that Pacific sardines respond to temperature cycles in the California current. Recognizing these dynamic natural fluctuations, National Marine Fisheries Service scientists have developed a stringent Harvest Guideline formula. After calculating the annual biomass, they subtract 150,000 metric tons called a “cutoff”. A sliding scale rate of 5-15% based on water temperatures in southern California then determines the remaining biomass allowed for harvest. These regulations are meant to reserve over 85% of the estimated biomass as forage for marine predators.

Fishery
Sardines are currently a high-volume export fishery. The U.S. catch over the last ten years, 2000-2009 averaged 114,000 mt or 228 million pounds. An average price of 6 cents per pound yielded $13.6 million dollars. A 1 cent increase in the price per pound would raise the catch revenue $2.28 million dollars. Pacific sardines are processed whole in frozen blocks for the Australian tuna industry and Japanese longline-fishing. Fish for human consumption are also exported to foreign processors. Domestic Sardine canneries have closed, unable to compete with canneries in Mexico, Ecuador, Peru and Morocco.

American consumers are now learning that the fast growing, oily sardine is superior in health value compared to larger, long-lived highly migratory fish such as tuna and swordfish which tend to concentrate unhealthy toxins. The U.S. Pacific sardine fishery is recognized for its sustainable fishing practices. It is listed in consumer seafood guides as a “best-choice-to-eat”.

Regulation
The year-round California (CA) fishery has been regulated since the 1940’s when about 200 vessels participated in the fishery. In 1999, the Pacific Fishery Management Council (PFMC)
assumed management of the CA sardine fishery. To prevent overcapitalization, a maximum fishing capacity established in 2003 reduced the fleet to 65 “limited access” permits south of 39º N latitude (Point Arena, CA). These purse-seine (a type of net) fishermen are diversified in the coastal pelagic species (CPS) they target, switching to higher value squid, and other pelagic finfish when sardines are not abundant at the size and oil content demanded by overseas markets. Due to global market demand and competition, the annual allocation was under-fished between 1999 and 2007.

Recovered sardine populations and under-fishing stimulated a northern re-entry into the fishery. Beginning in 2001, the PFMC allowed up to 40 new “open access” experimental sardine fishery permits in Oregon and Washington. These states were allowed to set their own policies for limited entry permits and were initially allocated a separate annual harvest guideline.

Amendment 11 was established by PFMC in 2004 for the five-year period 2005-09 “to achieve optimal utilization of the Pacific sardine resource and equitable allocation of the harvest opportunity for Pacific Sardine” (70 FR 69502). The Harvest Guidelines (HG) formula estimates the population annually through marine science temperature measurements and egg counts at the southern range of the fishery where the greatest spawning activity was believed to occur.

For the first three years, 2005 through 2007, HG set under Amendment 11 did not restrict the fishermen, allowing market forces to work relatively freely. Fishermen landed an average 114,000 mt (81%) of a 141,000 mt average allocation during this 5-year regulatory period. The final two years, 2008 and 2009, the formula calculated a decline in the biomass of sardines, resulting in a drop in HG to 89,093 mt in 2008 and to 66,932 mt in 2009.

### Management Alternatives for the Future

**Alternative One: Status Quo**

- **Management** - Continue "Command and Control" Federal Management methodology.
- **Permits** - Continue to allow “open access” permits in the PNW and “limited access” in CA.
- **Quota** - Use the same southern range: temperature studies, annual egg surveys and HG formula to forecast the quota for the next year. Use the tri-annual regional percentage format: 35% Jan through June, 40% July through Sept 14 and 25% Sept 15 through Dec 31.
- **Result** – Water temperatures and timing of egg surveys do not account for strength of fish populations observed in central California and the PNW. If Quotas below 100,000 mt persist, the
“race to fish” will continue with early tri-annual closures. Competition between CA and PNW will intensify. Declining revenues provide disincentive to risk investment into lower volume domestic market innovations. Fishing effort will shift to more profitable CPS.

**Alternative Two: Domestic Food Market Incentive and Permit Equity**

- **Management** - Continue status quo "Command and Control" Federal Management
- **Permits** - Include PNW in “limited access” permit rules.
- **Quota** – Continue Amendment 11 annual Harvest Guideline allocation formula. Apply the 35/40/25 tri-annual allocation split for bulk export markets only. Allow 365-day fishing access for domestic food markets.
- **Result** – Progress is made toward permit equity between CA and PNW. A minor change in fishery access by market could be included in the 2010 guideline. A method to track the domestic market sardines similar to tracking the allowed set aside for bycatch can be implemented during tri-annual fishery closures. Established fresh and processed fish markets as well as new market testing and collaborative demonstration projects will not be affected by early season closures unless the annual HG is met. These actions will support innovative research and development experiments and sustain local efforts toward a higher value fishery.

**Alternative Three: Community Property Rights (CPR)**

- **Management** – PFMC would oversee NMFS verified fishery data gathering activities conducted by area communities and hired marine scientists. Fishery property rights management is transferred to the area level as community-based decision-making. The community areas are determined by geographical/ecological/political splits, Southern California and Northern California (SCA and NCA) and PNW. Separate fishery population assessments and harvest limits are established for each independent community area.
- **Permits** – Permit decisions inclusive of socio-economic considerations are made by each area and adapted to sardine biomass changes.
- **Quota** - Each area receives a separate allocation, which includes visual and physical population data from the specific area. This data collected by the fishing community, provides a secondary index increasing the accuracy of baseline southern range biomass forecasts.
- **Result** – Race to fish quota and permit competition is eliminated between California and PNW. Fishermen would fish according to the weather and conditions in their community area. SCA and NCA would continue a year-round fishery strategy diversified between coastal pelagic
species. PNW would fish during summer and early fall when their fish are the largest and weather is best. Communities would be vested in improving their methods to set permit access and data gathering to maintain a healthy fishery population and sustainable fishing community in their area. Less time and fewer economic resources will be spent competing for resources with fishermen outside the area.

**Alternative Four: Individual Transferable Quota (ITQ)**

- Management - Implement a limited access privilege program (LAPP), Individual Transferable Quota (ITQ) system. PFMC would develop for NMFS approval new methods to establish and track individual permit landings and limits.
- Permits - Private property rights are granted through allocation of a percentage of the Total Allowable Catch (TAC) per permit. Permit holders have rights to sell the permit share.
- Quota - Historical catch data per permit holder is measured and a percentage determined. Annual maximum sustainable yield and HG calculate the TAC. Annual ITQ shares of the fishery harvest are allocated by permit percentage.
- Result – The race to fish is eliminated. If pre-1999 historical data is used, CA will receive 100% of the shares. If 2006/07 data is used, PNW will receive approximately half of the share percentage for 10% of the active fishery participants. Expanded management structure is needed to track individual catch share limits. Fluctuating sardine populations and cyclic declines make sustainable private property rights impossible to guarantee. If low TAC persists, smaller shareholders will be motivated to sell, causing industry consolidation.

**Recommendation**

Pacific sardine management, NMFS and PFMC are beginning to lay the groundwork for Long-Term Amendment 13. In the meantime, short-term policy adjustments can be made for the 2010 season. Alternative Two: Domestic Food Market Incentive is a viable short-term plan to sustain availability for existing low-volume domestic food markets and preserve expansion opportunities. The fishing industry is likely to support a domestic market incentive if their larger export markets are not threatened. If the landed value were to reach that of market squid in 2009 (34 cents/lb), fishermen would receive approximately $2.2 million from only 5% (3,300 mt) of the 65,723 mt HG2009 compared to $8 million at 6 cents/lb for 100% of the HG2009. A higher-value domestic market for sardines will stimulate the fishing industry to expand their local
seafood offering and diversify their products leading to greater prosperity with lower-volume landings.

In the short-term, a “limited access” permit system for both CA and the PNW is more equitable in a declining fishery by removing existing discrepancies between federal and state laws. In the long-term, permit access to the fishery can be re-assessed. Implementation of Alternative Three, Community Property Rights in the next long-term plan will allow permit rights based on sardine population expansion and retraction in each area rather than across the entire fishery.

As the fishery recovered, it expanded from the south throughout its central and northern ranges. Known as a prolific spawner, the Pacific sardine is now capable of laying eggs from Mexico to British Columbia. Biomass estimates reached through traditional egg surveys in the southern range do not support reports by fishermen of large sardine schools off the coasts of central and northern California, Oregon and Washington. In 2009, PNW and NCA were granted a portion of the 1,200 mt research set aside allocated in the HG to develop a methodology for visually and physically measuring the expanded Pacific sardine population off the coasts of NCA and PNW. There is support among the PFMC subcommittees and NMFS to test, verify and incorporate this type of secondary index into the HG. These advances will build trust among stakeholders and open the opportunity to implement a new long-term management strategy based on geographical/ecological/political areas such as Community Property Rights. The PFMC has the jurisdiction to expand our understanding of the dynamic Pacific sardine population and recommend regulations to strengthen a heritage fishery with deep local community dependence and individual character.