NATIONAL MARINE FISHERIES SERVICE REPORT

Mr. Mark Helvey, of the National Marine Fisheries Service West Coast Region (NMFS WCR), will provide the Council with a regulatory update. Mr. Dale Sweetnam, NMFS Southwest Fisheries Science Center, will provide an update on the spring and summer research surveys, information regarding a potential assessment of the northern anchovy population, and information on a recent review of west coast stock assessment activities.

Council Task:

Discussion.

Reference Materials:

None.

Agenda Order:

a.	Agenda Item Overview	Kerry Griffin
b.	Regulatory Activities	Mark Helvey
c.	Fisheries Science Center Activities	Dale Sweetnam
d.	Reports and Comments of Advisory Bodies and Management Entities	
e.	Public Comment	
f.	Council Discussion	

PFMC
10/23/2014

NOAA FISHERIES
SWFSC

Agenda Item E.1.c
Fisheries Science Center Activities

- Update on the Spring and Summer CPS Surveys
- Update of Programmatic Review of Stock Assessments held July 28-August 1, 2014 La Jolla, CA
- Schedule of upcoming CPS assessments

Dale Sweetnam, Fisheries Resources Division
November 15, 2014

Agenda Item E.1.c
Update on the Spring and Summer CPS Surveys

NOAA FISHERIES

SWFSC

- Warmer than normal waters have dominated the West Coast since the spring
- Does not match El Niño or Pacific Decadal Oscillation patterns
- May have caused sardine to alter spawning behavior and migrate to PNW earlier than recent years
- SWFSC continues to process biological information for the 2015 assessments

For more information see full press release: Unusual North Pacific Warmth Jostles Marine Food Chain

https://swfsc.noaa.gov/news.aspx?Division=FED&ParentMenuId=54&id=19491

Agenda Item E.1.c
Update on the Spring and Summer CPS Surveys

NOAA FISHERIES

Agenda Item E.1.c
Update on the Spring and Summer CPS Surveys

NOAA FISHERIES
SWFSC

California Current Ecosystem Survey 2014 (CCE14) was delayed and shortened due to ship problems (From 80DAS to 58DAS)

- Leg 1 June 26-July 11, 2014 (18 DAS)
- Leg II August 3-22, 2014 (20 DAS)
- Leg III (Hake Research) (20 DAS)

Because of changing environmental conditions, priority switched from off-year SaKe research to sardine synoptic survey

NWFSC gave up 20+ days of hake research in order for the SWFSC to complete a synoptic survey for sardine

Dale Sweetnam, Fisheries Resources Division
November 15, 2014

Agenda Item E.1.c
Update on the Spring and Summer CPS Surveys

NOAA FISHERIES

Agenda Item E.1.c
Update on the Spring and Summer CPS Surveys

NOAA FISHERIES

Agenda Item E.1.c
Update of Programmatic Review of Stock Assessments
July 28-August 1, 2014 La Jolla, CA

NOAA FISHERIES

SWFSC

Review of our Stock Assessment Process

Are we doing good science?

Are we doing the right science?

Goals: To provide advice on improving the quality, relevance and performance of SWFSC stock assessments:

- Focus on modeling and assessment practices
- Prioritization and peer review process
- SWFSC's organization to support stock assessments

Dale Sweetnam, Fisheries Resources Division
November 15, 2014

NOAA FISHERIES

SWFSC

Agenda Item E.1.c
Update of Programmatic Review of Stock Assessments
July 28-August 1, 2014 La Jolla, CA

1. Does the Center **apply a suitable scientific/technical approach** to fishery stock assessment modeling?
2. Is the **assessment process efficient, effective and clearly described**, including terms of reference for assessment reports?
3. Does the Center, in conjunction with other entities such as the Council's Scientific and Statistical Committee (SSC), have **an adequate peer review process**?
4. Is the Center's program **organization effective at accomplishing needed assessments** according to a set of assessment priorities? Include program structure, staffing, and funding; include prioritization of stocks for assessment
5. Does the Center **achieve adequate assessment accomplishments** relative to mandates particularly with respect to the number of Fishery Management Plan(FMP) species assessed?
6. Does the assessment program **adequately communicate their results, needs, and research**?
7. Are there **opportunities for improving stock assessments** and the stock assessment process?

Dale Sweetnam, Fisheries Resources Division
November 15, 2014

Agenda Item E.1.c
Update of Programmatic Review of Stock Assessments
July 28-August 1, 2014 La Jolla, CA

NOAA FISHERIES
SWFSC

- ✓ Panel submitted final report within a week (August 2014)
  - ✓ Individual reports from each member of the panel
  - ✓ Chair provided a summary report
- ✓ Center provided response and has submitted to HQ (November 2014)
- ❑ After review from HQ, final reports and Center responses will be posted publicly (January 2015)

Dale Sweetnam, Fisheries Resources Division
November 15, 2014

Agenda Item E.1.c
Schedule of upcoming assessments of other CPS

NOAA FISHERIES
SWFSC

- Current CPS Assessment Schedule for 2015
  - Pacific sardine assessment update scheduled for March 5, 2015 Vancouver, WA
  - Pacific mackerel full stock assessment review scheduled for April 27-29, 2015 SWFSC, La Jolla, CA for approval at June Council meeting
- Other CPS including northern anchovy (2 stocks) and jack mackerel
  - Collection of biological information for northern anchovy from independent and dependent sampling was initiated in 2012 and continues
  - Aging expertise of northern anchovy must be relearned
  - Data–preparation meeting held in conjunction with the 2014 Pacific Sardine STAR review, March 6, 2014 to determine current available information

Questions?

Photo by Juan Zwolinski: Northern anchovy school at SIO pier 7-8-2014

Agenda Item E.1.e
Supplemental Public Comment
November 2014

October 31, 2014

Ms. Dorothy Lowman, Chair
Pacific Fishery Management Council
1100 NE Ambassador Place, #101
Portland, Oregon 97220

Mr. William Stelle, Regional Administrator
NOAA Fisheries, West Coast Region
7600 Sand Point Way NE
Seattle, Washington 98115

Re: Agenda Item E.1 – NMFS Report (CPS)

Dear Chair Lowman, Mr. Stelle, and Council Members:

We write to request that the Council include a full agenda item on northern anchovy management on its agenda for Coastal Pelagic Species (CPS) in March or April. If the Council's workload does not permit a full agenda item in March or April, we request that an agenda item be added to the Council schedule no later than June 2015. We attached our coalition letter from September detailing the reasoning and justification for our request. We are encouraged with the Southwest Fishery Science Center's intent to provide an update on the northern anchovy stock assessment at the upcoming meeting in Costa Mesa. However, we reiterate our request for a more thorough report on NOAA Fisheries progress.

Thank you for your time and consideration. We look forward to working with NOAA Fisheries and the Council to ensure sustainable management of northern anchovy.

Sincerely,

Anna Weinstein
Seabird and Marine Program Director
Audubon California

Corey Ridings
Policy Analyst
Ocean Conservancy

Karen Garrison
Co-Director, Oceans Program
Natural Resources Defense Council

Andrea Treece
Staff Attorney
Earthjustice

Geoffrey G. Shester, Ph.D.
California Program Director
Oceana

Paul Shively
Manager, U.S. Oceans, Pacific
The Pew Charitable Trusts

Agenda Item E.1
NMFS Report (CPS)
Public Comment

October 31, 2014

Ms. Dorothy Lowman, Chair
Pacific Fisheries Management Council
1100 NE Ambassador Place, #101
Portland, OR 97220

Mr. William Stelle, Regional Administrator
NOAA Fisheries, West Coast Region
7600 Sand Point Way NE
Seattle, Washington 98115

Re: Agenda Item E.1 – NMFS Report (CPS)

Dear Ms. Lowman, Mr. Stelle, and Council members:

We respectfully request that the Council include northern anchovy management on its November agenda for Coastal Pelagic Species (CPS). Northern anchovy is one of the most important forage species in the California Current ecosystem and fishing pressure is increasing, yet stock status is poorly known and more management safeguards for this species are needed in the CPS Fishery Management Plan (FMP) to ensure adequate forage for dependent predators. Agendizing this

topic for November will allow the National Oceanic and Atmospheric Administration's Fisheries Service (NOAA Fisheries) to inform the Council and the public as to the status of the stock assessment process as well as create an opportunity for public input and discussion. It may also provide the Council with the information needed to generate a motion identifying and prioritizing tasks to advance management of northern anchovy. This attention is critically needed in order to begin the process of putting in place an updated, scientifically sound and legally compliant management framework for this essential forage species.

In 2013, a federal court ordered NOAA Fisheries to establish a maximum sustainable yield (MSY) or MSY proxy for the northern subpopulation of northern anchovy. NOAA Fisheries recommended an MSY fishing mortality rate (F_{msy}) of 0.3 for the northern subpopulation. In developing its recommendation to the Council, NOAA Fisheries acknowledged that the information needed to develop an accurate MSY was incomplete and advised "as new information becomes available that this value be reevaluated."[1] At its November 2013 meeting, the Council adopted the MSY as recommended by NOAA Fisheries. In the discussion preceding the motion, the Council acknowledged the near-complete lack of information on the status of either the northern or the central subpopulation and recommended NOAA Fisheries prioritize stock assessments for both the northern and central subpopulations in the next five years.

Additionally, during the public comment period for the November meeting, our organizations recommended the Council and NOAA Fisheries take steps to implement and update required management measures for both subpopulations.[2,3] First, we recommended that NOAA Fisheries conduct full stock assessments on both subpopulations, which would support an updated, scientifically sound and legally compliant management framework for northern anchovy. This framework would account for ecosystem needs and the social and economic factors consistent with achieving Optimum Yield (OY), including precautionary management measures such as Annual Catch Limits, Minimum Stock Size Thresholds and other status determination criteria.

Second, we noted that despite specifying ACLs for so-called "monitored" species in the CPS FMP in Amendment 13 adopted in 2010, NOAA Fisheries has yet to promulgate regulations to implement these legally required management measures to prevent overfishing. We reiterate our request for NOAA Fisheries to issue proposed and final regulations to implement ACLs for northern anchovy.

Third, we recommended the Council eliminate the distinction made in the CPS FMP between "Active" and "Monitored" categories for CPS, which is contrary to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act, is antiquated, and has resulted in insufficient scientific and management attention paid to monitored stocks including northern anchovy.

We made these recommendations to address three primary scientific and management concerns: (1) the importance of anchovy to predators; (2) the lack of basic information on the status of northern anchovy stocks combined with declining trends in northern anchovy in recent surveys; and (3) increased fishing effort targeting northern anchovy. We provide detailed discussion of these concerns below.

(1) Importance of anchovy to predators. Anchovy are a vitally important prey species for a multitude of predators in the California Current System (CCS). The Council's Fishery Ecosystem Plan notes:

"The greatest proportion of energy flow in the CCS appears to be through krill, market squid, northern anchovy, Pacific sardine, and Pacific herring."

Anchovy are important to managed fish species in the salmon, groundfish, and highly migratory species Fishery Management Plans. For example, the seasonal diet of Chinook salmon in California can be over 90% anchovy.[4]

According to two separate and complementary new analyses, anchovy is the single most important prey species for California Current seabirds,[5] and the first or second most important for the broader suite of predators, such as humpback whales, Chinook salmon, dolphins, and pinnipeds.[6] Numerous seabirds including California Brown Pelican; Short-tailed, Sooty, Buller's, Flesh-footed, Pink-footed, and Black-vented Shearwaters;[7,8,9] Common Murre; Rhinocerous Auklet; Craveri's Murrelet; Scripps's Murrelet; and California Least Tern rely on anchovy for one or more seasons of the year.[10] Newly published analyses of seabird and forage fish distribution and abundance in the CCS show that a substantial decline in seabird abundance in the northern portion of the southern CCS (from around Pt Conception, CA North) – a rate of decline of 2.2% per annum from 1987-2011— is attributable to declines in anchovy abundance and availability. The authors note:

"We think anchovy decline probably accounts for much of the long term decline in the seabirds in the region."[11]

Pacific Brown Pelicans are heavily dependent on abundance and availability of anchovies in close proximity to colonies during the pre-breeding and breeding periods.[12,13] Anchovies comprised 33% -100% of the diets of breeding pelicans in six years of surveys that took place at the U.S. Channel Islands between 1991-2005, including two years where anchovies comprised 100% of the diet.[14] Since 2010, biologists have noted a general decline in Pacific Brown Pelican reproductive success, culminating in a near-total nesting failure in 2012 and 2013. In 2014, biologists reported the first-ever range-wide breeding failure of Pacific Brown Pelicans, from the Gulf of California through the U.S. Channel Islands.[15] At the Channel Islands, biologists analyzed a range of possible causes, including contaminants, disease, and disturbance effects, and concluded that local prey availability during the breeding season is most likely the primary cause of the these reproductive failures.[16]

It is important to note that the CPS FMP, which was originally the Northern Anchovy FMP, used to include a broader set of management measures for northern anchovy, including a harvest control rule with a CUTOFF biomass of 300,000 mt (double the CUTOFF in the Pacific sardine Harvest Guideline) under which the catch level was capped at 7,000 mt. This harvest strategy was designed so that fishing only occurred at high levels of abundance, and included the explicit goal of ensuring a forage reserve for marine predators. At the time, NOAA Fisheries and the Council were required to pay special attention to the forage needs of Brown Pelicans in formulating and implementing management measures for northern anchovy.[17]

In fact, the U.S. Fish and Wildlife Service based its 2009 decision to remove Brown Pelicans from Endangered Species Act protection in part on the assumption that the CPS FMP would ensure sufficient food for breeding success of the west coast population of Brown Pelicans:

The CPSMP will continue to ensure that adequate forage is available to pelicans if economic conditions change and northern anchovies become more intensively fished. The CPSFMP will also ensure that other forage fishes used by pelicans, such as Pacific sardines and Pacific mackerel, are also managed to preserve adequate forage reserves.[18]

However, the entire management regime originally established by the Northern Anchovy FMP was eliminated in 1998 when the FMP became the CPS FMP in Amendment 8, and northern anchovy were relegated to "monitored" status. The fact that Brown Pelicans have experienced significant breeding failures for the past five years, and sea lions pups in southern California have experienced high mortality rates due to lack of prey in the past two years, indicate that the forage supply for some marine predators is inadequate. NOAA Fisheries and the Council should re-evaluate the existing fishery management measures for CPS in light of current science and the needs of these predators, and determine whether improvements can be made to ensure adequate forage.

(2) Lack of stock information combined with declining survey trends. The central subpopulation was last assessed in 1995 and the biomass assessment for the northern subpopulation is based on egg, larval and acoustic surveys from the 1970s. At the November 2013 Council meeting, NOAA Fisheries acknowledged that it had incomplete information for both subpopulations, and noted that full stock assessments are tentatively planned for 2015 and 2016 for the northern and central subpopulations, respectively.[19] The urgent need to conduct full stock assessments is underscored by the long-term declining trend in anchovy abundance in the CCS in survey cruises conducted by the NOAA Fisheries Southwest Fishery Science Center, in the range of the central subpopulation.[20] Observers have also noted an increasing shoreward contraction of anchovy in certain areas of the CCS.[21]

(3) Existing and increasing landings. As of August 14, 2014, anchovy landings in California are at the highest level since 2008, with 10,158 tons landed, amounting to ex-vessel revenue of $1,514,340. There were no reported landings in Oregon in 2014.[22] Fisheries effort on anchovy may continue to increase in light of the collapse of the sardine stock, which has recently triggered Council action to reduce harvest quotas.[23]

Thank you for your time and consideration, and for your work in advancing ecosystem-based fishery management. For the reasons we've detailed above, there is a critical need to agendize northern anchovy for the November Council meeting. We look forward to working with you on this important issue.

Sincerely,

Anna Weinstein
Seabird and Marine Program Director
Audubon California

Karen Garrison
Co-Director, Oceans Program
Natural Resources Defense Council

Corey Ridings
Policy Analyst
Ocean Conservancy

Andrea Treece
Staff Attorney
Earthjustice

Geoffrey G. Shester, Ph.D.
California Program Director
Oceana

Paul Shively
Manager, U.S. Oceans, Pacific
The Pew Charitable Trusts

---

[1] NMFS. 2013. Potential alternatives for establishing an estimate of MSY for the northern subpopulation of northern anchovy. Agenda Item E.3.a. Supplemental Attachment 1, NMFS Report. November.
[2] Audubon, Earthjustice, Oceana, Pew Charitable Trusts. 2013. Comment letters and public comment submitted under Agenda Item E.3: Establish MSY Reference Point for Northern Anchovy. November meeting of the PFMC. Costa Mesa, CA.
[3] Agenda Item E.3.c, Supplemental Public Comment 3 (Oceana PowerPoint).
[4] Thayer, J, *et al.* 2013. Changes in California Chinook salmon diet over the past 50 years: Relevance to the recent population crash. *Mar Ecol Prog Ser.*
[5] Szoboszlai, A. et al. (In prep) Data synthesis for understanding predator forage needs: A case study from the California Current. *Ecological Archives*.
[6] Ainley, D., P. Adams, and J. Jahncke. 2014. Towards ecosystem based-fishery management in the California Current System – Predators and the preyscape: a workshop. Unpublished report to the National Fish and Wildlife Foundation. Point Blue Conservation Science, Petaluma, California. Point Blue contribution number 1979.
[7] Lyday, S. et al. 2013. Shearwaters as ecological indicators: towards predicting fish catch in the California Current. https://app.box.com/s/o3cf5a2xssm3qvu19r9q/1/1161890651/10450888935/1
[8] Szoboszlai et al. (i) ibid.
[9] Sydeman, W. et al. 2001. Climate change, reproductive performance and diet composition of marine birds in the southern California Current system, 1969–1997. Progress in Oceanography 49: 309–329
[10] Thayer, J. et al. 2008. Forage fish of the Pacific Rim as revealed by diet of a piscivorous seabird: synchrony and relationships with sea surface temperature Can. J. Fish. Aquat. Sci. 65: 1610–1622
[11] Sydeman,W. et al. 2014. Climate–ecosystem change off southern California: Time-dependent seabird predator–prey numerical responses. Deep-Sea Research II http://dx.doi.org/10.1016/j.dsr2.2014.03.008i
[12] Anderson, D. et al. 1980. Brown pelicans as anchovy stock indicators and their relationships to commercial fishing. CalCOFI Rep., Vol. XXI, 1980.

[13] Anderson, D. et al. 1982. Brown pelicans: influence of food supply on reproduction. OIKOS 39: 23-31.
[14] Harvey, L. 2013. California Institute of Environmental Studies. California Brown Pelican reproductive decline on the Channel Islands colonies. Unpublished data. March.
[15] May 2014. Preliminary data presented by Dan Anderson (Mexico) and Laurie Harvey (Channel Islands) at phone meeting of the Pacific Brown Pelican Rangewide Technical Working Group. Convened by USFWS Region 8. Carlsbad, CA.
[16] Harvey, L. 2013. Ibid.
[17] U.S. Fish and Wildlife Service. 1983. California Brown Pelican Recovery Plan. Portland, OR. http://www.fws.gov/arcata/es/birds/brnpelican/documents/1986%20Recovery%20Plan%20for%20the%20Brown%20Pelican.pdf
[18] Federal Register / Vol. 74, No. 220 / Tuesday, November 17, 2009 / Rules and Regulations. 50 CFR 17 Endangered and Threatened Wildlife and Plants; Removal of the Brown Pelican (*Pelecanus occidentalis*) From the Federal List of Endangered and Threatened Wildlife; Final Rule.
[19] NMFS. 2013. Agenda Item E.1.c . Supplemental FSC PowerPoint (Werner). November.
[20] NMFS. 2014. Annual State of the California Current Ecosystem Report. A Report of the NMFS Northwest and Southwest Fisheries Science Research Centers.
[21] Hsieh, C.H., et al. (2005) A comparison of long term trends and variability in populations of larvae of exploited and unexploited fishes in the Southern California region: a community approach. *Prog Ocean* 67:160–185.
[22] Pacific States Marine Fisheries Commission (PacFin). August 14, 2014. http://pacfin.psmfc.org/pacfin_pub/all_species_pub/woc_r308.php
[23] NMFS. 2014. *Ibid.*

Agenda Item E.2
Situation Summary
November 2014

SARDINE HARVEST FRACTION FINAL PREFERRED ALTERNATIVE

The current sardine harvest guideline (HG) control rule includes a harvest fraction parameter that is based on the SST as measured at the Scripps Institution of Oceanography (SIO) pier. However, a 2013 panel of experts made a recommendation, subsequently endorsed by the Scientific and Statistical Committee and the Council, to use the California Cooperative Oceanic Fisheries Investigations (CalCOFI) temperature index, as well as a revised F_{msy} relationship, for use in calculating the OFL. The Council adopted the technical change of using the CalCOFI temperature index, rather than the SIO temperature recordings, for the best estimate of a temperature-productivity relationship, used to calculate the annual overfishing limit (OFL) and acceptable biological catch (ABC) for Pacific sardine. The new temperature index and new temperature-productivity relationship were used for establishing the OFL starting with the April 2014 meeting, when the Council established harvest specifications and management measures for the fishing year beginning July 1, 2014.

The HG control rule will continue to use the SIO temperature and temperature-productivity relationship, and a 5-15 percent harvest fraction range, until the Council takes action to change the control rule. In changing the HG control rule, the Council can adopt the change to the CalCOFI index and temperature-productivity relationship, and consider four options for a harvest fraction range: 5-15 percent, 5-20 percent, 0-20 percent, and 10-20 percent. National Marine Fisheries Service (NMFS) staff, Council staff, and the CPSMT prepared a draft Environmental Assessment (EA) with alternatives for Council consideration, included as Agenda Item E.2.a, Attachment 1.

At its September 2014 meeting, the Council considered a preliminary draft Environmental Assessment (EA), and requested more information regarding comparisons between possible changes in the HG control rule to the status quo/No Action alternative. To this end, the CPSMT developed additional tables, which are included in Agenda Item E.2.b, CPSMT Report. These include Table 1 (retrospective SIO and CalCOFI HGs), Table A-2 (hypothetical scenarios based on varying temperatures and biomasses), Table A-5 (hypothetical retrospective HGs), and a new 'no action alternative' column in Table A-1 (fishery performance measures).

It is important to note that there are three major variables that are different between the HG control rule alternatives and status quo, making direct comparisons to the status quo difficult: the temperature index (SIO to CalCOFI), a different set of years used to inform the temperature-productivity relationship, and a different operating model. However, the CPSMT's retrospective analysis of harvest scenarios, in addition to hypothetical scenarios under varying temperatures and biomass levels, help to compare the alternatives with status quo.

The CPSMT also included a "harvest rate" (HR) in its report. The HR is the effective harvest rate, which is different from the FRACTION term. The HR is simply the HG allowed as directed

harvest, divided by the total 1+ stock biomass. The HR gives a more accurate indication of what actual percent of the stock would be harvested in any given year.

This action is being taken under the framework management approach described in the CPS FMP. As a full rulemaking action it requires at least two Council meetings, public notice, and comment. The November 2014 Council meeting represents the third Council meeting. In order for the Council to use the new harvest fraction parameters for the following fishing year (July 1, 2015 through June 30, 2016), the Council must take final action (selection of a final preferred alternative) at the November 2014 meeting. After final Council action, the process will consist of transmittal of the action to NMFS, regulatory deeming, and proposed and final rulemaking. The Council is scheduled to set Pacific sardine harvest specifications and management measures at its April 2015 meeting.

At this, meeting the Council should adopt a Final Preferred Alternative regarding the temperature index and temperature-productivity relationship, and should select a harvest fraction range to accompany the FPA.

Council Action:

Adopt Final Preferred Alternative for the Pacific Sardine temperature index, temperature-productivity relationship, and accompanying harvest fraction range.

Reference Materials:

1. Agenda Item E.2.a, Attachment 1: Draft Environmental Assessment for incorporating best available science into harvest management control rules for Pacific sardine.
2. Agenda Item E.2.b, CPSMT Report.
3. Agenda Item E.2.c, Public Comment (***full document with signatories electronic only***).

Agenda Order:

a. Agenda Item Overview Kerry Griffin/Lorna Wargo
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action**: **Adopt Final Preferred Alternative for the Pacific Sardine Harvest Fraction Parameter.**

PFMC
10/27/14

DRAFT

ENVIRONMENTAL ASSESSMENT

INCORPORATING THE USE OF A NEW TEMPERATURE INDEX INTO THE CALCULATION OF THE PACIFIC SARDINE HARVEST GUIDELINE FORMULA

REGULATORY IDENTIFIER NUMBER _____

PREPARED BY
THE PACIFIC FISHERY MANAGEMENT COUNCIL
AND
NATIONAL MARINE FISHERIES SERVICE

NOVEMBER 2014

TABLE OF CONTENTS

1.0 Introduction 1
1.1 DOCUMENT ORGANIZATION 2
1.2 PURPOSE AND NEED 2
1.3 Related documents incorporated by reference 2
2.0 Description of Alternatives 4
3.0 Affected Environment 8
3.1 Sardine Resource 8
3.2 Habitat 9
3.3 Protected Species 10
3.4 Fishing Industry 15
3.5 Tribal Fisheries 17
4.0 Analysis of Alternatives 18
4.1 Effects on sardine resource 18
4.1.1 Alternative 1 – No Action 18
4.1.2 Alternative 2 – New temperature index and temperature-recruit relationship 18
..... 21
4.2 Effects on Habitat 21
4.2.1 No Action Alternative 22
4.2.2 Alternative 2 22
4.3 Effects on Protected Species 22
4.3.1 No Action Alternative 23
4.3.2 Alternative 2 23
4.4 Effects on fishing industry 23
4.4.1 No Action Alternative 23
4.4.2 Alternative 2 24
4.5 Effects on Tribal fisheries 24
4.5.1 No Action Alternative 24

4.5.2 Alternative 2 24
4.6 Cumulative Effects 25
4.6.1 Pacific sardine biology and biomass estimates 25
4.6.2 Endangered Species act 25
4.6.3 Habitat 26
4.6.4 Protected resources 26
5.0 consistency with other applicable law 26
6.0 Literature Cited 26

1.0 INTRODUCTION

The Harvest Guideline (HG) control rule for Pacific sardine was first established by Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (PFMC 1998). The HG is calculated as:

$$HG = (BIOMASS - CUTOFF) \bullet FRACTION \bullet DISTRIBUTION$$

HG is a harvest limit for the U.S. (California, Oregon, and Washington) for a year. BIOMASS is the estimated stock biomass (ages 1+), CUTOFF (150,000 mt) is the lowest level of estimated biomass at which harvest is allowed, FRACTION (5%-15%) is the percentage of biomass above the CUTOFF that can be harvested by the fisheries, and DISTRIBUTION (presently 87%) is the average portion of BIOMASS assumed in U.S. waters.

FRACTION is dependent on oceanographic conditions and is a proxy for E_{MSY} (the exploitation rate for deterministic equilibrium MSY). The FRACTION term is used because the productivity of the sardine stock is directly related to ocean temperatures, sardines being more productive at higher ocean temperatures. The relationship between sardine stock E_{MSY} and temperatures currently in the FMP is estimated to be:

$$FRACTION = 0.248649805\ T^2 - 8.19004375(T) + 67.4558326$$

where T is the average three-year sea surface temperature at the SIO Pier during the three previous years. Although E_{MSY} may be higher or lower, FRACTION is bounded and is never allowed to be higher than 15% or less than 5%. These levels were part of the overall Council policy decisions in the HG control rule based on social, economic, and biological criteria. The three year average was also a policy decision to reduce the volatility of the HG and lend stability to harvest levels.

In 2010, McClatchie *et al*. called into question the original relationship between Scripps Pier temperature and productivity proposed by Jacobson and MacCall (1995) and used in the analysis to establish the existing FRACTION parameter and control rule in the FMP. Primarily as a result of this new information, in February 2013, the Pacific Fishery Management Council and the Southwest Fisheries Science Center (SWFSC) convened a workshop to examine, among other items related to Pacific sardine management, the temperature-recruit relationship used to inform FRACTION. The February workshop found that although a temperature-recruitment correlation based on Scripps Pier was still scientifically valid, that a temperature index based on data from the California Cooperative Oceanic Fisheries Investigations (CalCOFI) survey explained a more significant amount of sardine recruitment variability/success than the SIO index and was generally better aligned with ocean temperatures in the Pacific sardine main habitat.

Hurtado-Ferro, F. and A. E. Punt (2013) subsequently derived a revised F_{MSY}/E_{MSY} equation based on the conclusion that the CalCOFI temperature index provides a better indicator of Southern California ocean temperatures and sardine recruitment. This new relationship is

$$E_{MSY} = -18.46452 + 3.25209\ (T) - 0.19723(T^2) + 0.0041863(T^3)$$

and was used in the simulation model developed by Hurtado-Ferro and Punt to enable the examination of the risks associated with the current harvest control rules using this new index as well as the comparison stock and fishery performance measures from alternative OFL and HG control rules, sensitivity tests, and an assessment of changing to a new temperature recruit index.

1.1 DOCUMENT ORGANIZATION

This document is intended to present and analyze alternatives that were developed to reflect new information regarding Pacific sardine recruitment in relation to environmental conditions. Section 1 contains background, purpose and need, and related documents. Section 2 contains the description of the alternatives; Section 3 contains a description of the affected environment; Section 4 is the analysis of alternatives; Section 5 describes consistency with applicable laws; and Section 6 contains literature cited.

1.2 PURPOSE AND NEED

The purpose of this action is to incorporate new information regarding the temperature relationship used to calculate the FRACTION parameter while maintaining consistency with the Council's harvest policy approach and the existing HG control rule. At its March 2014 meeting the Council adopted the use of a new temperature index (temperature measured throughout the southern California bight from the California Cooperative Oceanic Fisheries Investigations (CalCOFI) survey), and corresponding stock-harvest relationship, for the purposes of calculating F_{MSY}/E_{MSY} for use in the overfishing limit (OFL) and acceptable biological catch (ABC) control rules for Pacific sardine. This change was recommended by the Council's SSC because this new CalCOFI temperature index had been identified as being more statistically significant than the previously used Scripps Pier index (temperature measured off the Scripps Institution of Oceanography (SIO) pier) in terms of its relationship with sardine recruitment.

Although it has been determined that the CalCOFI temperature index and a revised productivity relationship likely represent the best available science for use in the Pacific sardine harvest control rules, the Scripps Pier index is prescribed in the CPS FMP for calculating the FRACTION parameter in the HG rule. Additionally, FRACTION parameter, along with the HG rule as a whole, includes policy implications not explicit in the OFL and ABC control rules. Because the Scripps Pier index is prescribed in the FMP as well as uncertainty regarding potential policy implications of applying the CalCOFI temperature index and temperature-productivity relationship in the HG control rule this action is needed to determine how best to incorporate this information into the calculation of the FRACTION parameter while maintaining consistency with the Council's harvest policy approach and the existing HG control rule.

1.3 RELATED DOCUMENTS INCORPORATED BY REFERENCE

Several documents are directly related to Pacific sardine science and management, and are hereby incorporated by reference:

Hurtado-Ferro, F., and A. E. Punt. 2014. Revised analyses related to Pacific sardine harvest parameters. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195-5020. This document forms the basis for the long-term modeling and fishery performance measures, based on a variety of HCR scenarios.

Jacobson, L. J. and A. D. MacCall. 1995. Stock-recruitment models for Pacific sardine (*Sardinops sagax*). Can. J. Fish. Aquat. Sci. 52:566-577. This paper established the basis for fishery modeling and management decisions made relative to Amendment 8 to the CPS FMP.

Pacific Fishery Management Council (PFMC). 2011. Coastal Pelagic Species Fishery Management Plan, as amended by Amendment 13. Pacific Fishery Management Council, Portland, OR. This FMP and its appendices describe a framework management plan for CPS stocks managed by the Council. It includes process, triggers, background information, and HCRs for establishing allowable harvest of CPS species.

Pacific Fishery Management Council (PFMC). 2013. April Council meeting Agenda Item I.1.b, Attachment 1, Report of the Pacific Sardine Harvest Parameters Workshop. This report documents the scientific review of the Pacific sardine temperature-productivity relationship, the statistical validity of Southern California sea surface temperature indices, the operating model (Hurtado-Ferro and Punt), and other considerations relative to Pacific sardine management.

2.0 DESCRIPTION OF ALTERNATIVES

Harvest Control Rule Framework

To effectively evaluate the options presented below it is important to recognize the interplay between the set of Pacific sardine harvest control rules (HCRs) under current policy. Prior to Amendment 13, the Harvest Guideline (HG) was the only control rule and it described the overfishing limit, annual harvest policy, and the annual catch limit. To more explicitly define what levels would be considered overfishing, Amendment 13 adopted Overfishing Limit (OFL) and Acceptable Biological Catch (ABC) as additional harvest control rules. The formulas for the three HCRs are displayed below.

Harvest Control Rule (HCR) Formulas
OFL = BIOMASS * E_{MSY} * DISTRIBUTION
$ABC_{P\text{-}star}$ = BIOMASS * $BUFFER_{P\text{-}star}$ * E_{MSY} * DISTRIBUTION
HG = (BIOMASS - CUTOFF) * FRACTION * DISTRIBUTION

All three control rules incorporate E_{MSY}, an estimate of the exploitation rate at maximum sustainable yield. E_{MSY} is dependent upon sea surface temperature (SST) and serves as a proxy for the influence of environmental conditions on stock biomass, so that harvest levels (rates) are adjusted in relation to different conditions. For the OFL and ABC control rules, E_{MSY} is bounded from 0 to 25%. The upper bound of 25% corresponds to the upper quartile of observed temperatures.

In the HG control rule, FRACTION specifies how much of the stock is available to the fishery when biomass exceeds the CUTOFF value set at 150,000 mt. FRACTION is equal to E_{MSY} except it is bounded, currently 5-15%, as a matter of policy to limit the portion of stock available to the fishery depending on environmental conditions (Figure 1).

Analyses conducted during the Amendment 13 scoping process showed that although the HG control rule generally produced harvest levels far lower than necessary to prevent overfishing and protect the stock, there were times when the output of the ABC control rule fell below the HG at some P* (probability of overfishing) values during regimes with lower SSTs. This outcome is in part due to fixing the lower bound for FRACTION in the HG rule. Amendment 13 implemented a control rule policy that specifies the lower of the two be used for annual management. The result was that sardine management post-Amendment 13 became more precautionary, particularly in cooler and low biomass conditions.

The general implementation of this policy in setting maximum allowable catch is demonstrated in Figure 2. Under most SSTs, the HG is the lowest of the HCRs and represents the maximum allowable harvest. As SSTs become relatively cold, the HG and ABC lines converge, and the ABC HCR (illustrated here buffered at P*= 40) produces increasingly lower catch allowances and overrides the HG for annual management. In this example, when biomass (1+) is 500,000 mt, the

HG exceeds OFL and ABC (for P*40) at all temperatures below 14.8 degrees[1]. At these temperatures, the ABC (for P*40) is lowest and therefore sets the maximum harvest allowed. The results are similar for larger biomasses and other values of P*.

Figure 1. CalCOFI SST and Emsy, FRACTION bounded at 5-15%.

[1] Temperatures below 14.8 degrees have not been observed in the CalCOFI index since 1984 although the recent year trend has been towards cooler temperatures. The recent five year average was 15.4; the lowest recorded temperature was 14.9 in 2002.

Figure 2. Illustration of the harvest control outputs: OFL, ABC P*40 with HG bounded at 5-15%. By policy annual management follows the lowest HCR.

There are several choices for incorporating an environmental co-variate into harvest policy for Pacific sardine. A hierarchy of decision points is represented in the alternatives below. The first decision point is whether to use Scripps Institution of Oceanography (SIO) (Alternative 1: No Action) or California Cooperative Oceanic Fisheries Investigations (CalCOFI) as the temperature index (Alternative 2). Secondarily, Alternative 2 and its sub-alternatives present a range of choices for establishing the FRACTION bounds in the HG.

At the March 2014 Council meeting the CPSMT presented information on the effects of the new index and the revised productivity relationship with environment on the performance of sardine management harvest control rules (HCR). The focus of this evaluation was on whether changing the temperature index that informs FRACTION would maintain or deviate from established policy for sardine management. Based on the information available and this evaluation, the CPSMT concluded that a HCR change to the CalCOFI index did impact current policy and that changing

FRACTION to range of 10-20 provided a better representation of the SST data and new knowledge of stock productivity. This option attempted to preserve current policy by permitting harvest rates to take more advantage of periods when biomass and productivity are higher, while still restricting harvest when biomass and productivity are depressed.

To ensure the analysis of transitioning to CalCOFI and the new Emsy relationship were fully captured, in particular when compared to what was previously in place as well as variations on the lower bound of FRACTION, the Council requested the CPSMT also examine FRACTION bounds of 0-20 and 5-20. Those alternatives, along with the general decision points of transitioning from SIO to CalCOFI are presented below.

Alternative 1 – SIO Temperature Index; HG FRACTION 5-15 (NO ACTION)
This alternative retains the SIO pier temperature index to describe the relationship between ocean conditions and sardine stock productivity and the bounds around the FRACTION harvest control rule parameter as adopted in Amendment 8 of the CPS FMP. It maintains the OFL and ABC control rules adopted in Amendment 13 of the CPS FMP.

Alternative 2 – CalCOFI Temperature Index, select HG FRACTION
This alternative adopts the CalCOFI temperature index, and includes four options, or 'sub-alternatives' for an HG FRACTION range.

2a. FRACTION 5-15%
This sub-alternative adopts CalCOFI as the temperature index and as the basis for the temperature-productivity relationship, and retains the existing HG FRACTION range of 5-15%.

2b. FRACTION 10-20%
This sub-alternative adopts CalCOFI as the temperature index and as the basis for the temperature-productivity relationship, and adjusts the HG FRACTION range in the harvest guideline control rule to 10-20%.

2c. FRACTION 5-20%
This sub-alternative adopts CalCOFI as the temperature index and as the basis for the temperature-productivity relationship. It maintains a lower bound of FRACTION at 5% and increases the upper bound to 20%.

2d. FRACTION 0- 20%
This sub-alternative adopts CalCOFI as the temperature index and as the basis for the temperature-productivity relationship, and adjusts the HG FRACTION range. Under this alternative the bounds for Fraction in the HG control rule are the broadest of all the sub-alternatives, set at 0-20%.

3.0 AFFECTED ENVIRONMENT

For the purposes of this action, the general action area is the West Coast Exclusive Economic Zone (EEZ) (which is directly affected by the Federal action) and the marine waters, other than internal, of the states of Washington, Oregon, and California (which may be indirectly affected by the federal action).

3.1 SARDINE RESOURCE

Pacific sardine (*Sardinops sagax*) are small schooling fish. When the population of Pacific sardine is large, it is abundant from the tip of Baja California to southeastern Alaska and throughout the Gulf of California. In the north, sardines tend to appear seasonally. Sardines also form three (and possibly four) subpopulations. The northern subpopulation of sardines is most important to U.S. commercial fisheries. Sardines are taken by a wide variety of predators. More information on current Pacific sardine abundance and population trends is contained in the current CPS SAFE Report (DRAFT) (PFMC 2014) and the *Assessment of the Pacific Sardine Resource in 2014 for U.S. Management in 2014-2015* (Hill et al 2014). The Pacific sardine resource is assessed each spring in support of the Council process that recommends an annual OFL, ABC, Annual Catch Limits (ACL) and HG for the U.S. commercial fishery. The primary purpose of the assessment is to provide an estimate of current biomass which is used to calculate HGs for the July 1 to June 30 management cycle.

Sardine, along with other species such as anchovy, hake, jack mackerel, and Pacific mackerel can achieve large populations in the California Current region as well as in other major eastern boundary currents. These populations are important to the trophic dynamics of the entire California Current ecosystem. Anchovy and sardines are key consumers of large quantities of primary production (phytoplankton) in the ecosystem and all five species are significant consumers of zooplankton. Additionally, all five species, and particularly the mackerels, hake, and also squid, are important predators of the early stages of fish. The juvenile stages, and in many cases the adults, of squid and all five species of finfish are important as forage for seabirds, pinnipeds, cetaceans, and other fish.

Trophic interactions between CPS and higher-trophic-level fish are complex, and it is unknown if populations of individual predaceous fish are enhanced or hindered by large populations of CPS. The value of CPS as forage to adult predators versus the negative effects of CPS predation (on larvae and juveniles of predator fish species) and competition (removal of phytoplankton, zooplankton, and other fish) is unknown.

Modeling efforts are underway that may enhance our understanding of these linkages and improve our ecosystem-based management approaches for these species. However, implementing ecosystem-based management requires an understanding of the complex dynamics of marine ecosystems as well as an understanding of how humans fit into the system. A key step toward ecosystem-based management is to better understand how interactions within food webs affect species of commercial and conservation importance. Efforts are underway to provide comprehensive diet information and food web analysis for major taxa within the California Current

ecosystem, including fish, marine mammals, birds, and invertebrates (Dufault et al 2009). Furthermore, robust simulations of the California Current ecosystem that will allow the exploration of potential effects of natural and human-induced perturbations over a range of spatial and temporal scales have been undertaken (Horne et al 2010). Future management tools based on this ongoing work by NOAA will provide a platform for addressing important hypotheses relating to the effects of perturbations (e.g., harvest), characterizing the potential trade-offs of alternate management actions, and testing the utility of ecosystem indicators for long-term monitoring programs (Kaplan et al. 2013). Additionally, these tools will allow consideration of the entire ecosystem such that ecosystem management can maintain multiple ecosystem services as well as system resilience rather than focusing on a single species.

Environmental changes affect all species; however, small coastal pelagic species off the Pacific coast, like those managed by the CPS FMP, show responses that offer dramatic examples of environmental effects. In 1983, the biomass (age 1 +) of Pacific sardine was estimated to be 5,145 mt. By 1999, the biomass was estimated to be around 1 million mt (Conser et al.2001). Pacific mackerel biomass (age 1 +) estimates were atypically high in the early 1980s but began declining steadily from the mid-1980s to the early 2000s. Population estimates increased moderately, with some signs of 'rebuilding' observed in the years 2009-2011 (Crone et al. 2011). More recently, and in historical terms, the population remains at a relatively low abundance level, due primarily to oceanographic conditions. In *El Nino* years, the availability of squid in its typical spawning areas where it is harvested is low, but squid make a dramatic reappearance when the effects of *El Nino* abate.

These types of fluctuations in abundance are common in R-selected species (e.g., pollock, herring, sardine, and mackerel), which generally have higher reproductive rates, are shorter-lived, attain sexual maturity at younger ages, and have faster individual growth rates than K-selected species (e.g., rockfish, many flatfish). As such, predators that utilize R-selected fish species as prey (marine mammals, birds, and other fish) have evolved in an ecosystem in which fluctuations and changes in relative abundances of these species have occurred. Consequently, most of them are generalists who are not dependent on the availability of a single species but rather on a suite of species, any one (or more) of which is likely to be abundant each year.

3.2 HABITAT

In 2011 a five-year review of CPS essential fish habitat (EFH) was completed and can be found in the 2011 Stock Assessment and Fishery Evaluation (SAFE) document (PFMC 2011). Although some new information was gathered during this process, no changes were made to the actual description of CPS EFH. A complete description of EFH for CPS may be found in Appendix D of the CPS FMP (PFMC 1998). In determining EFH for CPS, the estuarine and marine habitat necessary to provide sufficient production to support maximum sustainable yield and a healthy ecosystem were considered. Using presence/absence data, EFH is based on a thermal range bordered within the geographic area where a managed species occurs at any life stage, where the species has occurred historically during periods of similar environmental conditions, or where environmental conditions do not preclude colonization by the species.

The specific description and identification of EFH for CPS finfish accommodates the fact that the geographic range of all species varies widely over time in response to the temperature of the upper mixed layer of the ocean, particularly in the area north of 39° N latitude. For example, an increase in sea surface temperature since the 1970s has led to a northerly expansion of the Pacific sardine resource. CPS EFH is linked to ocean temperatures, which shift temporally and spatially, providing a dynamic definition of EFH. This definition is as follows:

> *The east-west geographic boundary of EFH for each individual CPS finfish and market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (EEZ) and above the thermocline where sea surface temperatures range between 10^0C to 26^0C. The southern boundary of the geographic range of all CPS finfish is consistently south of the US-Mexico border, indicating a consistency in SSTs below 26^0C, the upper thermal tolerance of CPS finfish. Therefore, the southern extent of EFH for CPS finfish is the US-Mexico maritime boundary. The northern boundary of the range of CPS finfish is more dynamic and variable due to the seasonal cooling of the SST. The northern EFH boundary is, therefore, the position of the 10^0C isotherm which varies both seasonally and annually.*

3.3 PROTECTED SPECIES

A more thorough description of the affected environment for protected species can be found in the Biological Opinion completed in December 2010 for the Pacific sardine fishery as well as in the Environmental Impact Statement (EIS) prepared for Amendment 8 to the Northern Anchovy FMP, now the CPS FMP (PFMC 1998). While the analysis provided in the EIS focused primarily on the fishery in southern California, most of the species that were identified occur along the entire U.S. West Coast and, thus, the analysis is applicable to fisheries currently managed under the CPS FMP.

The harvesting of Pacific sardines may affect species in two ways, direct take of the animals during the prosecution of the fishery (incidental catch) or indirectly due to reductions in prey base (sardine) that serve as forage. Protected species include species protected by three federal laws, the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA).

The following list of endangered or threatened species that may be present in the action area:

Species	**Status**
Marine Mammals	
Blue whale *(Baleaenoptera musculus)*	Endangered
Fin whale *(Baleranoptera physalus)*	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Killer whales, southern resident DPS (*Orcinus orca*)	Endangered

Northern Right whale (*Eubalaena glacialis*)	Endangered
Steller sea lion, eastern distinct population segment (DPS) (*Eumetopias jubatus*)	Threatened
Southern sea otter (*Enhydra lutris nereis*)	Threatened
Guadalupe fur seal (*Arctocephalus townsendi*)	Threatened
Birds	
Short-tailed albatross (*Phoebastria albatrus*)	Endangered
Marbled murrelet *(Brachyramphus marmoratus marmoratus)*	Threatened
Bald eagle *(Haliaeetus leucocephalus)*	Threatened
California least-tern *(Sternum antillarum browni)*	Endangered
Xantus's murrelet *(Synthliboramphus hypoleucus)*	Candidate
Sea turtles	
Leatherback turtle (*Dermochelys coriacea*)	Endangered
North Pacific Loggerhead turtle (*Caretta caretta*)	Endangered
Olive Ridley (*Lepidochelys olivacea*)	Endangered/Threatened
Green Sea Turtle (*Chelonia mydas*)	Endangered/Threatened
Marine invertebrates	
White abalone (*Haliotis sorenseni*)	Endangered
Black abalone (*Haliotis crachereodii*)	Endangered
Fish	
Green Sturgeon, southern DPS (*Acipenser medirostris*)	Threatened
Pacific eulachon, southern DPS (*Thaleichthys pacificus*)	Threatened
Yelloweye Rockfish (*Sebastes ruberrimus*)	Threatened

Salmonids		
ESU[a/]	**ESA Status Month and Year of Initial Listing**	**Stock Representation in Pacific Salmon FMP**
- - - CHINOOK - - -		
Central Valley Fall and Late Fall-run	Candidate Species Sept. 1999	Sacramento River Fall
Central Valley Spring-run	Listed Threatened Sept. 1999	Sacramento River Spring
Sacramento River Winter-run	Listed Endangered Aug. 1989	Sacramento River Winter
California Coast	Listed Threatened Sept. 1999	Eel, Mattole, and Mad Rivers
Southern Oregon/Northern California Coast	Not Warranted Sept. 1999	Southern Oregon Smith River Klamath River Fall
Upper Klamath and Trinity Rivers	Not Warranted	Klamath River Fall Klamath River Spring

Oregon Coast	Not Warranted	Central and Northern Oregon
Washington Coast	Not Warranted	Willapa Bay Fall Grays Harbor Fall Grays Harbor Spring Queets Fall Queets Spring/Summer Hoh Fall Hoh Spring/Summer Quillayute Fall Quillayute Spring/Summer Hoko Summer/Fall (Western Strait of Juan de Fuca)
Puget Sound	Listed Threatened May 1999	Elwha Summer/Fall (Eastern Strait of Juan de Fuca) Skokomish Summer/Fall (Hood Canal) Nooksack Spring (early) Skagit Summer/Fall Skagit Spring Stillaguamish Summer/Fall Snohomish Summer/Fall Cedar River Summer/Fall (Lake Washington) White River Spring Green River Summer/Fall Nisqually River Summer/Fall (South Puget Sound)
Lower Columbia River	Listed Threatened May 1999	Sandy, Kalama, and Cowlitz (fall and spring) North Lewis River Fall
Upper Willamette River	Listed Threatened May 1999	Upper Willamette River
Upper-Columbia River Summer/Fall	Not Warranted	Upper River Bright Upper River Summer
Upper Columbia River Spring	Listed Endangered May 1999	Upper River Spring
Snake River Fall	Listed Threatened May 1992	Snake River Fall
Snake River Spring/Summer	Listed Threatened May 1992	Snake River Spring/Summer
- - - COHO - - -		

Central California Coast	Listed Threatened Dec. 1996	By proxy - Rogue/Klamath hatchery coho
Southern Oregon/Northern California Coasts	Listed Threatened May 1997	Southern Oregon Coastal Natural Northern California
Oregon Coast	Listed Threatened Oct. 1998	South Central Oregon Coast North Central Oregon Coast Northern Oregon Coastal
Lower Columbia River	Listed Threatened June 2005	Columbia River Natural
Southwest Washington Coast	Candidate Species July 1995	Grays Harbor
Olympic Peninsula	Not Warranted	Queets Hoh Quillayute Fall Strait of Juan de Fuca (Western)
Puget Sound/Strait of Georgia	Candidate Species	Strait of Juan de Fuca (Eastern) Hood Canal Skagit Stillaguamish Snohomish
- - - PINK - - -		
Puget Sound, Odd Numbered Years	Not Warranted	Puget Sound

a/ A description of the ESU boundaries may be found at 63 FR 11486 (March 9, 1998) for Chinook and 60 FR 38016 (July 25, 1995) for coho.

Critical Habitat		
Steller sea lion (*Eumetopias jubatus*)	Rogue Reef: Pyramid Rock Oxnard Reef: Long Brown Rock and Seal Rock Ano Nuevo I. Southeast Farrallon I. Sugarloaf I.	Associated aquatic zones 3,000 feet seaward in State and Federally managed waters from the baseline of each rookery
Green Sturgeon, southern DPS (*Acipenser medirostris*)	US coastal marine waters within 60 fathoms from Monterey Bay, CA, to Cape Flattery, WA, the Sacramento River and other select waters within the Sacramento-San Joaquin River-Delta system, and other select coastal bays and estuaries waters within California, Oregon, and Washington.	

Leatherback sea turtle (*Dermochelys coriacea*)	Includes approximately 16,910 square miles (43,798 square km) stretching along the California coast from Point Arena to Point Arguello east of the 3,000 meter depth contour; and 25,004 square miles (64,760 square km) stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000 meter depth contour. The designated areas comprise approximately 41,914 square miles (108,558 square km) of marine habitat	Critical habitat extends to a water depth of 80 meters from the ocean surface and is delineated along the shoreline at the line of extreme low water, except in the case of estuaries and bays where COLREGS lines (defined at 33 CFR part 80) shall be used as the shoreward boundary of critical habitat.

A number of non-ESA listed marine mammals may also occur in the affected area, these include the northern fur seal, California sea lion, harbor seal, northern elephant seal, bottlenose dolphin, Pacific white-sided dolphin, common dolphin, harbor porpoise, Dall's porpoise, and minke whale. These species, like all marine mammals, are protected under the MMPA. Section 118 of the MMPA requires NMFS to place all U.S. commercial fisheries into one of three categories (I, II, III) based on the level of incidental serious injury and mortality of marine mammals occurring in each fishery (16 U.S.C. 1387(c)(1)), with Category I being the highest level of interactions and III being the lowest level. The California, Oregon and Washington sardine fisheries are listed as Category III fisheries, meaning that these fisheries have a remote likelihood of/no known incidental mortality or serious injury of marine mammal.

In addition, a number of non-ESA listed sea birds have been identified that forage on sardine and therefore may be affected directly or indirectly by the sardine fishery. These birds include grebes and loons, petrels and albatrosses, pelicans and cormorants, gulls, terns, auks, and some raptors (PFMC 1998).

At-sea observers have witnessed interactions with California sea lions, Pacific white-sided dolphins, and gulls within the California portion of the fishery. Observer records indicate that marine mammals, marine turtles, and steelhead are not encountered in the Pacific sardine purse seine fishery in Oregon and Washington. Fishermen in the southern subarea have not recorded incidental catch of marine turtles, southern green sturgeon, or steelhead in the sardine purse seine fishery. This is supported by preliminary observer information from vessels operating from San Pedro, Moss Landing, Dana Point, and San Diego, California.

Critical habitat for ESA listed cetaceans and most sea turtles has not been designated or proposed within the action area. Critical habitat for listed salmonids does not include marine waters and therefore it is not within the action area. Critical habitat for Steller sea lions in California are the rookeries at Ano Nuevo Island, Sugarloaf Island, and the southeast Farrallon Islands (50 CFR

226.202). Sardine fishermen in California do not fish near these islands therefore, critical habitat for Steller sea lions in California is not part of the affected environment.

3.4 FISHING INDUSTRY

During the 1940s and 1950s, approximately 200 vessels participated in the Pacific sardine fishery. In California, some present day CPS vessels are remnants of that fleet.

In recent history, a fishery for Pacific sardine has operated off Oregon and Washington since 1999. This fishery targets larger sardine, which have typically sold as bait for Asian longline tuna fisheries. Beginning in 2006, this fishery has been expanding into human consumption markets.

Along the West Coast, other vessels target CPS finfish in small quantities, typically selling their catch to specialty markets for relatively high prices. In recent years, these have included:

- Approximately 18 live bait vessels in southern California and two vessels in Oregon and Washington that landed about 4,000 mt per year of CPS finfish (mostly northern anchovy and Pacific sardine) for sale to recreational anglers.
- Roundhaul vessels that take a maximum of 1,000 mt to 3,000 mt per year of northern anchovy that are sold as dead bait to recreational anglers.
- Roundhaul and other mostly small vessels that target CPS finfish (particularly Pacific mackerel and Pacific sardine) for sale in local fresh fish markets or canneries.
- In Washington, albacore tuna vessels using lampara gear that target northern anchovy for use as live bait in the tuna fishery.

The CPS fishery is administratively divided into a federally managed "limited entry" fishery (requiring Federal permits in order to participate in the fishery), south of 39 degrees North latitude (Southern subarea), and an "open access fishery" (not requiring Federal permits to participate in the fishery), north of 39 degrees North latitude (northern subarea). Vessels landing less than five metric tons of CPS per trip in the Southern subarea are exempt from limited entry requirements. However, the states of Oregon and Washington both have specific state restrictions that limit the number of vessels in their respective fisheries. The CPS LE fleet currently consists of 65 permits and 56 vessels. The LE vessels range in age from 4 to 70 years, with an average age of 34 years. The capacity goal and transferability provisions established under Amendment 10 are based on calculated gross tonnage (GT) of individual vessels. Calculated GT serves as a proxy for each vessel's physical capacity and is used to track total fleet capacity. The fleet capacity goal established through Amendment 10 is 5,650.9 GT, and the trigger for restricting transferability is 5,933.5 GT (Goal + 5 percent). The current LE fleet is 4,753 GT, well within the bounds of the capacity goal and not likely substantially different from current capacity. In the northern subarea, fishermen must have individual state harvest permits to fish for Pacific sardine.

The northern subarea fishery operates in an area approximately 45 nm north and 30 nm south of the Columbia River, and extends approximately 35 nm offshore. Fishing depths range from 7 fathoms to over 400 fathoms. There are less specific data available to characterize the geographic range of the southern subarea fishery except that the majority of Pacific sardine are landed in the central California ports of Monterey and Moss Landing and the Southern California port in San

Pedro. The gear type traditionally used in the CPS fishery is a purse seine. Typical purse seine nets measure 185 fathoms long, 22 fathoms wide and 1,600 meshes deep with 1 ¼ inch mesh (Lutz and Pendleton, 2000).

The Pacific sardine fishery in Oregon operates as a day fishery with vessels based primarily in Astoria where processing plants for sardine operate. Many vessels utilize aircraft to assist in locating schools of sardine and setting their nets when weather permits. Weather and tides are major factors in fishing operations and timing of vessels transiting in and out of the Columbia River. The Pacific sardine fishery off Oregon started in 1935, but there are recorded landings of sardine in Oregon dating back to 1928. The catch dropped off in the 1940s with 1948 being the last year of directed fishery landings until 1999 when the fishery was revived. Pacific sardine was managed as a developmental fishery from 1999 to 2005. In 2004, the sardine industry asked ODFW to remove Pacific sardines from the developmental species list and create a LE system for the fishery. ODFW began work with the Developmental Fisheries Board and the industry to develop alternatives for the fishery. In December 2005, the Oregon Fish and Wildlife Commission (OFWC) moved the Pacific sardine fishery from a developing fishery into a state-run LE fishery system. Twenty Oregon permits were initially established and made available to qualifying participants for the 2006 fishery. The OFWC amended an LE permit eligibility rule in August 2006, which resulted in an immediate addition of six permits for a total of 26 LE sardine fishery permits.

In April 2009 the OFWC enacted a number of rule changes for the Pacific sardine fishery. First, the OFWC modified the requirement for minimum landings of sardines into Oregon to qualify for permit renewal (initially enacted in 2006). The minimum landing requirements for permit renewal were effective only when the federal coastwide maximum HG for the fishing year exceeded 100,000 mt. The minimum landing requirements, either a minimum of ten landings of at least five mt each or landings totaling at least $40,000 ex-vessel price, were not changed. Next, the OFWC eliminated a rule that became effective in 2008, which specified that permit holders must either own or operate a vessel that is permitted. The OFWC also established a lottery system for sardine permits. If the number of permits issued falls below 24 a lottery may be held the following year, but the total number issued shall not exceed 26 LE permits. Finally, a new rule defined catching vessels and limited catch sharing to catching vessels with state LE sardine permits. In April 2012, the OFWC removed sardine landings requirements for permit renewal. Of the 25 permits available in 2013, 14 vessels actively fished in the 2013 fishery.

Pacific sardines are the primary coastal pelagic species harvested off the state of Washington. From 2000 through 2009, participation in the sardine fishery was managed under Washington's Emerging Commercial Fishery Act (ECFA), which provides for the harvest of a newly classified species or harvest of a classified species in a new area or by new means. In 2003, to address management needs of the fishery, a formal Sardine Advisory Board (Board) was created, and the WDFW Director, in collaboration with the Board, advanced the sardine fishery designation from trial to experimental as provided for under the ECFA. The number of experimental fishery permits was capped at 25. The experimental fishery program continued through June 2009. Besides limiting participation, WDFW also restricted the amount of sardines sold for reduction to a 15 percent season cumulative total by weight by individual vessel.

Pacific sardines are the targeted catch in the Washington fishery, but anchovy, mackerel, and squid can also be retained and landed. In 2011, 2012, and 2013 mackerel was the only other coastal pelagic species landed, fluctuating from 0.42 mt in 2011 to 636 mt in 2012 to 196 mt in 2013.

During the 2009 Washington State legislative session, WDFW proposed legislation to establish a commercial license limitation program specifically for the harvest and delivery of Pacific sardines into the state. The legislation was passed into rule in July 2009. The new rules established 16 licenses to be issued to holders of a 2008 sardine experimental fishery permit only, with an exception for past participants of the experimental fishery that became ineligible because of loss of their vessel at sea. These newly created sardine licenses can be sold. In addition, the new rule provides criteria for the issuance of temporary annual permits at the discretion of the WDFW Director. In combination, the number of permanent and temporary annual licenses cannot exceed 25. Of the 16 licenses issued in 2011 seven were actively fished in the 2011 fishery. In 2012, 9 of the 16 Washington limited entry licenses were actively fished, as was one temporary annual permit issued for 2012. In 2013, 15 Washington limited entry licenses were issued.

3.5 Tribal Fisheries

Treaties between the United States and Pacific Northwest Indian Tribes reserve the rights of the Tribes to take fish at usual and accustomed fishing grounds. The Pacific Fishery Management Council's Coastal Pelagic Species Fishery Management Plan (CPS FMP), as amended by Amendment 9 and codified in National Marine Fisheries Service (NMFS) regulations (50 CFR 660.518), outline a process for the Council and NMFS to consider and implement tribal allocation requests for CPS.

The Quinault Indian Nation requested that for the 2014-2015 fishing season NMFS provide the Quinault Indian Nation with the exclusive right to harvest 4,000 mt (2,000 mt less than in 2013) of Pacific sardine in their Usual and Accustomed Fishing Area off the coast of Washington State, pursuant to the 1856 Treaty of Olympia (Treaty with the Quinault). In 2013, through consultation, 6,000 mt of Pacific sardine were set-aside for the Quinault Indian Nation with the expectation that two Quinault fishing vessels would participate in the fishery. In 2013, in part because only one Quinault vessel fished, out of the expected two, the Tribe harvested only 586 mt. For 2013, the Tribe expects that two Quinault vessels will fish actively for sardine. The Quinault usual and accustomed fishing area (U & A) is defined in § 660.50(c)(4) as "That portion of the Fishery Management Area between 47°40.10' N. lat. (Destruction Island) and 46°53.30' N. lat. (Point Chehalis) and east of 125°44' W. long." This represents an area directly off Westport/Gray's Harbor, Washington, and waters to the north of this area. This area is also regularly fished by the non-tribal commercial fishery.

While a large proportion of the sardine stock off the West Coast may pass through the Usual and Accustomed Fishing Area (U&A) of the Quinault in some years, the requested amount for 2014-2015, as in 2013, was not based on a scientific determination of their precise treaty share under current conditions. In future years, the precise amount provided under the treaty will have to be more fully examined.

4.0 ANALYSIS OF ALTERNATIVES

This chapter describes anticipated impacts of the alternatives on sardine resources, habitat, protected resources, the sardine fishing industry, and cumulative effects. Table 1 depicts fishery performance measures of the action alternatives.

4.1 EFFECTS ON SARDINE RESOURCE

4.1.1 ALTERNATIVE 1 – NO ACTION

This Alternative is based on the Scripps Institution of Oceanography (SIO) Temperature Index and an HG FRACTION range of 5-15%. Amendment 8 of the CPS FMP adopted a harvest policy for Pacific sardine that included a SST temperature-dependent exploitation factor as a biological indicator of stock status/productivity. The SIO temperature time series has provided SST for use in the HCRs. In 2013 an evaluation of SST indexes found that the 1984-2008 CalCOFI SST time series provides the best fit for the sardine recruitment – environment relationship (PFMC 2013). This temperature index was found to track more closely with other SST time series and is more geographically representative of the sardine recruitment environment than the current SIO pier index. This finding was subsequently endorsed by the PFMC SSC.

Under the No Action alternative, FRACTION in the HG would continue to rely on SIO which is less representative of current ocean conditions in the Southern California Bight. The effect on sardine resources is difficult to calculate because impacts to the resource will vary with biomass and temperature. In general, the effect of the No Action alternative, by relying on a weaker indicator of stock productivity, may be to increase management uncertainty. In addition, by using the previous Emsy of 12 percent instead of the newly-adopted 18 percent, the No Action Alternative would effectively have lower impacts to the sardine stock because it ignores the fact that the sardine stock is more productive than previously thought.

4.1.2 ALTERNATIVE 2 – NEW TEMPERATURE INDEX AND TEMPERATURE-RECRUIT RELATIONSHIP

This alternative replaces the temperature index from SIO with CalCOFI, thereby utilizing the best available scientific information regarding Pacific sardine biology and productivity. Selection of this alternative then requires selection of an associated harvest Fraction term. The four action alternatives analyzed in this EA area all generally consistent with prevailing Council policy, which is to allow relatively higher harvest opportunities during favorable environmental conditions, while restricting harvest during less favorable conditions.

Sub-alternative 2a has a depletion value of 78%, meaning that a relatively higher biomass remain in the ocean after fishery removals. This is slightly higher, but similar to the other sub-alternatives (Table 1). [2] Unlike the FRACTION bounds adopted under Amendment 8, FRACTION bounded

[2] Depletion refers to the portion of the population remaining after harvest (i.e., the percentage of fish left in the ocean after harvest). Thus, higher depletion values are considered desirable from a fishery resource perspective.

at 5-15% based on CalCOFI does not bracket the mid-range of temperatures vs E_{MSY}. Nor does it encompass stochastic E_{MSY} which was 0.12 under Amendment 8 analyses compared to the more-recently computed stochastic E_{MSY} 0.18 (Hurtado-Ferro and A. E. Punt. 2014). As a consequence, sub-alternative 2a is a very conservative harvest policy under all conditions. For example, with biomass (1+) at 370,000 mt and CalCOFI SST at 15.3 (2014-2015 estimates, rounded) the effective harvest rate is approximately 6%. In comparison, with a biomass of 700,000 and the same CalCOFI temperature, the harvest rate increases to 8%. The harvest rate with this latter biomass and SST of 16.7 degrees (representing warmer conditions) is 10%.

Sub-alternative 2b describes the effect of changing the range of the Fraction term to 10-20 percent. Like sub-alternative 2a, this also is based on the recommended CalCOFI temperature index. Overall, the effects of the various FRACTION bounds on fish resources are not markedly different because at a given biomass and E_{MSY} between 10 and 20 percent, each alternative will produce the same result. The biological performance measures presented in Table 1 illustrates the similarity among and between the different bounds for FRACTION.

Adjusting the HG FRACTION from 5-15% to 10-20% mirrors the increase from stochastic Emsy of 0.12 in Amendment 8 to 0.18 based on the updated analysis and new operating model (Hurtado-Ferro and A. E. Punt. 2014). This increase in E_{MSY} reflects a statistically identified increased productivity and therefore the ability of the stock to withstand a higher average fishing rate. Additionally, a FRACTION that ranges from 10-20% also better reflects the mid-range of actual measured temperatures and aligns with CalCOFI temperatures and the temperature vs E_{MSY} relationship in a manner similar to the where the 5-15% range fell relative to SIO temperatures. Bounding Fraction at 10-20% permits higher harvest rates to take advantage of periods when biomass and productivity are high and restricts harvest when biomass and productivity are low, in a manner similar to the No Action Alternative, thereby preserving current harvest policy. Additionally, although the lower bound in this scenario would increase from 5% to 10% compared to alternative 2a, during low biomass and presumably less productive conditions, this lower bound still limits fishing to only a 5% effective harvest rate (Figure 3).

Sub-alternative 2c blends sub-alternative 2a and sub-alternative 2b by maintaining a lower bound of FRACTION at 5% and increasing the upper bound to 20%. By increasing the FRACTION term up to 20%, this alternative also accommodates the increase in stochastic E_{MSY} from 0.12 to 0.18. By extending the range of FRACTION to 20%, this alternative is similar in effect to the No Action Alternative but increases harvest opportunity compared to Alternative 2 when environmental conditions are favorable. In maintaining the lower FRACTION bound at 5% the effect of this alternative under cooler regimes is more similar to Alternative 2 than the No Action Alternative.

Under sub-alternative 2d, the bounds for Fraction in the HG control rule are the broadest of all the options, at 0-20%. The upper bound of 20% captures the adjustment for the change from the SIO to the CalCOFI temperature index described previously, so like alternatives 2b and 2c, it allows increased harvest rates to take advantage of years when environmental conditions are favorable and biomasses are high. However, the lower bound of 0% is more conservative and restricts harvests to a greater degree under less favorable environmental conditions and low biomasses than

any of the other alternatives. Under the Council's recent approach toward uncertainty (i.e., tier 1 stock assessment for Pacific sardine), a FRACTION of 0-20% means that at low biomasses, HG will always be lower than the OFL and ABC control rules at all P* values (Figure 4). The HG, therefore, represents the maximum allowable harvest at all stock sizes and temperature conditions. If uncertainty were greater (i.e., a tier 2 stock assessment), and at higher biomasses, the ABC at some low P* values may be lower than the HG at very low temperatures.

Figure 3. An illustration of harvest control outputs: OFL, ABC P*40 and HG with varying FRACTION bounds.

Figure 4. An illustration of harvest control rule outputs: OFL, ABC at various P* values and the HG when FRACTION is bounded 0-20%.

4.2 Effects on Habitat

Appendix D to Amendment 8 of the CPS FMP describes CPS fishing activities and gear that have the potential to adversely affect EFH, and notes that direct interactions with habitat are unlikely because CPS fisheries typically occur in waters deeper than the height of the net. However, it is important to clarify that while CPS fishing gear does interact with the water (which is EFH), a fishing net passing through the water column is not expected to adversely affect the functioning of that habitat. Direct interactions between gear and CPS EFH may occur when derelict gear comes into contact with the benthos, which could potentially harm squid eggs embedded in the benthos. Even so, Appendix D concludes that habitat impacts resulting from net interactions are rare, minimal, and transitory.

Climate change is likely to alter the prevailing physical and biological environment in the California Current, as the ocean becomes warmer and more acidic. Pacific sardines typically thrive in relatively warmer ocean conditions, but other factors such as availability of zooplankton could limit the stock's ability to increase substantially.

4.2.1 ALTERNATIVE 1 – NO ACTION

The No Action Alternative would not result in any substantial changes to fishing behavior, and annual harvest levels would continue to vary, affected mostly by the overall biomass of the stock. Pacific sardines are harvested almost exclusively with purse seine nets, in waters deeper than the net. Impacts to habitat resources are essentially non-existent. As such, the existing impacts to habitat, considered to be negligible, would continue to negligible effects. The effects are not expected to be significant.

4.2.2 ALTERNATIVE 2 – NEW TEMPERATURE INDEX AND TEMPERATURE-RECRUIT RELATIONSHIP

Alternative 2 would utilize the same harvest control rule structure described in the FMP, but would use the CalCOFI temperature series and temperature-productivity relationship that represent best available scientific information. Alternative 2 presents four sub-alternatives regarding the Fraction term in the HCR, each representing modest variations for harvest opportunities for Pacific sardines. Three sub-alternatives (2b, 2c, and 2d) include harvest Fractions up to 20 percent when SSTs are relatively warm. This allows moderately higher harvest rates during favorable environmental conditions, consistent with the Council's policy. Two sub-alternatives (2a and 2c) include harvest Fractions as low as 5 percent, and one (2d) includes zero percent as the lowest end of the harvest fraction ranges.

In all cases, because Pacific sardine fishing activities generally do not impact habitat, any effects resulting from Alternative 2 or any of its sub-alternatives are expected to be not significant.

4.3 EFFECTS ON PROTECTED SPECIES

A formal section 7 consultation and Biological Opinion on the operation and prosecution of the Pacific sardine fishery were completed in 2010. The BiOp determined that fishing activities conducted under the CPS FMP and its implementing regulations are not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of critical habitat of any such species.

The portion of the Pacific sardine fishery that operates off of Oregon and Washington is likely to take ESA listed salmon, however there is no evidence to suggest that ESA listed southern green sturgeon, marine mammals, or sea turtles are being incidentally taken. To date, there is no evidence to suggest that ESA listed salmon, steelhead, southern green sturgeon, marine mammals, or sea turtles are being incidentally taken in the sardine fishery off California. This is supported by at-sea observer information from a pilot Federal observer program for vessels operating from San Francisco to San Diego, California as well as portside sampling by the California Department of Fish and Wildlife (CDFW). The Federal observer program operated from January 2006 to January 2008 and a total of 199 trips (426 sets) were observed. No marine mammals, sea turtles, or seabirds were observed as bycatch. CDFW conducts portside catch sampling at San Pedro, CA and Monterey, CA, the two major California ports for sardine landings. The sardine landings are sampled approximately 12 days per month for the past 20 years and thus far one salmon has been observed (Brady 2009; PFMC 2008). In 2007 one adult Chinook salmon was offloaded at Moss

Landing and had been caught in CDFW Block 509. Most sampling and observer coverage has focused in central and southern California because fishing for sardine is very rare in northern California. There was only one landing of sardine catch recorded in the Pacific Fisheries Information Network (PacFIN) database, a landing in 2003 in Eureka, CA.

4.3.1 ALTERNATIVE 1 – NO ACTION

The No Action Alternative would not result in any substantial changes to fishing activities, and annual harvest levels would continue to vary, affected mostly by the overall biomass of the stock. As such, the existing impacts to protected resources would remain approximately the same. The effects of the No Action Alternative are therefore not expected to be significant.

4.3.2 ALTERNATIVE 2 – NEW TEMPERATURE INDEX AND TEMPERATURE-RECRUIT RELATIONSHIP

Alternative 2 would utilize the same harvest control rule structure described in the FMP, but would use the CalCOFI temperature series and temperature-productivity relationship that represent best available scientific information. Alternative 2 presents four sub-alternatives regarding the Fraction term in the HCR, each representing modest variations for harvest opportunities for Pacific sardines. Three sub-alternatives (2b, 2c, and 2d) include harvest Fractions up to 20 percent when SSTs are relatively warm. This allows moderately higher harvest rates during favorable environmental conditions, consistent with the Council's policy. Two sub-alternatives (2a and 2c) include harvest Fractions as low as 5 percent, and one (2d) includes zero percent as the lowest end of the harvest fraction ranges.

All four sub-alternatives are not likely to result in substantial changes to the nature or magnitude of Pacific sardine fishing activities. Therefore, any impacts are expected to be consistent with existing impacts, and are not expected to be significant.

4.4 EFFECTS ON FISHING INDUSTRY

The Pacific sardine biomass varies greatly, in response to interannual environmental conditions. The primary spawning center of the northern stock of sardines is centered in the Southern California Bight, and when the population contracts, sardines are not typically found outside the area. However, when the sardine population grows, it expands geographically into the Pacific Northwest and British Columbia. In the 1990s, sardines began to appear in harvestable quantities in the Pacific Northwest, and fisheries developed in Oregon, Washington, and British Columbia. In 2010, 2011, and 2012, British Columbia harvested in the low 20,000 mt range. However, none were landed in 2013. Landings in the Pacific Northwest, between 2000 and 2013 ranged from 14,000 mt to nearly 80,000 mt (Hill et al, 2014).

4.4.1 ALTERNATIVE 1 – NO ACTION

The No Action Alternative would not, in itself, result in any substantial changes to fishing activities; and annual harvest levels would continue to vary, affected primarily by the overall biomass of the stock. Although the effects of the No Action Alternative are therefore not expected

to be significant, harvest levels could be less than what the stock could reasonably absorb, based on the fact that we now know the stock has a higher productivity that previously thought.

4.4.2 Alternative 2 – New temperature index and temperature-recruit relationship

Alternative 2 would utilize the same harvest control rule structure described in the FMP, but would use the CalCOFI temperature series and temperature-productivity relationship that represent best available scientific information. Alternative 2 presents four sub-alternatives regarding the Fraction term in the HCR, each representing modest variations for harvest opportunities for Pacific sardines. Three sub-alternatives (2b, 2c, and 2d) include harvest Fractions up to 20 percent when SSTs are relatively warm. This allows moderately higher harvest rates during favorable environmental conditions, consistent with the Council's policy. Two sub-alternatives (2a and 2c) include harvest Fractions as low as 5 percent, and one (2d) includes zero percent as the lowest end of the harvest fraction ranges.

Table 1 shows the performance measures associated with each sub-alternative. The performance measures are all extremely similar relative to fishing industry benefits, with the exception of sub-alternative 2a, which shows slightly lower median catches than 2b, 2c, and 2d.

All four sub-alternatives are not likely to result in substantial changes to fishing opportunities, which are dictated primarily by stock biomass. Therefore, any impacts are not expected to be significant.

4.5 EFFECTS ON TRIBAL FISHERIES

The CPS FMP recognizes the rights of treaty Indian tribes to harvest Pacific sardine and provides a framework for the development of a tribal allocation. From 2011 to 2014, the Quinault Indian Nation has requested and received a Pacific sardine harvest allocation, consistent with Tribal treaty rights. Any Tribal allocation is taken from the annual allowable harvest (expressed as an ACL, HG, or ACT), and therefore does not represent additional fishing.

4.5.1 Alternative 1 – No Action

The No Action Alternative would not, in itself, result in any substantial changes to fishing activities; and annual harvest levels would continue to vary, affected primarily by the overall biomass of the stock. The effects of the No Action Alternative are therefore not expected to be significant to Tribal fisheries.

4.5.2 Alternative 2 – New temperature index and temperature-recruit relationship

Alternative 2 scenarios relative to Tribal fisheries would mirror the effects on the fishing industry, because both are subject to the overall allowable harvest in any given year. As with the effects on the fishing industry, any impacts are not expected to be significant.

4.6 CUMULATIVE EFFECTS

Cumulative effects include past, present, and reasonably foreseeable future actions within as well as outside the scope of this action. The purpose of presenting the effects is to determine the cumulative effects resulting from the incremental impact of this action, when added to other past, present, and reasonably foreseeable future actions.

4.6.1 PACIFIC SARDINE BIOLOGY AND BIOMASS ESTIMATES

Sardine productivity and population size, over short (annual) and long (multidecadal) time scales, is driven by ocean conditions and environmental factors. Outside of this environmental forcing, the primary past, present and foreseeable actions that may impact sardines are primarily those associated with the directed commercial harvest of Pacific sardine as there are no state or Federal fisheries for which a significant amount of Pacific sardine is caught as bycatch, and research catch of this species is de minimus (less than 1 mt).

The annual harvest guideline is directly tied to annual estimates of biomass. Two circumstances can lead to biomass projections that would exceed reality and potentially allow for excess harvest. One is the model overestimating abundance in any particular year. To reduce the chance of this happening, data for the most recent year and any new biological information that might have been obtained are compared to all past biomass estimates. The biomass estimate obtained each year provides a new picture of the fluctuation of the resource over time. The other circumstance that can confound management is harvest in Mexico and Canada that exceeds what is accounted for in the formula, which could potentially lead to overfishing of the resource on a stock level. Landing information is obtained from Mexico and Canada each year, and landings from all areas for the previous year, are incorporated into the model so that all harvested fish are accounted for. If actual harvests exceed planned harvests in any year, this could lead to a lower biomass estimate the following year, which, in turn, would lead to a lower harvest guideline than would otherwise be possible.

4.6.2 ENDANGERED SPECIES ACT

Several consultations on the effects of CPS fisheries on endangered and threatened species have been completed. NMFS SWR Sustainable Fisheries Division initiated a formal section 7 consultation with NMFS SWR Protected Resources Division (PRD) on the operation and prosecution of the Pacific sardine fishery. PRD completed a formal section 7 consultation on this action and, in a Biological Opinion dated December 21, 2010, determined that fishing activities conducted under the CPS FMP and its implementing regulations are not likely to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS or result in the destruction or adverse modification of critical habitat of any such species. Specifically, the current status of the Lower Columbia River Chinook, Snake River Fall Chinook, Upper Willamette Chinook, Puget Sound Chinook, Lower Columbia River coho, and Oregon coast coho were deemed not likely to be jeopardized by the Pacific sardine fishery.

4.6.3 HABITAT

The Pacific sardine fishery has no significant habitat impacts, and it is unlikely that any reasonably foreseeable actions would change that.

4.6.4 PROTECTED RESOURCES

Pacific Eulachon (*Thaleichthys pacificus*), also called Columbia River smelt or candlefish, was listed as Threatened under the ESA in 2010. There is potential that the 2010 biological opinion on the sardine fishery could be reinitiated to address concerns about eulachon. However, there is little if any documented bycatch of eulachon in the sardine fishery. The 2014 SAFE document includes small amounts of "unknown smelt" in some California bycatch reports. However, the range of eulachon is from northern California to British Columbia, so it is unlikely that any bycatch in the California sardine fishery was eulachon. It is unlikely that the listing of eulachon represents a potential future impact to the sardine fishery, and unlikely that the sardine fishery would have any impacts to eulachon.

5.0 CONSISTENCY WITH OTHER APPLICABLE LAW

6.0 LITERATURE CITED

PFMC 2014. Draft CPSMT report, November council meeting Agenda Item E.2.b Attachment 1.

PFMC 2014a. Draft Stock Assessment and Fishery Evaluation (SAFE) Report.

Hill, K. T., et al. 2014. Assessment of the Pacific sardine resource in 2014 for U.S. management in 2014-2015. NOAA Southwest Fisheries Science Center, La Jolla, CA.

Hurtado-Ferro, F., and A. E. Punt. 2014. Revised analyses related to Pacific sardine harvest parameters. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195-5020.

McClatchie, S., R. Goericke, G. Auad, and K. Hill. 2010. Re-assessment of the stock–recruit and temperature–recruit relationships for Pacific sardine (*Sardinops sagax*). Can. J. Fish. Aquat. Sci. 67: 1782–1790.

Pacific Fishery Management Council (PFMC). 1998. Amendment 8 (to the Northern Anchovy Fishery Management Plan) Incorporating A Name Change To: The Coastal Pelagic Species Fishery Management Plan. Pacific Fishery Management Council, Portland, OR.

Pacific Fishery Management Council (PFMC). 2013. April Council meeting Agenda Item I.1.b, Attachment 1, Report of the Pacific Sardine Harvest Parameters Workshop.

Table 1: Fishery performance measures of action alternatives

Alternative	**1 "No Action"**	**2a**	**2b**	**2c**	**2d**
Simulation Model	Original Am. 8 Analysis	Hurtado-Punt, 2014			
Temperature Index	SIO temp series	CalCOFI temp series			
E_{MSY} Bounds (FRACTON):	5-15	5-15	10-20	5-20	0-20
OFL E_{MSY} (%)	-	0-25	0-25	0-25	0-25
CUTOFF	150	150	150	150	150
MAXCAT	200	200	200	200	200
Performance Measure					
Biological					
Mean B1+ (SD)	1952 (49)	1220 (888)	1182 (883)	1186 (882)	1187 (881)
Mean SSB (SD)	-	945 (757)	911 (753)	915 (752)	916 (751)
Median B1+	1648	991.8	945.1	948.6	949.5
% years when B1+>400	96	92	91	92	92
Depletion (Biomass as a % of unfished biomass)	64%	78%	75%	75%	76%
Economic					
% of years no catch	0.5	4.7	4.7	4.8	5.1
% of years catch<50	-	31	31	31	31
Median catch	182	97	107	107	107
Mean catch (SD)	145 (67)	106 (73)	112 (75)	111 (75)	111 (76)

Cutoff = when the biomass falls below 150,000 mt, no directed fishing is allowed.
Maxcat = directed fishing will never be allowed over 200,000 mt.
B1+ = biomass of 1 year olds and older.
Depletion = the biomass after harvest, as a percent of unfished biomass.

Agenda Item E.2.a,
Supplemental Attachment 2
(Electronic Only)
November 2014

Incorporating the Use of a New Temperature Index into the Calculation of the Pacific Sardine Harvest Guideline Formula

CPSMT, NMFS, PFMC

November 2014
Costa Mesa, CA

Background

- Sardine harvest control rules (HCR) include a temperature-dependent parameter
- CalCOFI temperature index recommended; endorsed by SSC and Council
- Hurtado-Ferro and Punt: New simulation model, management scenarios
- March 2014: CPSMT Harvest Parameter Report; Council requested additional scenarios for modeling FRACTION
- April 2014: CalCOFI temperature index used to calculate OFL for 2014-2015 fishing year
- September 2014: Draft EA presented

Purpose and Need

Purpose – The purpose of this action is to incorporate new information regarding sea surface temperature and its relationship with sardine productivity, in calculating the FRACTION parameter in the harvest control rule, while maintaining consistency with the Council's harvest policy approach.

Need – The need for this action is to determine how best to incorporate the best temperature index and temperature-productivity relationship in calculating the FRACTION parameter in the HG control rule.

Harvest Control Rule Framework

- OFL = Biomass * E_{MSY} * DISTRIBUTION

- ABC = Biomass * E_{MSY} * DISTRIBUTION * BUFFER

- Harvest Guideline
  (HG) = (BIOMASS – CUTOFF) * FRACTION * DISTRIBUTION
  HG FRACTION = E_{MSY} *bounded at 5 and 15%*

- ACT = HG or ABC, whichever is lower

General Illustration of Harvest Control Rule Policy

Alternatives

Alternative 1 (No Action) – SIO Temp Index and FRACTION 5-15%

Alternative 2a – New Temperature Index and FRACTION 5-15%

Alternative 2b – New Temperature Index and FRACTION 10-20%

Alternative 2c – New Temperature Index and FRACTION 5-20%

Alternative 2d – New Temperature Index and FRACTION 0- 20%

SIO vs. CalCOFI Temperatures 1951-2014
19.0
18.5
18.0
17.5
17.0
16.5
16.0
15.5
15.0
14.5
14.0
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013

Comparing SIO and CalCOFI Productivity

Amendment 8 Fishery Performance Measures

Simulation Model	Original Amend. 8 Analysis
Temperature Index	SIO
E_{MSY} Bounds (FRACTON):	5-15
OFL E_{MSY} (%)	-
CUTOFF	150
MAXCAT	200
<u>Performance Measure</u>	
Biological	
Mean B1+ (SD)	1952 (49)
Mean SSB (SD)	-
Median B1+	1648
%B1+>400	96
Depletion (B1+ % of Unfished B1+)	64%
Economic	
%No catch	0.5
%Catch<50	-
Median catch	182
Mean catch all (SD)	145 (67)

Table 1. Fishery performance measures of alternatives.

Alternative	2a	2b	2c	2d	SSC Recommended Projections	
Simulation Model	Hurtado-Ferro and Punt, 2014				Option 1	
Temperature Index	CalCOFI					
E_{MSY} Bounds (FRACTION):	5-15	10-20	5-20	0-20	5	15
OFL E_{MSY} (%)	0-25	0-25	0-25	0-25	0-25	0-25
CUTOFF	150	150	150	150	150	150
MAXCAT	200	200	200	200	200	200
Performance Measure						
Biological						
Mean B1+ (SD)	1220 (888)	1182 (883)	1186 (882)	1187 (881)	1408 (892)	1208 (893)
Mean SSB (SD)	945 (757)	911 (753)	915 (752)	916 (751)	1132 (769)	936 (761)
Median B1+	992	945	949	950	1223	980
%B1+>400	92	91	92	92	97	91
Depletion (Mean B1+ /Unfished B1+)	78%	75%	75%	76%	90%	77%
Economic						
%No catch	4.7	4.7	4.8	5.1	4.2	4.7
%Catch<50	31	31	31	31	52	30
Median catch	97	107	107	107	48	98
Mean catch all (SD)	106 (73)	112 (75)	111 (75)	111 (76)	59 (47)	107 (72)

Sardine Harvest Rates 1951-2014
Actual Temperatures
Hypothetical biomass of 700,000 mt
16%
14%
12%
10%
8%
6%
4%
2%
0%
Harvest Rate (%)
1951
1956
1961
1966
1971
1976
1981
1986
1991
1996
2001
2006
2011
Year
SIO HR
CC5-15
CC10-20
CC5-20
CC0-20

2a (5-15)		2b (10-20)		2c (5-20)		2d (0-20)	
34%	higher	85%	higher	74%	higher	74%	higher
51%	same	0%	same	11%	same	0%	same
15%	lower	15%	lower	13%	lower	26%	lower

"Low" Temp
Emsy between 0 and 5%
Emsy used for scenario: 2.5%
Temp Range: 14.58 to 14.88
Temp Used for Scenario: 14.73

Low Biomass

250,000

1	Harvest rate	ABC or HG
2d. 0-20	0.87%	2,175
ABC 0.05	1.20%	3,007
ABC 0.10	1.37%	3,428
ABC 0.20	1.61%	4,016
2a. 5-15	1.74%	4,350
2c. 5-20	1.74%	4,350
ABC 0.30	1.80%	4,502
ABC 0.40	1.99%	4,963
ABC 0.45	2.08%	5,197
2b. 10-20	3.48%	8,700

Moderate Biomass

700,000

6	Harvest rate	ABC or HG
ABC 0.05	1.20%	8,421
ABC 0.10	1.37%	9,597
ABC 0.20	1.61%	11,245
2d. 0-20	1.71%	11,962
ABC 0.30	1.80%	12,605
ABC 0.40	1.99%	13,897
ABC 0.45	2.08%	14,551
2a. 5-15	3.42%	23,925
2c. 5-20	3.42%	23,925
2b. 10-20	6.84%	47,850

High Biomass

1,500,000

11	Harvest rate	ABC or HG
ABC 0.05	1.20%	18,044
ABC 0.10	1.37%	20,566
ABC 0.20	1.61%	24,096
ABC 0.30	1.80%	27,011
2d. 0-20	1.96%	29,361
ABC 0.40	1.99%	29,780
ABC 0.45	2.08%	31,181
2a. 5-15	3.92%	58,725
2c. 5-20	3.92%	58,725
2b. 10-20	7.83%	117,450

"Low-Mod" Temp
Emsy between 5 and 10%
Emsy used for scenario: 7.5%
Temp Range: 14.88 to 15.20
Temp Used for Scenario: 15.04

Low Biomass		
250,000		
2	Harvest rate	ABC or HG
2a. 5-15	2.61%	6,525
2c. 5-20	2.61%	6,525
2d. 0-20	2.61%	6,525
2b. 10-20	3.48%	8,700
ABC 0.05	3.61%	9,022
ABC 0.10	4.11%	10,283
ABC 0.20	4.82%	12,048
ABC 0.30	5.40%	13,506
ABC 0.40	5.96%	14,890
ABC 0.45	6.24%	15,591

Moderate Biomass		
700,000		
7	Harvest rate	ABC or HG
ABC 0.05	3.61%	25,262
ABC 0.10	4.11%	28,793
ABC 0.20	4.82%	33,735
2a. 5-15	5.13%	35,887
2c. 5-20	5.13%	35,887
2d. 0-20	5.13%	35,887
ABC 0.30	5.40%	37,817
ABC 0.40	5.96%	41,693
ABC 0.45	6.24%	43,654
2b. 10-20	6.84%	47,850

High Biomass		
1,500,000		
12	Harvest rate	ABC or HG
ABC 0.05	3.61%	54,134
ABC 0.10	4.11%	61,699
ABC 0.20	4.82%	72,290
ABC 0.30	5.40%	81,036
2a. 5-15	5.87%	88,086
2c. 5-20	5.87%	88,086
2d. 0-20	5.87%	88,086
ABC 0.40	5.96%	89,342
ABC 0.45	6.24%	93,544
2b. 10-20	7.83%	117,450

"Mod" Temp

Emsy between 10 and 15%

Emsy used for scenario: 12.5%

Temp Range: 15.20 to 15.52

Temp Used for Scenario: 15.35

Low Biomass

250,000

3	Harvest rate	ABC or HG
2a. 5-15	4.35%	10,875
2b. 10-20	4.35%	10,875
2c. 5-20	4.35%	10,875
2d. 0-20	4.35%	10,875
ABC 0.05	6.02%	15,038
ABC 0.10	6.86%	17,139
ABC 0.20	8.03%	20,081
ABC 0.30	9.00%	22,511
ABC 0.40	9.93%	24,818
ABC 0.45	10.39%	25,985

Moderate Biomass

700,000

8	Harvest rate	ABC or HG
ABC 0.05	6.02%	42,105
ABC 0.10	6.86%	47,990
ABC 0.20	8.03%	56,227
2a. 5-15	8.54%	59,813
2b. 10-20	8.54%	59,813
2c. 5-20	8.54%	59,813
2d. 0-20	8.54%	59,813
ABC 0.30	9.00%	63,030
ABC 0.40	9.93%	69,490
ABC 0.45	10.39%	72,759

High Biomass

1,500,000

13	Harvest rate	ABC or HG
ABC 0.05	6.02%	90,225
ABC 0.10	6.86%	102,835
ABC 0.20	8.03%	120,487
ABC 0.30	9.00%	135,064
2a. 5-15	9.79%	146,814
2b. 10-20	9.79%	146,814
2c. 5-20	9.79%	146,814
2d. 0-20	9.79%	146,814
ABC 0.40	9.93%	148,907
ABC 0.45	10.39%	155,911

"Mod-Warm" Temp
Emsy between 15 and 20%
Emsy used for scenario: 17.5%
Temp Range: 15.52 to 15.84
Temp Used for Scenario: 15.68

Low Biomass

250,000

4	Harvest rate	ABC or HG
2a. 5-15	5.22%	13,050
2b. 10-20	6.09%	15,225
2c. 5-20	6.09%	15,225
2d. 0-20	6.09%	15,225
ABC 0.05	8.42%	21,052
ABC 0.10	9.60%	23,995
ABC 0.20	11.25%	28,113
ABC 0.30	12.61%	31,515
ABC 0.40	13.90%	34,745
ABC 0.45	14.55%	36,379

Moderate Biomass

700,000

9	Harvest rate	ABC or HG
ABC 0.05	8.42%	58,947
ABC 0.10	9.60%	67,185
2a. 5-15	10.25%	71,775
ABC 0.20	11.25%	78,717
2b. 10-20	11.96%	83,738
2c. 5-20	11.96%	83,738
2d. 0-20	11.96%	83,738
ABC 0.30	12.61%	88,241
ABC 0.40	13.90%	97,285
ABC 0.45	14.55%	101,861

High Biomass

1,500,000

14	Harvest rate	ABC or HG
ABC 0.05	8.42%	126,314
ABC 0.10	9.60%	143,968
ABC 0.20	11.25%	168,680
2a. 5-15	11.75%	176,175
ABC 0.30	12.61%	189,088
2b. 10-20	13.30%	200,000
2c. 5-20	13.30%	200,000
2d. 0-20	13.30%	200,000
ABC 0.40	13.30%	200,000
ABC 0.45	13.30%	200,000

How does SIO compare with CalCOFI in different temperature scenarios?

Temp category	Year	SIO SST	SIO HR	CC SST	2a HR	2b HR	2c HR	2d HR
L	1955	16.40	3.4%	14.69	3.4%	6.8%	3.4%	1.2%
L/M	1953	16.55	3.4%	15.12	6.1%	6.8%	6.1%	6.1%
M	2014	17.22	10.3%	15.35	8.5%	8.5%	8.5%	8.5%
M/W	1979	17.35	1.4%	15.75	1.7%	1.7%	1.7%	1.7%
W	1988	17.71	10.3%	16.01	10.3%	13.7%	13.7%	13.7%

Acknowledgements

Felipe Hurtado-Ferro

Kerry Griffin
Kirk Lynn
CPSMT

Questions?

E_{MSY} = 0.248649805(T^2)- 8.190043975(T) + 67.4558326
Emsy (Amendment 8 simulations)
FRACTION
T_{upper} = 17.33 C
E_{MSY} = 0.1985
T_{median} = 16.98 C
E_{MSY} = 0.0792
T_{lower} = 16.61 C
E_{MSY} = 0.020
Emsy or FRACTION (default HCR)
SST at SIO Pier
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
16.60
16.65
16.70
16.75
16.80
16.85
16.90
16.95
17.00
17.05
17.10
17.15
17.20
17.25
17.30
17.35
17.40
17.45
17.50
17.55
17.60
17.65
17.70
17.75
17.80
17.85
17.90
17.95
18.00
18.05
18.10

E_{MSY} = -18.46452+3.25209 (T)-0.1923(T^2)+0.0041863(T^3)
Emsy
FRACTION 5-15
FRACTION 10-20
T_{upper} = 16.25 C
E_{MSY} = 0.2641
T_{median} = 15.90 C
E_{MSY} = 0.2094
T_{lower} = 15.65 C
E_{MSY} = 0.1710
Emsy or FRACTION
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
14.60
14.66
14.72
14.78
14.84
14.90
14.96
15.02
15.08
15.14
15.20
15.26
15.32
15.38
15.44
15.50
15.56
15.62
15.68
15.74
15.80
15.86
15.92
15.98
16.04
16.10
16.16
16.22
16.28
16.34
16.40
16.46
16.52
16.58
16.64
16.70
16.76
CalCOFI SST (3-year running average)

E_{MSY} = -18.46452+3.25209 (T)-0.19723(T^2)+0.0041863(T^3)
Emsy (CalCOFI simulations)
FRACTION 5-15
FRACTION 10-20
T_{upper} = 16.16 C
E_{MSY} = 0.2502
T_{median} = 15.72 C
E_{MSY} = 0.1823
T_{lower} = 15.28 C
E_{MSY} = 0.1126
Emsy or FRACTION
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
14.60 14.66 14.72 14.78 14.84 14.90 14.96 15.02 15.08 15.14 15.20 15.26 15.32 15.38 15.44 15.50 15.56 15.62 15.68 15.74 15.80 15.86 15.92 15.98 16.04 16.10 16.16 16.22 16.28 16.34 16.40 16.46 16.52 16.58 16.64 16.70 16.76
CalCOFI SST (3 yr running average)

CalCOFI, full temperature time series back to 1950

Figure 4. Illustration of Harvest Control Rules at "2014" Biomass
OFL, ABC P*40, HG with FRACTION 5-10, HG with FRACTION 10-20

CalCOFI, full temperature time series back to 1950

CalCOFI, full temperature time series back to 1950

COASTAL PELAGIC SPECIES MANAGEMENT TEAM REPORT ON
SARDINE HARVEST FRACTION

Introduction

The harvest guideline (HG) control rule for Pacific sardine includes a sea surface temperature (SST) parameter measured off the Scripps Institution of Oceanography (SIO) pier. Recent research indicates that the California Cooperative Oceanic Fisheries Investigations (CalCOFI) temperature index is a better indicator of the California Bight SST and a better predictor of Pacific sardine recruitment and productivity. The Council already adopted the CalCOFI temperature index and productivity relationship for use in the overfishing limit (OFL) control rule. The purpose of this report is to assess the effect of changing the temperature index from SIO to CalCOFI for the FRACTION component of the Pacific sardine harvest guideline (HG) control rule, and to recommend changes to FRACTION based on this assessment.

In March and September 2014, the Coastal Pelagic Species Management Team (CPSMT) presented reports that considered how use of a SST index for Pacific sardine management would affect existing Pacific Council harvest and management policy. In addition to recommending use of the CalCOFI temperature index to replace the SIO pier index, the CPSMT recommended modifying the FRACTION bounds for the HG harvest control rule (HCR) from 5-15% to 10-20%. The March report analyzed two options for FRACTION: 5-15% and 10-20%; the September report included Council requested analyses of alternate HG FRACTION bounds of 5-20% and 0-20%.

At its September meeting, the Council considered a preliminary draft Environmental Assessment (EA) describing preliminary alternatives for the SST index and four variations on the harvest FRACTION range: 5-15 percent, 5-20 percent, 0-20 percent, and 10-20 percent (September 2014 Agenda Item C.1.a Attachment 1). To meet the Council's desire for more direct comparison to what is in place now, this report expands the information and analyses presented to further characterize the transition to CalCOFI and the new temperature-recruitment relationship. Performance measures with SIO informing the FRACTION term are included, along with a retrospective view of harvest control rule outputs with both the SIO and CalCOFI temperature time series, and a series of hypothetical scenarios illustrating the suite of harvest control outputs over a range of biomasses and SSTs.

How this report is organized

Before describing the alternatives under consideration, this report begins with a brief review of the events leading to reevaluation of the temperature index for the sardine control rules, and the formulas and current policy framing the control rules. Next, a description comprising simulation modeling performance measures, retrospective views and hypothetical scenarios for the alternatives is presented. Embedded in the description and conclusion is the CPSMT's recommendation for the FRACTION term.

A number of appendices include new supporting information, as well as material submitted in previous reports for reference. Appendix 1 adds descriptive text, and depicts simulation modeling performance measures for Alternatives 1 and sub-alternatives 2a-d. Likewise, the complete table of fifteen hypothetical scenarios is found in Appendix 2. Additional runs of the Hurtado-Ferro and Punt (2014) simulation model were done for sub-alternatives 2a-d with varying P-star and Tier values; these are depicted in Appendix 3. Scripps Pier and CalCOFI mean annual temperatures are repeated from earlier reports in Appendix 4. Appendix 5 presents additional retrospective harvest levels based on observed temperatures with hypothetical biomass estimates.

In addition to this report, the CPSMT, National Marine Fisheries Service (NMFS) staff, and Council staff prepared a draft environmental assessment (EA) for this action, included as Agenda Item E.2.a, Attachment 1.

Harvest Control Rule Framework

To effectively evaluate the alternatives presented in this report, it is important to recognize the interplay between the set of Pacific sardine HCRs under current policy, which is informed by both Amendments 8 and 13 of the CPS FMP.

A Maximum Sustainable Yield (MSY) Control Rule and the HG for Pacific sardine were first established in Amendment 8 of the Coastal Pelagic Species Fishery Management Plan (CPS FMP) (PFMC 1998). The HG includes a FRACTION term, which is a proxy for E_{MSY} [1] and which specifies how much of the sardine stock is available for harvest when the biomass is above CUTOFF (i.e. the lowest biomass at which harvest is allowed). FRACTION has been dependent on a linear relationship between oceanic water temperature and stock productivity, with sardines being more productive at higher ocean temperatures (Jacobsen and MacCall 1995).

Up until Amendment 13 of the CPS FMP (PFMC 2011), the HG was the only sardine harvest control rule and it described the overfishing limit, the annual harvest policy, and the annual catch limit. Amendment 13 adopted Overfishing Limit (OFL) and Acceptable Biological Catch (ABC) as additional harvest control rules. The formulas for the three HCRs are displayed below.

Harvest Control Rule (HCR) Formulas
OFL = BIOMASS * E_{MSY} (0-25) * DISTRIBUTION $\mathrm{ABC}_{\text{P-star}}$ = BIOMASS * $\mathrm{BUFFER}_{\text{P-star}}$ * E_{MSY} * DISTRIBUTION HG = (BIOMASS - CUTOFF) * FRACTION (E_{MSY} 5-15) * DISTRIBUTION

[1] As a point of clarification, Overfishing Limits (OFLs) for CPS are based on F_{MSY} or E_{MSY} proxy harvest rates applied to the best available estimate of biomass. F_{MSY} is an instantaneous measure of fishing mortality rate for deterministic equilibrium MSY. In reality, an annual exploitation rate, E_{MSY}, is used as a proxy for F_{MSY} as the appropriate measure of fishing mortality for a particular year. E_{MSY} is used to determine OFL and is also equal to FRACTION in the HG Harvest Control Rule, subject to lower and upper bounds.

All three control rules (OFL, ABC, and HG) incorporate E_{MSY}, an estimate of the exploitation rate at MSY. E_{MSY} is dependent upon SST and serves as a proxy for the influence of environmental conditions on stock biomass, so that harvest levels (rates) are adjusted in relation to different oceanic conditions. In both the OFL and ABC control rules E_{MSY} is bounded at 0 and 25% (Figure 1)[2]. In the HG control rule, E_{MSY} is more narrowly bounded, from 5-15%, and is represented by the FRACTION parameter. These bounds – 0, 5, 15 and 25% – reflect Council policy to set the portion of stock available to the fishery depending on, and within a range of environmental conditions.

The upper bounds constrain the exploitation rate when temperature and E_{MSY} increase, as SSTs get warmer. Similarly, the lower bound of 5% in the HG reflects a policy decision to allow the exploitation rate to remain constant at this level regardless of further declines in temperature and E_{MSY}. Analyses conducted during the Amendment 13 scoping process showed that there were times when the ABC control rule fell below the HG at some P-star (probability of overfishing) values during years with lower SSTs. This outcome is in part due to fixing the lower bound for FRACTION at 5%. To address this, Amendment 13 implemented an additional policy that specifies the lowest HCR be used for annual management, effectively overriding FRACTION's lower bound at lower SSTs. The result was that sardine management post-Amendment 13 became more precautionary, particularly in cooler and low biomass conditions.

Figure 1. CalCOFI E_{MSY} relationship to SST, with current OFL/ABC and HG bounds on E_{MSY}.

[2] The upper bound of 25% was recommended by the SSC because it nearly corresponds to the upper quartile of observed CalCOFI temperatures, 1984-2008. Actual upper quartile value is 26% (Figure 3); Hurtado-Ferro and Punt simulation modeling utilized 25%.

In 2010, McClatchie et al. questioned whether the SIO sardine stock–recruit and temperature–recruit relationships underpinning the FRACTION term in the sardine HG formula were still valid. Subsequently, the CalCOFI temperature time series was identified as a better indicator of ocean temperatures off southern California and a better predictor of Pacific sardine recruitment/productivity (Lindegren and Checkley 2013). To incorporate this new scientific information, at the behest of the Council, Felipe Hurtado-Ferro and André Punt developed a new simulation harvest model and conducted an analysis of sardine management scenarios (Hurtado-Ferro and Punt 2014). The simulation model and sensitivity tests developed by Hurtado-Ferro and Punt enabled the examination of the risks associated with the current harvest control rules using this new index, as well as comparison of stock and fishery performance measures for alternative OFL and HG control rules.

The following information and analyses of alternatives characterize the transition to the CalCOFI temperature index and the new temperature-recruitment relationship. Performance measures with SIO informing the FRACTION term are included, along with a retrospective view of harvest control rule outputs with both the SIO and CalCOFI temperature time series, and a series of hypothetical scenarios illustrating the suite of harvest control outputs over a range of biomasses and SSTs.

Description of Alternatives for Temperature Index and FRACTION Bounds, and CPSMT Recommendation

Alternative 1 – SIO Temp Index; HG FRACTION 5-15 (NO ACTION)

This alternative retains the Scripps Institution of Oceanography (SIO) pier temperature index to describe the relationship between ocean conditions and sardine stock productivity and the bounds around the FRACTION harvest control rule parameter as adopted in Amendment 8 of the CPS FMP.

Alternative 2 – Use the New Temp Index (CalCOFI)

The purpose of this alternative is to switch from the SIO temperature index to a CalCOFI SST-based index for computing the harvest control rules, while evaluating whether and how this transition can occur while maintaining current harvest policy. Alternative 2 examines four different scenarios for bounding FRACTION, which are defined below:

Sub-alternative 2a – Maintain existing bounds on FRACTION, of 5-15%
This sub-alternative retains the existing HG FRACTION bounds of 5-15% adopted originally in Amendment 8 to implement a temperature-based harvest control rule, but adopts the CalCOFI temperature index.

Sub-alternative 2b – Revise bounds on FRACTION to 10-20%
This sub-alternative adjusts the HG FRACTION range in the harvest guideline control rule to 10-20%.

Sub-alternative 2c – Revise bounds on FRACTION to 5-20%
This sub-alternative maintains a lower bound of FRACTION at 5% and increases the upper bound to 20%.

Sub-alternative 2d – Revise bounds on FRACTION to 0-20%

Under this sub-alternative the bounds for FRACTION in the HG control rule are the broadest of all the options, and are set at 0-20%.

There are several choices for incorporating an environmental co-variate into the HG policy for Pacific sardine. The first decision point is whether to use SIO (Alternative 1 or No Action) or CalCOFI as the temperature index (Sub-alternatives 2a-d). Secondarily, sub-alternatives 2a-d present a range of E_{MSY} bounds (FRACTION) for the HG.

CPSMT Recommendation

The CPSMT **recommends** adopting sub-alternative 2b, use of the CalCOFI SST temperature index with a harvest FRACTION of 10-20% in order to better 1) adhere to the goals and maintain policies for sardine management previously adopted under Amendments 8 and 13; 2) cover the range of CalCOFI temperatures similar to the past use of SIO temperatures; and 3) provide for adaptive management under a broad range of sardine resource and environmental conditions. The 20% upper bound of the FRACTION range will allow greater harvest opportunities in some cases, when SSTs are favorable and the stock is abundant. The 10% lower limit ensures that at least a small amount will be available especially for incidental harvest in other commercial fisheries and for live bait.

Regarding the decision to move from the SIO-based temperature index and temperature-productivity relationship, the CPSMT recognizes the CalCOFI SST index is presently the most appropriate indicator of sardine recruitment/productivity and **recommends** its use. The results of the harvest policy workshop demonstrated the CalCOFI index had the best fit to recruitment measures of all available environmental variables evaluated (PFMC 2013). And the SSC approved using the CalCOFI SST index as best available science, to compute the Overfishing Limit (OFL).

1) Adherence to Goals and Policies

Sub-alternative 2b is consistent with the Council's goals and policies. The specific HG formula adopted under Amendment 8 was selected from among many potential HCR rules analyzed because it optimally met the following CPS FMP goals:

1. Promote efficiency and profitability in the fishery, including stability of catch.
2. Achieve optimum yield.
3. Provide adequate forage for predator species.
4. Prevent overfishing.

A variety of performance measures were estimated over the long-term with a simulation model and then compared against the goals for each HCR variant. A similar approach was used to evaluate various FRACTION bounds under Alternative 2 with the new CalCOFI SST temperature index (Hurtado-Ferro and Punt 2014). The performance measure results for the Alternatives are presented in Appendix 1 of this report, and in Table 1 of the draft EA (November Briefing Book Agenda Item E.1.a Attachment 1). Under the No Action alternative, FRACTION in the HG would continue to rely on SIO which has been deemed less representative of current ocean conditions and not the best available science.

Sub-alternative 2b maintains a precautionary management approach. Depletion refers to the portion of the population remaining after harvest (i.e., the percentage of fish left in the ocean after harvest). The CPSMT notes that the depletion rate (% mean biomass compared to the unfished case) rose from 64% based on the existing HG rule in Amendment 8 to ≥75% for sub-alternatives 2a-d (Appendix 1, Table A-1). This means that under all scenarios under Alternative 2, a higher percent of biomass is being left in the ocean compared to what was expected under the status quo.

Further, the updated analysis/new model shows an increase from stochastic E_{MSY} of 0.12 in Amendment 8 to 0.18 (Hurtado-Ferro and Punt 2014). The increase in E_{MSY} reflects statistically identified increased productivity and therefore a higher fishing rate at MSY that maximizes mean catch.

For sub-alternatives 2a-d, biological and economic performance measures are similar, differing by less than 5% except for mean and median catch (Appendix 1). Mean and median catch are approximately 5% and 9% lower, respectively, for sub-alternative 2a than the other sub-alternatives. Other economic performance indicators are generally comparable. All of the sub-alternatives have similar frequencies of years with no catch (i.e., no fishery), ranging from 4.7% to 5.1%, and the frequency of years with catch <50 mt is identical: 31% for all Alternatives. For biological performance measures, all the Alternatives have a population biomass over 400,000 mt more than 91 percent of the time. These results show 2a (FRACTION bounds of 5-15) provides less catch than the other scenarios, but does not produce higher biomass levels than those other scenarios with higher catches.

2) Range of Observed CalCOFI Temperatures

Sub-alternative 2b best represents, and is best aligned with, the range of observed CalCOFI temperatures. In the relationship between SST and E_{MSY}, a FRACTION that ranges from 10-20% better reflects the range of observed CalCOFI temperatures in a comparable manner to the 5-15% range for SIO temperatures. Figure 2 depicts the current policy from Amendment 8, using SIO temperature and FRACTION bounded at 5-15%, with median and quartile observed temperatures noted. Figure 3 similarly depicts FRACTION bounded at 5-15% and 10-20% using CalCOFI temperatures, with median and quartile observed temperatures noted. FRACTION at 5-15% for the CalCOFI SST index encompasses fewer than half the observed temperatures.

Given that the stock is more productive than previously estimated, and assuming use of the CalCOFI temperatures, FRACTION at 10-20% is a more conservative policy than a FRACTION range of 5-15% (using SIO temperatures). Under the 10-20% range, FRACTION is better aligned with the median CalCOFI temperatures, but the range still falls in the lower temperature range than the 5-15% using SIO temperatures.

CalCOFI FRACTION at 10-20% manages the stock at lower prescribed E_{MSY}/FRACTION levels compared to SSTs commonly observed, while SIO FRACTION at 5-15% manages at roughly the E_{MSY}/FRACTION levels corresponding to most of the SSTs observed. Hence, using a CalCOFI 10-20% FRACTION results in a smaller FRACTION relative to what the E_{MSY}/SST relationship calls for, i.e., at an exploitation rate less than MSY. Use of the SIO 5-15% FRACTION results in generally falling in line with exploitation at MSY, based on the E_{MSY}/SST relationship.

Figure 2. E_{MSY} and FRACTION based on SST at SIO pier (Amendment 8). Vertical lines represent quartile and median SSTs from years used to develop the E_{MSY} -SST relationship (1916-1997).

Figure 3. E_{MSY} and FRACTION based on CalCOFI (Hurtado-Ferro and Punt 2014). FRACTION bounded at 5-15% and 10-20%. Vertical lines represent quartile and median SSTs from years used to develop the E_{MSY}-SST relationship (1984-2008).

3) Management under Diverse Conditions

Sub-alternative 2b allows for adaptive management under a variety of conditions. The original intent of the HG under the CPS FMP was to have a FRACTION that varied based on temperature to allow higher harvest rates and more catch during good conditions and lower harvest rates and less catch during unfavorable environmental conditions. The bounding of FRACTION was a Council policy decision based on social, economic, and biological criteria.

Under Amendment 13, additional Harvest Control Rules afforded the Council the assurance that allowed harvests would not exceed the OFL or the ABC, for a given P-star value (probability of overfishing). The Council adopted a policy to set the allowable harvest no higher than the lowest of the HCRs. In addition, the Council may set an Annual Catch Target (ACT) at any level below the lowest ABC or HG but not higher, giving the Council the ability to adapt to adverse social, economic, environmental or biological conditions not already accounted for in the three HCRs.

For the HG, the lower FRACTION bound of 10% is a minimum harvest level under cooler SST conditions. It allows for some harvest opportunity in cooler conditions, although the ABC control rule can still be lower than an HG with FRACTION at 10%. The net result is that a lower bound at 10%, couched in the current policy to select the lowest HCR output, is not substantially different than a lower bound at 5% (Appendix 2/Table A-2, panels 1, 6 and 11). Selecting a FRACTION with an upper bound of 20 preserves a greater level of fishing opportunity while still retaining the ability to set lower harvest limits. Alternative 2b (10-20%) thus 1) affords the most flexibility to select harvest limits at the lower bound, since Annual Catch Target levels can always be selected below (but not above) the prescribed ABC or HG to protect the stock, and 2) provides more opportunity during warmer more productive conditions.

Hypothetical Scenarios and Control Rule Analysis

To compare and evaluate FRACTION Alternatives 2a-d under a wide range of biomass and temperature conditions, the CPSMT estimated allowable harvests for the HCRs and each Alternative for 15 sample conditions (Appendix 2, Table A-2). Three levels were selected to indicate low (250,000 mt), moderate (700,000 mt) and high (1,500,000 mt) biomass. Five temperature conditions, as indicated by E_{MSY} values, were analyzed: 0-5% for low temperatures, 5-10% for moderately low temperatures, 10-15% for moderate temperatures, 15-20% for moderately warm temperatures, and 20-25% for warm temperatures. These example ranges were selected to reflect the potential differences in upper and lower bounds of FRACTION sub-alternatives 2a-d, as well as the OFL/ABC bounds (0-25%). The HCRs included OFL, ABC with P-star=0.4, ABC with P-star=0.05, and HG under each of the FRACTION sub-alternatives 2a-d. For each example (panel in table), the computed harvest control rule (whether ABC or HG) and its associated harvest rate (harvest/biomass of age 1+ fish) are listed in order of low to high harvest level.

For a given biomass level and HCR, allowable harvests increase with increasing temperatures, until the upper bound of FRACTION or MAXCAT (200,000 mt) is reached. At all biomass levels and moderately warm and warm temperatures, allowable harvests under sub-alternatives 2b, c, and d are the same because their upper FRACTION bound is 20%. Allowable harvest under all the

alternatives is below the ABC at P-star = 0.4 and even below ABC at P-star = 0.05 when biomass is low.

At low and moderately low temperatures and all biomass levels, the lower bound of FRACTION determines the level of allowed harvest. Allowed harvest under these conditions is the same for Alternatives 2a and 2c (lower bound of 5%), and Alternative 2d (lower bound of 0%) allows the least harvest of all the sub-alternatives. However, at all three biomass levels (panels 1, 6 and 11), ABC at P-star = 0.4 is lower than the HG for sub-alternative 2b (lower bound of 10%), and therefore, the ABC would be used for management.

At moderate temperatures and all three biomass levels, the sub-alternatives 2a-2d do not differ. All alternatives provide the same allowable harvest and it is lower than ABC at P-star = 0.4. The difference between allowable harvest and the ABC value decreases as stock size increases so that at high biomass levels, the allowable harvest and ABC are nearly the same.

In the following figures, 4a-d, which correspond to the FRACTION sub-alternatives 2a-d, harvest rates as a function of SST are shown for different levels of stock biomass (low = 250,000 mt, moderate = 700,000 mt, high = 1,500,000 mt). These figures pictorially present information similar to Table A-2 with hypothetical examples of harvest rates and harvests under a range of biomass and temperatures. However, Table A-2 presents information tabulated to easily compare among Alternatives at a given biomass and temperature level, whereas each of the Figures 4a-d presents information to readily compare harvest rates and interplay among control rules for a single Alternative under different biomass and temperature conditions. To provide an indication of how often these temperature conditions have been observed historically, quartile and median values for 3-year averaged CalCOFI temperatures from 1950-2013 are denoted by dashed and solid vertical lines, respectively. HG and ABC (P-star 0.4) harvest rates are constrained by the 200,000 mt maximum catch allowance (MAXCAT). ABC values are also restricted by the E_{MSY} upper bound of 0.25. At the lower end of SSTs, ABC harvest rates go to zero, while HG harvest rates are limited by each alternative's lower FRACTION bound for E_{MSY}. Negative harvest rates at lower SSTs are set to 0 on the figures. Also note that the lines are the same for ABCs at low and medium biomass levels on all the figures.

For **sub-alternative 2a** (Figure 4a), harvest rates for the HG are lower than those for ABC above the lower SST quartile, when biomass is at medium or high levels. At temperatures below 14.8 degrees, harvest rates are determined by the ABC and are less than 5% at all biomass levels. At approximately the median SST, harvest rates reach their maximum: 12% for high biomass, 10% for medium biomass, and 5% for low biomass levels.

Figure 4a. Harvest rates as a function of CalCOFI SST under different levels of stock biomass (low = 250,000 mt, medium = 700,000 mt, high = 1,500,000 mt) for **sub-alternative 2a** (FRACTION = 5-15%).

For **sub-alternatives 2b-d** (Figures 4b-d), harvest rates for a given biomass level are identical at temperatures above 15.3 degrees (the lower SST quartile), and harvest rates for the HG are lower than the ABC rates. Under these scenarios, harvest rates reach their maximum at temperatures above the median, ranging from approximately 14% for medium and high biomass levels to about 7% for low biomass levels. Because these sub-alternatives differ only in the lower bounds for FRACTION, their harvest rates diverge from each other at progressively lower temperatures as the lower FRACTION bound is reduced. For example, under sub-alternative 2b (FRACTION 10-20%), the lower bound for the HG at all biomass levels is reached at temperatures below about 15.2 degrees. Similarly, under **sub-alternative 2c** (FRACTION 5-20%), the lower HG bound is reached at about 14.9 degrees, whereas it is reached at 14.6 degrees for **sub-alternative 2d** (FRACTION 0-20%). The point at which the ABC is lower than the HG and therefore, determines allowable harvest likewise occurs at progressively lower temperatures. Consequently, harvest rates at low temperatures range from a maximum of about 8% for Alternative 2b at high biomass levels down to zero for sub-alternative 2d at all biomass levels.

For the sub-alternatives, at cooler temperatures between about 14.6 – 15.1 ^{0}C, the ABC begins to override the HG. Below about 14.6 ^{0}C harvest rates are reduced to zero regardless of biomass level.

Figure 4b. Harvest rates as a function of CalCOFI SST under different levels of stock biomass (low = 250,000 mt, medium = 700,000 mt, high = 1,500,000 mt) for **sub-alternative 2b** (FRACTION = 10-20%).

Figure 4c. Harvest rates as a function of CalCOFI SST under different levels of stock biomass (low = 250,000 mt, medium = 700,000 mt, high = 1,500,000 mt) for **sub-alternative 2c** (FRACTION = 5-20%).

Figure 4d. Harvest rates as a function of CalCOFI SST under different levels of stock biomass (low = 250,000 mt, medium = 700,000 mt, high = 1,500,000 mt) for **sub-alternative 2d** (FRACTION = 0-20%).

In summary, at low temperatures (unfavorable conditions), harvest rates and harvests estimated for FRACTION sub-alternative 2b (10-20%) are overridden by a lower ABC value, as intended under the HCR policies adopted under Amendment 13. At moderate temperatures, all the Alternatives perform similarly. At higher temperatures (favorable environmental conditions), sub-alternatives 2b, c, and d perform similarly and allow greater harvest rates and harvests compared to sub-alternative 2a. At moderate and high biomasses, the difference can be substantial, as much as 25,000 mt until MAXCAT is reached. If sub-alternative 2a is adopted, this additional harvest opportunity is foregone. If one of the other sub-alternatives is adopted, this opportunity is preserved, and the Council may choose to set a more conservative ACT as environmental, socioeconomic or resource conditions warrant.

Retrospective Analysis

The application of the CalCOFI index and the alternatives for FRACTION are shown retrospectively in the following table and figures. Caution should be used in evaluating these illustrations. First, removals in any year affect biomass in subsequent years and this view assumes no difference in biomass regardless of difference of catch between the two indices. Secondly, biomass estimates are not fixed. With each stock assessment, biomass estimates are updated reflecting new understanding as more biological and catch data are added. For this evaluation, biomasses for the period prior to federal management (i.e. 2000) are taken from the 2010 sardine update assessment (Hill et al. 2010). The biomasses for subsequent years are those adopted for annual management each year. This approach is consistent with that used in the Harvest Parameters Workshop (Lindegren and Checkley 2013).

The differences in HG control rules and true harvest rates (HR) for years 1992-2014 are shown below using different FRACTION bounds for SIO and CalCOFI (Table 2). The HG values are subscripted: Alternative 1 (SIO 5-15% FRACTION bounds) or sub-alternatives 2a-2d (CalCOFI FRACTION bounds 5-15%, 10-20%, 5-20%, 0-20%). Note the minimum CalCOFI E_{MSY} value for 1992-2014 was 0.11 (11), so all HG and HR values for sub-alternatives 2b-2d are identical. Harvest rates are the HG value divided by the coastwide biomass (1+ years). In year 2000, HG_{2b-d} values are constrained by the 200,000 mt maximum allowable catch.

Figure 5 shows biomasses (low, median, and high) CalCOFI temperatures (low, median, and high) since 1992. Figure 6 compares harvest rates for all Alternatives since 1992.

Table 1. Pacific sardine HG control rules and true HRs for years 1992-2014, with SIO and CalCOFI temperature indices. HGs are bounded by Alternatives 1 (SIO) and 2a-d (CalCOFI) specifications, with temperature-dependent OFL/ABC FRACTION of 0-25%, and CUTOFF and MAXCAT at status quo.

		SIO					CalCOFI							
Year	Biomass (1+)	SST	Emsy	HG $FRAC_1$	HG_1	SIO HR	SST	Emsy	HG $FRAC_{2a}$	HG_{2a}	HG $FRAC_{2b-d}$	HG_{2b-d}	CC_{2a} HR	CC_{2b-d} HR
1992	168,037	17.35	0.207	0.150	2,354	1.4%	15.75	0.187	0.150	2,354	0.187	2,930	1.4%	1.7%
1993	250,493	17.61	0.340	0.150	13,114	5.2%	16.17	0.251	0.150	13,114	0.200	17,486	5.2%	7.0%
1994	329,328	17.84	0.482	0.150	23,402	7.1%	16.31	0.273	0.150	23,402	0.200	31,203	7.1%	9.5%
1995	562,105	17.97	0.575	0.150	53,780	9.6%	16.53	0.310	0.150	53,780	0.200	71,706	9.6%	12.8%
1996	821,223	18.04	0.631	0.150	87,595	10.7%	16.27	0.268	0.150	87,595	0.200	116,793	10.7%	14.2%
1997	819,628	18.07	0.649	0.150	87,386	10.7%	16.24	0.263	0.150	87,386	0.200	116,515	10.7%	14.2%
1998	771,761	18.08	0.659	0.150	81,140	10.5%	16.31	0.275	0.150	81,140	0.200	108,186	10.5%	14.0%
1999	1,095,610	18.47	1.015	0.150	123,402	11.3%	16.60	0.320	0.150	123,402	0.200	164,536	11.3%	15.0%
2000	1,581,346	18.08	0.660	0.150	186,791	11.8%	16.25	0.264	0.150	186,791	0.200	200,000	11.8%	12.6%
2001	1,182,465	17.75	0.421	0.150	134,737	11.4%	15.95	0.217	0.150	134,737	0.200	179,649	11.4%	15.2%
2002	1,057,599	17.24	0.162	0.150	118,442	11.2%	15.54	0.154	0.150	118,442	0.154	121,816	11.2%	11.5%
2003	999,871	17.31	0.191	0.150	110,908	11.1%	15.43	0.137	0.137	100,938	0.137	100,938	10.1%	10.1%
2004	1,090,587	17.46	0.259	0.150	122,747	11.3%	15.51	0.149	0.149	121,863	0.149	121,863	11.2%	11.2%
2005	1,193,515	17.60	0.334	0.150	136,179	11.4%	15.62	0.166	0.150	136,179	0.166	150,737	11.4%	12.6%
2006	1,061,391	18.03	0.618	0.150	118,937	11.2%	15.79	0.193	0.150	118,937	0.193	152,802	11.2%	14.4%
2007	1,319,072	18.11	0.685	0.150	152,564	11.6%	15.75	0.187	0.150	152,564	0.187	190,001	11.6%	14.4%
2008	832,706	18.12	0.693	0.150	89,093	10.7%	15.51	0.149	0.149	88,560	0.149	88,560	10.6%	10.6%
2009	662,886	17.83	0.477	0.150	66,932	10.1%	15.45	0.139	0.139	62,231	0.139	62,231	9.4%	9.4%
2010	702,024	17.84	0.483	0.150	72,039	10.3%	15.26	0.110	0.110	53,033	0.110	53,033	7.6%	7.6%
2011	537,173	17.90	0.522	0.150	50,526	9.4%	15.39	0.131	0.131	44,185	0.131	44,185	8.2%	8.2%
2012	988,385	17.64	0.358	0.150	109,409	11.1%	15.49	0.146	0.146	106,624	0.146	106,624	10.8%	10.8%
2013	659,539	17.36	0.213	0.150	66,495	10.1%	15.47	0.143	0.143	63,325	0.143	63,325	9.6%	9.6%
2014	369,506	17.22	0.156	0.150	28,646	7.8%	15.34	0.122	0.122	23,293	0.122	23,293	6.3%	6.3%

Figure 5. Sardine biomass (1+ years) and CalCOFI 3-yr averaged SST from 1992-2014; represents a retrospective view of years with high, moderate, and low biomass and temperatures.

Figure 6. Retrospective comparison of harvest rates from Table 1. Note elevated harvest rates and increased opportunity for fishing during warmer years under CalCOFI Alternatives 2b-2d (FRACTION 10-20%, 5-20%, 0-20%).

Conclusion

The CPSMT supports the continued inclusion of temperature as an environmental variable in the harvest guideline (HG) control rule for sardine management, because it is an indicator of stock productivity. The CPSMT recognizes the CalCOFI index is presently the most appropriate indicator of sardine recruitment/productivity and recommends its use. Use of the CalCOFI temperature time series, along with the change from a production to an age-structured model, incorporates best available science into the management of sardines and maintains a precautionary management policy over the long-term as evidenced by the simulation model performance measures, comparing sub-alternatives 2a-d with each other, and in comparison to the No Action Alternative.

The choice of values used to define or bound the HG FRACTION is a policy decision. The No Action option would be to continue to use SIO with FRACTION bounded at 5-15%. Another option is to use CalCOFI and FRACTION bounded at 5-15% (Alternative 2a). However, if CalCOFI is used going forward, and with the calculated stochastic E_{MSY} changing from 0.12 (using SIO SST) to 0.18 (using CalCOFI SST), the CPSMT believes it would be appropriate to adjust the HG FRACTION bounds accordingly. The original intent of the HG under the CPS FMP was to have a FRACTION that varied based on temperature to allow more catch during good conditions and less during unfavorable conditions.

Placing a lower bound on FRACTION was a policy decision taken by the Council based on social, economic, and biological criteria to allow a small, but directed fishery when biomass and temperature were low, but above CUTOFF. Additionally, a FRACTION that ranges up to 20% also better reflects the mid-range of temperature vs E_{MSY} and aligns with CalCOFI temperatures in manner that is similar to where the 5-15% range fell relative to SIO temperatures. Figure 2 depicts the current policy from Amendment 8, using SIO temperature and FRACTION bounded at 5-15%, compared to Figure 3 which depicts FRACTION bounded at 5-15% and 10-20% using CalCOFI temperature. This shift in FRACTION to up to 20% is a more conservative approach when looking at where the bounds lie with regard to the median temperature.

Among all the Alternatives, selection of FRACTION bounds of 10-20%, under existing policy, allows comparatively more Council discretion to set harvest levels, adaptively managing based on current information on recruitment, environmental conditions, or the trajectory of the stock biomass. The suite of HCRs (OFL, ABC, and HG) account for scientific and management uncertainty; the HG is but one control rule, used in conjunction with the others to manage the stock. Additionally, Annual Catch Target levels can always be selected below (but not above) the prescribed ABC or HG to address more immediate concerns. This option, with the cap at 20%, would preserve a greater level of fishing opportunity but does not limit the ability to set lower harvest limits as warranted to protect the stock. Additionally, a lower cap is not necessary to protect sardine because that is specifically what the ABC control rule does.

Appendix 1: Modeled Performance Measures

Table 1A below presents the performance measures from Amendment 8, HG-J and selected model harvest scenarios conducted by Hurtado-Ferro and Punt (2014), to compare values informing the FRACTION parameter.

Under the No Action alternative, OFL and ABC control rules would utilize the CalCOFI SST time series, whereas the FRACTION term in the HG would continue to rely on SIO. Performance measures for this alternative are not available; no single operating model exists that incorporates both SST time series. Development of such an operating model would first require analysis correlating the two SST time series. Such analysis would require oceanographic expertise and an approach similar to the Harvest Parameters Workshop (PFMC 2013).

As a substitute, performance metrics for the HCR policy adopted under Amendment 8 are presented in Table 1A. Care should be taken in evaluating the performance measures of the No Action alternative (1) with Alternatives 2a-d. The former are the output from the simulation modeling conducted under Amendment 8 (Jacobsen and MacCall 1995), whereas the latter were produced from the most recent simulation modeling Hurtado-Ferro, F. and A. E. Punt (2013). Because the results for the No Action alternative derive from a different data set and operating model, direct comparison between Alternatives 1 and 2a-d is not appropriate. However, a more general approach that considers the policy implications relative to the context, or scientific understanding of the two simulations, is reasonable.

The new operating model by Hurtado-Ferro and Punt (age-structured) is structurally different than the simulation model used in Amendment 8 (production model), and incorporates a revised recruitment time series that better represents sardine population dynamics over the past several decades. The updated model produces a higher stochastic E_{MSY} (SE_{MSY}) than Amendment 8 (0.18 vs 0.12) due to the bulk of the intermediate and low biomass years when Amendment 8 was developed and a period when sardine biomass was declining because of the numerous cold water years. The new time series with more recent data includes a large number of years at low and intermediate biomass levels when the biomass was expanding because it was a warm water period (Dr. Richard Parrish, pers. comm.).

All the scenarios used a three-year averaged CalCOFI SST time series because this moderates inter-annual fluctuations in temperature and therefore harvest. A three-year average also spans temperature conditions from the year preceding spawning, the birth year and the year prior to recruitment to the adult population. This is consistent with present policy for FRACTION, which currently uses a three-year average temperature variable, but from SIO temperatures. For the purpose of analysis Hurtado-Ferro and Punt (2014) set DISTRIBUTION to 1.0, as was done originally in Amendment 8, and thus this parameter was not a factor in the scenarios.

Under Alternative 2, plain shaded cells (green) represent values within 5% of the best value; dotted/shaded cells represent values in excess of 5% of the best value.

Table A-1.

Alternative	**1 "No Action"**	**2a**	**2b**	**2c**	**2d**
Simulation Model	Original Amend. 8 Analysis	Hurtado-Ferro and Punt, 2014			
Temperature Index	SIO	CalCOFI			
E_{MSY} Bounds (FRACTON):	5-15	5-15	10-20	5-20	0-20
OFL E_{MSY} (%)	-	0-25	0-25	0-25	0-25
CUTOFF	150	150	150	150	150
MAXCAT	200	200	200	200	200
Performance Measure					
Biological					
Mean B1+ (SD)	1952 (49)	1220 (888)	1182 (883)	1186 (882)	1187 (881)
Mean SSB (SD)	-	945 (757)	911 (753)	915 (752)	916 (751)
Median B1+	1648	991.8	945.1	948.6	949.5
%B1+>400	96	92	91	92	92
Depletion (B1+ % of Unfished B1+)	64%	78%	75%	75%	76%
Economic					
%No catch	0.5	4.7	4.7	4.8	5.1
%Catch<50	-	31	31	31	31
Median catch	182	97	107	107	107
Mean catch all (SD)	145 (67)	106 (73)	112 (75)	111 (75)	111 (76)

Appendix 2: Hypothetical Harvest Control Rule Scenarios

In Table A-2 three biomass levels were selected to indicate low (250,000mt), moderate (700,000mt) and high (1,500,000mt) biomass. Five temperature conditions, as indicated by E_{MSY} values, were analyzed: 0-5% for low temperatures, 5-10% for moderately low temperatures, 10-15% for moderate temperatures, 15-20% for moderately warm temperatures, and 20-25% for warm temperatures. These example ranges were selected to reflect the potential differences in upper and lower bounds of FRACTION Alternatives 2a-d, as well as the OFL bounds (0-25%).

The HCRs include OFL, ABC with P-star=0.4, ABC with P-star=0.05, and HG under each of the FRACTION Alternatives 2a-d. For each example (panel in table), the computed harvest (whether ABC or HG) and its associated harvest rate (harvest/biomass of 1+ fish) are listed in order of low to high harvest level.

In this illustration, the hypothetical biomass is analogous to total 1+ biomass. The ABC or HG output is US catch. The harvest rates are calculated as ABC or HG output divided by biomass. Therefore, the harvest rates here represent US catch of total 1+ biomass.

Table A-2

Yellow highlight indicates management "driver."
Under Panels 1 and 6 - ABC P.40 is lower than Alt 2b so it would be used for management.
Under Panel 11, ABC P.40 would be used for management in lieu of Alts 2a-c.
ABC P.05 and P.40 are in red font reflecting current Council choice (P.40) and something lower (P.05).
Within each panel - outputs are ranked low to high based on harvest rate.

"Low" Temp
Emsy between 0 and 5%
Emsy used for scenario: 2.5%
Temp Range: 14.58 to 14.88
Temp Used for Scenario: 14.73

Low Biomass (250,000 mt)

1	Harvest rate	ABC or HG
2d. 0-20	0.87%	2,175
ABC 0.05	1.20%	3,007
ABC 0.10	1.37%	3,428
ABC 0.20	1.61%	4,016
2a. 5-15	1.74%	4,350
2c. 5-20	1.74%	4,350
ABC 0.30	1.80%	4,502
ABC 0.40	1.99%	4,963
ABC 0.45	2.08%	5,197
2b. 10-20	3.48%	8,700

Moderate Biomass (700,000 mt)

6	Harvest rate	ABC or HG
ABC 0.05	1.20%	8,421
ABC 0.10	1.37%	9,597
ABC 0.20	1.61%	11,245
2d. 0-20	1.71%	11,962
ABC 0.30	1.80%	12,605
ABC 0.40	1.99%	13,897
ABC 0.45	2.08%	14,551
2a. 5-15	3.42%	23,925
2c. 5-20	3.42%	23,925
2b. 10-20	6.84%	47,850

High Biomass (1,500,000 mt)

11	Harvest rate	ABC or HG
ABC 0.05	1.20%	18,044
ABC 0.10	1.37%	20,566
ABC 0.20	1.61%	24,096
ABC 0.30	1.80%	27,011
2d. 0-20	1.96%	29,361
ABC 0.40	1.99%	29,780
ABC 0.45	2.08%	31,181
2a. 5-15	3.92%	58,725
2c. 5-20	3.92%	58,725
2b. 10-20	7.83%	117,450

"Low-Mod" Temp
Emsy between 5 and 10%
Emsy used for scenario: 7.5%
Temp Range: 14.88 to 15.20
Temp Used for Scenario: 15.04

2	Harvest rate	ABC or HG
2a. 5-15	2.61%	6,525
2c. 5-20	2.61%	6,525
2d. 0-20	2.61%	6,525
2b. 10-20	3.48%	8,700
ABC 0.05	3.61%	9,022
ABC 0.10	4.11%	10,283
ABC 0.20	4.82%	12,048
ABC 0.30	5.40%	13,506
ABC 0.40	5.96%	14,890
ABC 0.45	6.24%	15,591

7	Harvest rate	ABC or HG
ABC 0.05	3.61%	25,262
ABC 0.10	4.11%	28,793
ABC 0.20	4.82%	33,735
2a. 5-15	5.13%	35,887
2c. 5-20	5.13%	35,887
2d. 0-20	5.13%	35,887
ABC 0.30	5.40%	37,817
ABC 0.40	5.96%	41,693
ABC 0.45	6.24%	43,654
2b. 10-20	6.84%	47,850

12	Harvest rate	ABC or HG
ABC 0.05	3.61%	54,134
ABC 0.10	4.11%	61,699
ABC 0.20	4.82%	72,290
ABC 0.30	5.40%	81,036
2a. 5-15	5.87%	88,086
2c. 5-20	5.87%	88,086
2d. 0-20	5.87%	88,086
ABC 0.40	5.96%	89,342
ABC 0.45	6.24%	93,544
2b. 10-20	7.83%	117,450

"Mod" Temp
Emsy between 10 and 15%
Emsy used for scenario: 12.5%
Temp Range: 15.20 to 15.52
Temp Used for Scenario: 15.35

3	Harvest rate	ABC or HG
2a. 5-15	4.35%	10,875
2b. 10-20	4.35%	10,875
2c. 5-20	4.35%	10,875
2d. 0-20	4.35%	10,875
ABC 0.05	6.02%	15,038
ABC 0.10	6.86%	17,139
ABC 0.20	8.03%	20,081
ABC 0.30	9.00%	22,511
ABC 0.40	9.93%	24,818
ABC 0.45	10.39%	25,985

8	Harvest rate	ABC or HG
ABC 0.05	6.02%	42,105
ABC 0.10	6.86%	47,990
ABC 0.20	8.03%	56,227
2a. 5-15	8.54%	59,813
2b. 10-20	8.54%	59,813
2c. 5-20	8.54%	59,813
2d. 0-20	8.54%	59,813
ABC 0.30	9.00%	63,030
ABC 0.40	9.93%	69,490
ABC 0.45	10.39%	72,759

13	Harvest rate	ABC or HG
ABC 0.05	6.02%	90,225
ABC 0.10	6.86%	102,835
ABC 0.20	8.03%	120,487
ABC 0.30	9.00%	135,064
2a. 5-15	9.79%	146,814
2b. 10-20	9.79%	146,814
2c. 5-20	9.79%	146,814
2d. 0-20	9.79%	146,814
ABC 0.40	9.93%	148,907
ABC 0.45	10.39%	155,911

"Mod-Warm" Temp
Emsy between 15 and 20%
Emsy used for scenario: 17.5%
Temp Range: 15.52 to 15.84
Temp Used for Scenario: 15.68

4	Harvest rate	ABC or HG
2a. 5-15	5.22%	13,050
2b. 10-20	6.09%	15,225
2c. 5-20	6.09%	15,225
2d. 0-20	6.09%	15,225
ABC 0.05	8.42%	21,052
ABC 0.10	9.60%	23,995
ABC 0.20	11.25%	28,113
ABC 0.30	12.61%	31,515
ABC 0.40	13.90%	34,745
ABC 0.45	14.55%	36,379

9	Harvest rate	ABC or HG
ABC 0.05	8.42%	58,947
ABC 0.10	9.60%	67,185
2a. 5-15	10.25%	71,775
ABC 0.20	11.25%	78,717
2b. 10-20	11.96%	83,738
2c. 5-20	11.96%	83,738
2d. 0-20	11.96%	83,738
ABC 0.30	12.61%	88,241
ABC 0.40	13.90%	97,285
ABC 0.45	14.55%	101,861

14	Harvest rate	ABC or HG
ABC 0.05	8.42%	126,314
ABC 0.10	9.60%	143,968
ABC 0.20	11.25%	168,680
2a. 5-15	11.75%	176,175
ABC 0.30	12.61%	189,088
2b. 10-20	~~13.70%~~	~~205,538~~
2c. 5-20	~~13.70%~~	~~205,538~~
2d. 0-20	~~13.70%~~	~~205,538~~
ABC 0.40	~~13.90%~~	~~208,468~~
ABC 0.45	~~14.55%~~	~~218,274~~

"Warm" Temp
Emsy between 20 and 25%
Emsy used for scenario: 22.5%
Temp Range: 15.84 to 16.16
Temp Used for Scenario: 16.00

5	Harvest rate	ABC or HG
2a. 5-15	5.22%	13,050
2b. 10-20	6.96%	17,400
2c. 5-20	6.96%	17,400
2d. 0-20	6.96%	17,400
ABC 0.05	10.83%	27,067
ABC 0.10	12.34%	30,850
ABC 0.20	14.46%	36,146
ABC 0.30	16.21%	40,519
ABC 0.40	17.87%	44,672
ABC 0.45	18.71%	46,773

10	Harvest rate	ABC or HG
2a. 5-15	10.25%	71,775
ABC 0.05	10.83%	75,789
ABC 0.10	12.34%	86,381
2b. 10-20	13.67%	95,700
2c. 5-20	13.67%	95,700
2d. 0-20	13.67%	95,700
ABC 0.20	14.46%	101,208
ABC 0.30	16.21%	113,453
ABC 0.40	17.87%	125,081
ABC 0.45	18.71%	130,964

15	Harvest rate	ABC or HG
ABC 0.05	10.83%	162,404
2a. 5-15	11.75%	176,175
ABC 0.10	12.34%	185,101
ABC 0.20	~~14.46%~~	~~216,875~~
2b. 10-20	~~15.66%~~	~~234,900~~
2c. 5-20	~~15.66%~~	~~234,900~~
2d. 0-20	~~15.66%~~	~~234,900~~
ABC 0.30	~~16.21%~~	~~243,113~~
ABC 0.40	~~18.71%~~	~~268,030~~
ABC 0.45	~~18.71%~~	~~280,638~~

For slashed cells in Panels 14 and 15, HCRs exceed and revert to MAXCAT value of 200,000:

Harvest rate	ABC or HG
13.33%	200,000

Appendix 3: Additional Model Simulations

Additional runs of the Hurtado-Ferro and Punt simulation model were done for Alternative 2 with P-star 0.4 Tier 2 and P-star 0.2 Tier 2.

Table A-3. Performance measures for alternatives 2a-d using alternative tiers and P-stars.

Scenario	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
HG Fraction		5-15			10-20			5-20			0-20	
Tier	1	2	2	1	2	2	1	2	2	1	2	2
P*	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4
Buffer	0.7381	0.54555	0.83326	0.7381	0.54555	0.83326	0.7381	0.54555	0.83326	0.7381	0.54555	0.83326
Performance Measure												
Biological												
Mean B1+	1231.5	1272.2	1222.5	1204.2	1268.8	1190.3	1204.2	1268.8	1190.3	1204.2	1268.8	1190.3
SD B1+	885.2	877.1	887.5	879.1	876.5	880.8	879.1	876.5	880.8	879.1	876.5	880.8
Mean SSB	957.3	995.2	949.0	931.4	992.0	918.6	931.4	992.0	918.6	931.4	992.0	918.6
SD SSB	755.0	749.2	756.6	750.0	748.9	751.1	750.0	748.9	751.1	750.0	748.9	751.1
%B1+>400	93.0	94.8	92.6	92.5	94.7	91.9	92.5	94.7	91.9	92.5	94.7	91.9
Depletion	78.3	80.9	77.8	76.6	80.7	75.7	76.6	80.7	75.7	76.6	80.7	75.7
Economic												
%No catch	4.7	4.6	4.7	5.0	4.7	5.0	5.0	4.7	5.0	5.0	4.7	5.0
%Catch<50	31.5	35.2	31.2	30.8	34.6	30.7	30.8	34.6	30.7	30.8	34.6	30.7
Median catch	93.8	82.9	96.9	101.6	84.6	106.5	101.6	84.6	106.5	101.6	84.6	106.5
Mean catch all	104.1	97.8	105.4	108.9	98.3	110.9	108.9	98.3	110.9	108.9	98.3	110.9
SD catch all	72.0	71.1	72.3	74.3	70.9	75.1	74.3	70.9	75.1	74.3	70.9	75.1

Appendix 4: SIO and CalCOFI Temperature Series

The temperature time series from both the Scripps Pier and CalCOFI surveys shows that the Scripps Pier information tracked similarly with the CalCOFI information from approximately 1950-1998 but diverged after 1998, with CalCOFI temperatures mostly declining but Scripps Pier temperatures mostly increasing after this year (Figure A-1).

The 1984-2008 CalCOFI SST time series replaces the 1916-1998 SIO SST used in the Amendment 8 model and in the relationship to define E_{MSY} (F_{msy}). The annual CalCOFI SST time series provides the best fit for the sardine recruitment – environment relationship, as indicated by R^2 of 0.72 from Table 10 in the Hurtado-Ferro and Punt report (March 2014 Briefing Book Agenda Item I.1.b, Attachment 1).

Figure A-4. Mean annual temperatures from Scripps Pier and from the California Cooperative Oceanic Fisheries Investigation surveys.

Appendix 5: Additional Retrospective Harvest Rates

Below are retrospective harvest rates based, in graph and table format, on CalCOFI and SIO temperatures from 1950 to 1991. Biomass estimates were not available, so this Appendix uses three hypothetical biomass estimates: 250,000 mt, 700,000 mt, and 1,500,000 mt, representing low, medium, and high biomasses.

Retrospective Harvest Rates when Biomass = 700,000 mt
Harvest Rate
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
1951
1955
1959
1963
1967
1971
1975
1979
1983
1987
1991
Year
SIO 5-15
CC 5-15
CC 10-20
CC 5-20
CC 0-20

Retrospective Harvest Rates when Biomass = 1,500,000 mt
Harvest Rate
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
1951
1955
1959
1963
1967
1971
1975
1979
1983
1987
1991
Year
SIO 5-15
CC 5-15
CC 10-20
CC 5-20
CC 0-20

		SIO					CalCOFI													
Year	Biomass (1+)	SST	Emsy	HG FRAC$_1$	HG$_1$	SIO HR	SST	Emsy	HG FRAC$_{2a}$	HG$_{2a}$	HG FRAC$_{2b}$	HG$_{2b}$	HG FRAC$_{2c}$	HG$_{2c}$	HG FRAC$_{2d}$	HG$_{2d}$	CC$_{2a}$ HR	CC$_{2b}$ HR	CC$_{2c}$ HR	CC$_{2d}$ HR
1951	250,000	16.31	0.021	0.050	4,350	1.7%	15.40	0.133	0.133	11,540	0.133	11,540	0.133	11,540	0.133	11,540	4.6%	4.6%	4.6%	4.6%
1952	250,000	16.42	0.015	0.050	4,350	1.7%	15.35	0.124	0.124	10,769	0.124	10,769	0.124	10,769	0.124	10,769	4.3%	4.3%	4.3%	4.3%
1953	250,000	16.55	0.016	0.050	4,350	1.7%	15.12	0.089	0.089	7,715	0.100	8,700	0.089	7,715	0.089	7,715	3.1%	3.5%	3.1%	3.1%
1954	250,000	16.43	0.015	0.050	4,350	1.7%	14.80	0.037	0.037	3,215	0.100	8,700	0.050	4,350	0.037	3,215	1.3%	3.5%	1.7%	1.3%
1955	250,000	16.40	0.016	0.050	4,350	1.7%	14.69	0.017	0.050	4,350	0.100	8,700	0.050	4,350	0.017	1,503	1.7%	3.5%	1.7%	0.6%
1956	250,000	16.42	0.015	0.050	4,350	1.7%	14.84	0.043	0.050	4,350	0.100	8,700	0.050	4,350	0.043	3,778	1.7%	3.5%	1.7%	1.5%
1957	250,000	16.51	0.015	0.050	4,350	1.7%	14.53	0*	0.050	4,350	0.100	8,700	0.050	4,350	0.000	0	1.7%	3.5%	1.7%	0.0%
1958	250,000	16.65	0.023	0.050	4,350	1.7%	14.91	0.055	0.055	4,756	0.100	8,700	0.055	4,756	0.055	4,756	1.9%	3.5%	1.9%	1.9%
1959	250,000	17.04	0.096	0.096	8,316	3.3%	15.31	0.117	0.117	10,215	0.117	10,215	0.117	10,215	0.117	10,215	4.1%	4.1%	4.1%	4.1%
1960	250,000	17.62	0.346	0.150	13,050	5.2%	16.37	0.284	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1961	250,000	17.81	0.462	0.150	13,050	5.2%	16.20	0.257	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1962	250,000	17.41	0.233	0.150	13,050	5.2%	15.92	0.213	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1963	250,000	16.79	0.040	0.050	4,350	1.7%	15.54	0.154	0.150	13,050	0.154	13,367	0.154	13,367	0.154	13,367	5.2%	5.3%	5.3%	5.3%
1964	250,000	16.44	0.015	0.050	4,350	1.7%	15.87	0.204	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1965	250,000	16.54	0.016	0.050	4,350	1.7%	15.72	0.182	0.150	13,050	0.182	15,813	0.182	15,813	0.182	15,813	5.2%	6.3%	6.3%	6.3%
1966	250,000	16.61	0.020	0.050	4,350	1.7%	15.40	0.132	0.132	11,472	0.132	11,472	0.132	11,472	0.132	11,472	4.6%	4.6%	4.6%	4.6%
1967	250,000	16.68	0.026	0.050	4,350	1.7%	15.27	0.112	0.112	9,766	0.112	9,766	0.112	9,766	0.112	9,766	3.9%	3.9%	3.9%	3.9%
1968	250,000	16.62	0.021	0.050	4,350	1.7%	15.39	0.130	0.130	11,302	0.130	11,302	0.130	11,302	0.130	11,302	4.5%	4.5%	4.5%	4.5%
1969	250,000	16.93	0.067	0.067	5,811	2.3%	16.18	0.254	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1970	250,000	16.90	0.062	0.062	5,378	2.2%	15.35	0.124	0.124	10,812	0.124	10,812	0.124	10,812	0.124	10,812	4.3%	4.3%	4.3%	4.3%
1971	250,000	16.89	0.059	0.059	5,096	2.0%	15.35	0.124	0.124	10,812	0.124	10,812	0.124	10,812	0.124	10,812	4.3%	4.3%	4.3%	4.3%
1972	250,000	16.52	0.015	0.050	4,350	1.7%	15.35	0.124	0.124	10,812	0.124	10,812	0.124	10,812	0.124	10,812	4.3%	4.3%	4.3%	4.3%
1973	250,000	16.48	0.015	0.050	4,350	1.7%	15.16	0.094	0.094	8,182	0.100	8,700	0.094	8,182	0.094	8,182	3.3%	3.5%	3.3%	3.3%
1974	250,000	16.64	0.022	0.050	4,350	1.7%	15.16	0.094	0.094	8,182	0.100	8,700	0.094	8,182	0.094	8,182	3.3%	3.5%	3.3%	3.3%
1975	250,000	16.57	0.017	0.050	4,350	1.7%	15.16	0.094	0.094	8,182	0.100	8,700	0.094	8,182	0.094	8,182	3.3%	3.5%	3.3%	3.3%
1976	250,000	16.42	0.015	0.050	4,350	1.7%	14.30	0*	0.050	4,350	0.100	8,700	0.050	4,350	0.000	0	1.7%	3.5%	1.7%	0.0%
1977	250,000	16.10	0.049	0.050	4,350	1.7%	14.30	0*	0.050	4,350	0.100	8,700	0.050	4,350	0.000	0	1.7%	3.5%	1.7%	0.0%
1978	250,000	16.60	0.019	0.050	4,350	1.7%	14.30	0*	0.050	4,350	0.100	8,700	0.050	4,350	0.000	0	1.7%	3.5%	1.7%	0.0%
1979	250,000	17.09	0.111	0.111	9,657	3.9%	15.69	0.177	0.150	13,050	0.177	15,372	0.177	15,372	0.177	15,372	5.2%	6.1%	6.1%	6.1%
1980	250,000	17.32	0.194	0.150	13,050	5.2%	15.69	0.177	0.150	13,050	0.177	15,372	0.177	15,372	0.177	15,372	5.2%	6.1%	6.1%	6.1%
1981	250,000	17.07	0.106	0.106	9,220	3.7%	15.69	0.177	0.150	13,050	0.177	15,372	0.177	15,372	0.177	15,372	5.2%	6.1%	6.1%	6.1%
1982	250,000	16.98	0.079	0.079	6,891	2.8%														
1983	250,000	17.05	0.098	0.098	8,569	3.4%				no CalCOFI data available										
1984	250,000	17.25	0.167	0.150	13,050	5.2%														
1985	250,000	17.58	0.320	0.150	13,050	5.2%	16.35	0.281	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1986	250,000	17.80	0.454	0.150	13,050	5.2%	16.06	0.234	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1987	250,000	17.87	0.501	0.150	13,050	5.2%	16.03	0.230	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1988	250,000	17.71	0.395	0.150	13,050	5.2%	16.01	0.227	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1989	250,000	17.55	0.308	0.150	13,050	5.2%	16.02	0.228	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1990	250,000	17.24	0.164	0.150	13,050	5.2%	15.85	0.202	0.150	13,050	0.200	17,400	0.200	17,400	0.200	17,400	5.2%	7.0%	7.0%	7.0%
1991	250,000	17.19	0.145	0.145	12,637	5.1%	15.75	0.186	0.150	13,050	0.186	16,180	0.186	16,180	0.186	16,180	5.2%	6.5%	6.5%	6.5%

		SIO					CalCOFI													
Year	Biomass (1+)	SST	Emsy	HG $FRAC_1$	HG_1	SIO HR	SST	Emsy	HG $FRAC_{2a}$	HG_{2a}	HG $FRAC_{2b}$	HG_{2b}	HG $FRAC_{2c}$	HG_{2c}	HG $FRAC_{2d}$	HG_{2d}	CC_{2a} HR	CC_{2b} HR	CC_{2c} HR	CC_{2d} HR
1951	700,000	16.31	0.021	0.050	23,925	3.4%	15.40	0.133	0.133	63,471	0.133	63,471	0.133	63,471	0.133	63,471	9.1%	9.1%	9.1%	9.1%
1952	700,000	16.42	0.015	0.050	23,925	3.4%	15.35	0.124	0.124	59,230	0.124	59,230	0.124	59,230	0.124	59,230	8.5%	8.5%	8.5%	8.5%
1953	700,000	16.55	0.016	0.050	23,925	3.4%	15.12	0.089	0.089	42,434	0.100	47,850	0.089	42,434	0.089	42,434	6.1%	6.8%	6.1%	6.1%
1954	700,000	16.43	0.015	0.050	23,925	3.4%	14.80	0.037	0.037	17,681	0.100	47,850	0.050	23,925	0.037	17,681	2.5%	6.8%	3.4%	2.5%
1955	700,000	16.40	0.016	0.050	23,925	3.4%	14.69	0.017	0.050	23,925	0.100	47,850	0.050	23,925	0.017	8,264	3.4%	6.8%	3.4%	1.2%
1956	700,000	16.42	0.015	0.050	23,925	3.4%	14.84	0.043	0.050	23,925	0.100	47,850	0.050	23,925	0.043	20,777	3.4%	6.8%	3.4%	3.0%
1957	700,000	16.51	0.015	0.050	23,925	3.4%	14.53	0*	0.050	23,925	0.100	47,850	0.050	23,925	0.000	0	3.4%	6.8%	3.4%	0.0%
1958	700,000	16.65	0.023	0.050	23,925	3.4%	14.91	0.055	0.055	26,155	0.100	47,850	0.055	26,155	0.055	26,155	3.7%	6.8%	3.7%	3.7%
1959	700,000	17.04	0.096	0.096	45,739	6.5%	15.31	0.117	0.117	56,182	0.117	56,182	0.117	56,182	0.117	56,182	8.0%	8.0%	8.0%	8.0%
1960	700,000	17.62	0.346	0.150	71,775	10.3%	16.37	0.284	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1961	700,000	17.81	0.462	0.150	71,775	10.3%	16.20	0.257	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1962	700,000	17.41	0.233	0.150	71,775	10.3%	15.92	0.213	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1963	700,000	16.79	0.040	0.050	23,925	3.4%	15.54	0.154	0.150	71,775	0.154	73,519	0.154	73,519	0.154	73,519	10.3%	10.5%	10.5%	10.5%
1964	700,000	16.44	0.015	0.050	23,925	3.4%	15.87	0.204	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1965	700,000	16.54	0.016	0.050	23,925	3.4%	15.72	0.182	0.150	71,775	0.182	86,972	0.182	86,972	0.182	86,972	10.3%	12.4%	12.4%	12.4%
1966	700,000	16.61	0.020	0.050	23,925	3.4%	15.40	0.132	0.132	63,098	0.132	63,098	0.132	63,098	0.132	63,098	9.0%	9.0%	9.0%	9.0%
1967	700,000	16.68	0.026	0.050	23,925	3.4%	15.27	0.112	0.112	53,714	0.112	53,714	0.112	53,714	0.112	53,714	7.7%	7.7%	7.7%	7.7%
1968	700,000	16.62	0.021	0.050	23,925	3.4%	15.39	0.130	0.130	62,162	0.130	62,162	0.130	62,162	0.130	62,162	8.9%	8.9%	8.9%	8.9%
1969	700,000	16.93	0.067	0.067	31,960	4.6%	16.18	0.254	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1970	700,000	16.90	0.062	0.062	29,578	4.2%	15.35	0.124	0.124	59,464	0.124	59,464	0.124	59,464	0.124	59,464	8.5%	8.5%	8.5%	8.5%
1971	700,000	16.89	0.059	0.059	28,029	4.0%	15.35	0.124	0.124	59,464	0.124	59,464	0.124	59,464	0.124	59,464	8.5%	8.5%	8.5%	8.5%
1972	700,000	16.52	0.015	0.050	23,925	3.4%	15.35	0.124	0.124	59,464	0.124	59,464	0.124	59,464	0.124	59,464	8.5%	8.5%	8.5%	8.5%
1973	700,000	16.48	0.015	0.050	23,925	3.4%	15.16	0.094	0.094	45,002	0.100	47,850	0.094	45,002	0.094	45,002	6.4%	6.8%	6.4%	6.4%
1974	700,000	16.64	0.022	0.050	23,925	3.4%	15.16	0.094	0.094	45,002	0.100	47,850	0.094	45,002	0.094	45,002	6.4%	6.8%	6.4%	6.4%
1975	700,000	16.57	0.017	0.050	23,925	3.4%	15.16	0.094	0.094	45,002	0.100	47,850	0.094	45,002	0.094	45,002	6.4%	6.8%	6.4%	6.4%
1976	700,000	16.42	0.015	0.050	23,925	3.4%	14.30	0*	0.050	23,925	0.100	47,850	0.050	23,925	0.000	0	3.4%	6.8%	3.4%	0.0%
1977	700,000	16.10	0.049	0.050	23,925	3.4%	14.30	0*	0.050	23,925	0.100	47,850	0.050	23,925	0.000	0	3.4%	6.8%	3.4%	0.0%
1978	700,000	16.60	0.019	0.050	23,925	3.4%	14.30	0*	0.050	23,925	0.100	47,850	0.050	23,925	0.000	0	3.4%	6.8%	3.4%	0.0%
1979	700,000	17.09	0.111	0.111	53,114	7.6%	15.69	0.177	0.150	71,775	0.177	84,544	0.177	84,544	0.177	84,544	10.3%	12.1%	12.1%	12.1%
1980	700,000	17.32	0.194	0.150	71,775	10.3%	15.69	0.177	0.150	71,775	0.177	84,544	0.177	84,544	0.177	84,544	10.3%	12.1%	12.1%	12.1%
1981	700,000	17.07	0.106	0.106	50,712	7.2%	15.69	0.177	0.150	71,775	0.177	84,544	0.177	84,544	0.177	84,544	10.3%	12.1%	12.1%	12.1%
1982	700,000	16.98	0.079	0.079	37,899	5.4%														
1983	700,000	17.05	0.098	0.098	47,129	6.7%					no CalCOFI data available									
1984	700,000	17.25	0.167	0.150	71,775	10.3%														
1985	700,000	17.58	0.320	0.150	71,775	10.3%	16.35	0.281	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1986	700,000	17.80	0.454	0.150	71,775	10.3%	16.06	0.234	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1987	700,000	17.87	0.501	0.150	71,775	10.3%	16.03	0.230	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1988	700,000	17.71	0.395	0.150	71,775	10.3%	16.01	0.227	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1989	700,000	17.55	0.308	0.150	71,775	10.3%	16.02	0.228	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1990	700,000	17.24	0.164	0.150	71,775	10.3%	15.85	0.202	0.150	71,775	0.200	95,700	0.200	95,700	0.200	95,700	10.3%	13.7%	13.7%	13.7%
1991	700,000	17.19	0.145	0.145	69,501	9.9%	15.75	0.186	0.150	71,775	0.186	88,989	0.186	88,989	0.186	88,989	10.3%	12.7%	12.7%	12.7%

		SIO					CalCOFI													
Year	Biomass (1+)	SST	Emsy	HG FRAC$_1$	HG$_1$	SIO HR	SST	Emsy	HG FRAC$_{2a}$	HG$_{2a}$	HG FRAC$_{2b}$	HG$_{2b}$	HG FRAC$_{2c}$	HG$_{2c}$	HG FRAC$_{2d}$	HG$_{2d}$	CC$_{2a}$ HR	CC$_{2b}$ HR	CC$_{2c}$ HR	CC$_{2d}$ HR
1951	1,500,000	16.31	0.021	0.050	58,725	3.9%	15.40	0.133	0.133	155,792	0.133	155,792	0.133	155,792	0.133	155,792	10.4%	10.4%	10.4%	10.4%
1952	1,500,000	16.42	0.015	0.050	58,725	3.9%	15.35	0.124	0.124	145,384	0.124	145,384	0.124	145,384	0.124	145,384	9.7%	9.7%	9.7%	9.7%
1953	1,500,000	16.55	0.016	0.050	58,725	3.9%	15.12	0.089	0.089	104,157	0.100	117,450	0.089	104,157	0.089	104,157	6.9%	7.8%	6.9%	6.9%
1954	1,500,000	16.43	0.015	0.050	58,725	3.9%	14.80	0.037	0.037	43,398	0.100	117,450	0.050	58,725	0.037	43,398	2.9%	7.8%	3.9%	2.9%
1955	1,500,000	16.40	0.016	0.050	58,725	3.9%	14.69	0.017	0.050	58,725	0.100	117,450	0.050	58,725	0.017	20,285	3.9%	7.8%	3.9%	1.4%
1956	1,500,000	16.42	0.015	0.050	58,725	3.9%	14.84	0.043	0.050	58,725	0.100	117,450	0.050	58,725	0.043	50,997	3.9%	7.8%	3.9%	3.4%
1957	1,500,000	16.51	0.015	0.050	58,725	3.9%	14.53	0*	0.050	58,725	0.100	117,450	0.050	58,725	0.000	0	3.9%	7.8%	3.9%	0.0%
1958	1,500,000	16.65	0.023	0.050	58,725	3.9%	14.91	0.055	0.055	64,200	0.100	117,450	0.055	64,200	0.055	64,200	4.3%	7.8%	4.3%	4.3%
1959	1,500,000	17.04	0.096	0.096	112,269	7.5%	15.31	0.117	0.117	137,901	0.117	137,901	0.117	137,901	0.117	137,901	9.2%	9.2%	9.2%	9.2%
1960	1,500,000	17.62	0.346	0.150	176,175	11.7%	16.37	0.284	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1961	1,500,000	17.81	0.462	0.150	176,175	11.7%	16.20	0.257	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1962	1,500,000	17.41	0.233	0.150	176,175	11.7%	15.92	0.213	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1963	1,500,000	16.79	0.040	0.050	58,725	3.9%	15.54	0.154	0.150	176,175	0.154	180,455	0.154	180,455	0.154	180,455	11.7%	12.0%	12.0%	12.0%
1964	1,500,000	16.44	0.015	0.050	58,725	3.9%	15.87	0.204	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1965	1,500,000	16.54	0.016	0.050	58,725	3.9%	15.72	0.182	0.150	176,175	0.182	213,477	0.182	213,477	0.182	213,477	11.7%	14.2%	14.2%	14.2%
1966	1,500,000	16.61	0.020	0.050	58,725	3.9%	15.40	0.132	0.132	154,877	0.132	154,877	0.132	154,877	0.132	154,877	10.3%	10.3%	10.3%	10.3%
1967	1,500,000	16.68	0.026	0.050	58,725	3.9%	15.27	0.112	0.112	131,843	0.112	131,843	0.112	131,843	0.112	131,843	8.8%	8.8%	8.8%	8.8%
1968	1,500,000	16.62	0.021	0.050	58,725	3.9%	15.39	0.130	0.130	152,579	0.130	152,579	0.130	152,579	0.130	152,579	10.2%	10.2%	10.2%	10.2%
1969	1,500,000	16.93	0.067	0.067	78,446	5.2%	16.18	0.254	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1970	1,500,000	16.90	0.062	0.062	72,601	4.8%	15.35	0.124	0.124	145,957	0.124	145,957	0.124	145,957	0.124	145,957	9.7%	9.7%	9.7%	9.7%
1971	1,500,000	16.89	0.059	0.059	68,799	4.6%	15.35	0.124	0.124	145,957	0.124	145,957	0.124	145,957	0.124	145,957	9.7%	9.7%	9.7%	9.7%
1972	1,500,000	16.52	0.015	0.050	58,725	3.9%	15.35	0.124	0.124	145,957	0.124	145,957	0.124	145,957	0.124	145,957	9.7%	9.7%	9.7%	9.7%
1973	1,500,000	16.48	0.015	0.050	58,725	3.9%	15.16	0.094	0.094	110,459	0.100	117,450	0.094	110,459	0.094	110,459	7.4%	7.8%	7.4%	7.4%
1974	1,500,000	16.64	0.022	0.050	58,725	3.9%	15.16	0.094	0.094	110,459	0.100	117,450	0.094	110,459	0.094	110,459	7.4%	7.8%	7.4%	7.4%
1975	1,500,000	16.57	0.017	0.050	58,725	3.9%	15.16	0.094	0.094	110,459	0.100	117,450	0.094	110,459	0.094	110,459	7.4%	7.8%	7.4%	7.4%
1976	1,500,000	16.42	0.015	0.050	58,725	3.9%	14.30	0*	0.050	58,725	0.100	117,450	0.050	58,725	0.000	0	3.9%	7.8%	3.9%	0.0%
1977	1,500,000	16.10	0.049	0.050	58,725	3.9%	14.30	0*	0.050	58,725	0.100	117,450	0.050	58,725	0.000	0	3.9%	7.8%	3.9%	0.0%
1978	1,500,000	16.60	0.019	0.050	58,725	3.9%	14.30	0*	0.050	58,725	0.100	117,450	0.050	58,725	0.000	0	3.9%	7.8%	3.9%	0.0%
1979	1,500,000	17.09	0.111	0.111	130,370	8.7%	15.69	0.177	0.150	176,175	0.177	207,516	0.177	207,516	0.177	207,516	11.7%	13.8%	13.8%	13.8%
1980	1,500,000	17.32	0.194	0.150	176,175	11.7%	15.69	0.177	0.150	176,175	0.177	207,516	0.177	207,516	0.177	207,516	11.7%	13.8%	13.8%	13.8%
1981	1,500,000	17.07	0.106	0.106	124,474	8.3%	15.69	0.177	0.150	176,175	0.177	207,516	0.177	207,516	0.177	207,516	11.7%	13.8%	13.8%	13.8%
1982	1,500,000	16.98	0.079	0.079	93,024	6.2%														
1983	1,500,000	17.05	0.098	0.098	115,680	7.7%					no CalCOFI data available									
1984	1,500,000	17.25	0.167	0.150	176,175	11.7%														
1985	1,500,000	17.58	0.320	0.150	176,175	11.7%	16.35	0.281	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1986	1,500,000	17.80	0.454	0.150	176,175	11.7%	16.06	0.234	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1987	1,500,000	17.87	0.501	0.150	176,175	11.7%	16.03	0.230	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1988	1,500,000	17.71	0.395	0.150	176,175	11.7%	16.01	0.227	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1989	1,500,000	17.55	0.308	0.150	176,175	11.7%	16.02	0.228	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1990	1,500,000	17.24	0.164	0.150	176,175	11.7%	15.85	0.202	0.150	176,175	0.200	234,900	0.200	234,900	0.200	234,900	11.7%	15.7%	15.7%	15.7%
1991	1,500,000	17.19	0.145	0.145	170,594	11.4%	15.75	0.186	0.150	176,175	0.186	218,427	0.186	218,427	0.186	218,427	11.7%	14.6%	14.6%	14.6%

*Negative CalCOFI fraction

Literature Cited

Jacobson, L. J. and A. D. MacCall. 1995. Stock-recruitment models for Pacific sardine (*Sardinops sagax*). Can. J. Fish. Aquat. Sci. 52:566-577.

Hill, K. T., N. C. H. Lo, B. J. Macewicz, P. R. Crone, and R. Felix-Uraga. 2010. Assessment of the Pacific sardine resource in 2010 for U.S. management in 2011. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC- 469. 137 p.

Hurtado-Ferro, F., and A. E. Punt. 2014. Revised analyses related to Pacific sardine harvest parameters. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195-5020.

Lindegren, M. and D. M. Checkley, Jr. 2013. Temperature dependence of Pacific sardine (*Sardinops sagax*) recruitment in the California Current Ecosystem revisited and revised. Can. J. Fish. Aquat. Sci. 70: 245- 252.

McClatchie, S., R. Goericke, G. Auad, and K. Hill. 2010. Re-assessment of the stock–recruit and temperature–recruit relationships for Pacific sardine (*Sardinops sagax*). Can. J. Fish. Aquat. Sci. 67: 1782–1790.

Pacific Fishery Management Council (PFMC). 1998. Amendment 8 (to the Northern Anchovy Fishery Management Plan) Incorporating A Name Change To: The Coastal Pelagic Species Fishery Management Plan. Pacific Fishery Management Council, Portland, OR.

Pacific Fishery Management Council (PFMC). 2013. April Council meeting Agenda Item I.1.b, Attachment 1, Report of the Pacific Sardine Harvest Parameters Workshop.

COASTAL PELAGIC SPECIES ADVISORY SUBPANEL REPORT ON SARDINE HARVEST FRACTION

The Coastal Pelagic Species Advisory Subpanel (CPSAS) received a briefing from Ms. Lorna Wargo on the Coastal Pelagic Species Management Team (CPSMT) Report (Agenda Item E.2.b), including further analyses regarding sardine harvest fraction. The CPSAS commends the CPSMT for their additional work. This report thoroughly and clearly laid out the similarities and differences among the alternatives. This analysis also is included in the draft Environmental Assessment (EA), *Incorporating the Use of a New Temperature Index into the Calculation of the Pacific Sardine Harvest Guideline Formula*.

The CPSAS continues to support selection of Alternative 2b – a FRACTION range of 10-20 percent using the new CalCOFI temperature index, as recommended by the CPSMT and CPSAS in March and September.

We support alternative 2b for the following reasons identified in the CPSMT Report (Agenda Item E.2.b):

- "…Amendment 13 implemented an additional policy that specifies the lowest HCR be used for annual management, <u>effectively overriding FRACTION's lower bound</u> at lower SSTs. The result was that <u>sardine management post-Amendment 13 became more precautionary, particularly in cooler and low biomass conditions</u>."

- The CPSMT recommends adopting sub-alternative 2b with FRACTION range 10-20 percent because it:
    - Better adheres to the goals and policies adopted under Amendments 8 and 13.
    - Best reflects the range of actual observed temperatures and best aligns with CalCOFI temperatures and the temperature vs. Emsy relationship. This fraction range is comparable to the 5-15 percent relationship using the SIO temperature index.
    - Provides the most flexibility for adaptive management under a broad range of sardine resource and environmental conditions.
    - The lower bound of 10 percent, couched in current policy to select the lowest HCR output, is not substantially different from a lower bound at 5 percent because it defaults to the acceptable biological catch (ABC) control rule in low temperature conditions.
- There is no significant difference in biological performance measures among all the Alternative 2 sub-options in Table A-1. However, the 10-20 percent fraction range provides for more harvest opportunity when biomass and productivity are high, and still restricts harvest when biomass is low, "…thereby preserving current harvest policy."

The CPSAS also notes the recommendation of the Quinault Indian Nation supporting Alternative 2b as consistent with their treaty rights. (Agenda Item E.2.b, Supplemental Tribal Report).

It is important to consider that the harvest control rule effectively accelerates reduction of the fishing rate as biomass declines. In addition, the overlay of the ABC control rule on the harvest guideline (HG) control rule during low temperature/low biomass years further constrains harvest to protect the stock. Council harvest policy since implementation of Amendment 8 has emphasized biomass over catch, acknowledging the importance of sardines in the ecosystem.

As the CPSAS stated in our March and September, 2014 reports, decisions regarding fisheries management require balance. Alternative 2b best achieves the goals and objectives of the CPS Fishery Management Plan, namely to:

- Promote efficiency and profitability in the fishery, including stability of catch
- Achieve optimum yield
- Provide adequate forage for dependent species
- Prevent overfishing

In conclusion, the CPSAS strongly supports the CPSMT recommendation of Alternative 2b as the best option to preserve balance between fishing opportunity and ecosystem needs. The CPSAS recommends that the Council adopt Alternative 2b as the final preferred alternative.

PFMC
11/14/14

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON SARDINE HARVEST FRACTION

The Scientific and Statistical Committee (SSC) reviewed the draft Environmental Assessment (EA) related to harvest control rules for Pacific sardine (Agenda Item E.2.a, Attachment 1). Ms. Lorna Wargo (Coastal Pelagic Species Management Team [CPSMT] Chair) gave a presentation on the alternatives for determining the FRACTION parameter in the harvest guideline (HG) control rule, and outlined the CPSMT analysis of the Alternatives (Agenda Item E.2.b, CPSMT Report). The No Action Alternative bases the HG on temperature measured at Scripps Institution of Oceanography (SIO) and a range for FRACTION of 5 to 15%. The Action Alternatives differ from the No Action Alternative by basing the HG on CalCOFI temperature, and a set of ranges for the FRACTION parameter.

Ms. Wargo summarized how often each of the Action Alternatives would have led historically to equal, higher or lower harvest rates than the current HG control rule. The SSC recommends this information be included in the EA.

Table 1 of the draft EA includes performance measures for a No Action Alternative and Alternatives 2a-2d. However, the technical bases for the calculations underlying the performance measures for the No Action Alternative and for Alternatives 2a-2d are different. Any comparisons between these sets of performance measures are consequently misleading. The analyses on which the performance measures for the No Action Alternative are based did not account for the Overfishing Level (OFL) and Acceptable Biological Catch (ABC) control rules, which will be part of management decision making even if the HG control rule is not changed. This is because there was no requirement for OFLs and ABCs when Amendment 8 to the Coastal Pelagic Species Fishery Management Plan (FMP) was adopted.

The SSC provides the following two options to compare Alternatives 2a-2d with what would happen if HGs are computed using a control rule based on SIO temperature and constraining FRACTION to lie between 5% and 15%. The OFL and ABC control rules will need to be applied along with the HG control rules for both options.

1. Conduct two projections setting FRACTION to 5% and 15% respectively. These two projections will provide results which will bound the outcomes of the No Action Alternative.
2. Conduct projections in which actual CalCOFI temperature data (repeated to yield a long-term time-series) drives recruitment. The performance measures for the No Action Alternative would be computed by basing HGs on Scripps Institute of Oceanography temperature, while the performance measures for Alternatives 2a-2d would be computed by basing HGs on CalCOFI temperature. The SIO and CalCOFI indices will need to be paired to ensure valid comparisons can be made.

Either of these options will allow a comparison between the Action Alternatives and the No Action Alternative.

PFMC
11/15/14

Quinault Indian Nation

POST OFFICE BOX 189 ☐ TAHOLAH, WASHINGTON 98587 ☐ TELEPHONE (360) 276 - 8211

Ms. Dorothy Lowman, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place #200
Portland OR 97220

October 28, 2014

Dear Ms. Lowman,

Per Title 50 of the Code of Federal Regulations (CFR), part 660, the Quinault Indian Nation has been exercising its treaty right to participate in the Pacific sardine fishery since 2012.

After reviewing the alternatives in the Environmental Assessment (November agenda item E.2.a) and the Coastal Pelagic Species Management Team report (November agenda item E.2.b), the Quinault Indian Nation urges you to adopt Sub-alternative 2.b. as your Final Preferred Alternative of Pacific sardine Harvest Parameters. Bounding the FRACTION parameter at 10-20 provides a conservative and safe approach to future sardine fishing, while balancing the needs of Treaty, as well as Non-Treaty, fishers and related economic communities.

Amendment 8 of the Coastal Pelagic Species (CPS) Fishery Management Plan (FMP) was a unique and innovative approach to matching environmental factors to harvest guidelines and has served well in preventing overfishing of the Pacific sardine resource. New models of fishery performance have been integrated into sardine management since then which show that bounding FRACTION at 10-20 with the CalCOFI temperature data provides the best mix of economic performance and biological performance.

Sub-alternative 2.b. provides a conservative approach to fishery management that reduces the volatility and the chances of having fishing curtailed to the point of elimination in any given year. We urge the Council to fully recognize the forethought that was put forth in Amendment 8 in setting a CUTOFF of 150,000 metric tons (mt). The FMP provides for zero targeted fishing when biomass levels go down to this point. 150,000 mt is, based on average size, at least 700 million fish that will remain in the water.

Pacific sardines are an important Tribal resource, and Sub-alternative 2.b. is the best available alternative for maintaining our treaty-right fisheries while minimizing impacts to the resource.

Sincerely,

Ed Johnstone

Ed Johnstone,
Quinault Fisheries Policy Spokesperson

CC David Sones, Tribal Seat, Pacific Fisheries Management Council
Phil Anderson, Director, Washington Department of Fish and Wildlife
Will Stelle, Administrator, NOAA Fisheries West Coast Region

Agenda Item E.2.c
Public Comment
(Full Document Electronic Only)
November 2014

Ms. Dorothy Lowman, Chair
And Members of the Pacific Fishery Management
Council 7700 NE Ambassador Place #100
Portland OR 97220-1384

RE: Agenda Item E.2.c. Sardine Harvest Fraction FPA

Dear Ms. Lowman and Council members,

As a former (retired) member of the CPS Management Team (CPSMT) and responsible for the analysis of the Amendment 8 model that has governed sardine management for more than a decade, I appreciate the Council's consideration of these comments.

The northern sardine stock has been declining for several years due to poor recruitment, and there is concern that it will decline further in the next couple of years. Although no one can predict the environmental conditions that will occur in the future, the pessimistic view is that the northern stock will continue to decline and the optimistic view is that the present warm water conditions will herald increased recruitment.

Whichever occurs first, the past, present and CPSMT-recommended sardine harvest control rules were all designed to automatically regulate the exploitation rates both by reducing the quota and reducing the harvest rates as the stock declines, and by shutting down the fishery if the biomass falls below 150,000 mt.

It appears that the Council now faces two concerns with sardine; (1) revision of the original harvest control rule based on analyses that were carried out in response to new science and (2) dealing with concerns about the recent downward trend in the recruitment of sardine.

REVISION OF THE HARVEST CONTROL RULE:

An exhaustive set of workshops and meetings involving more than 60 people was held over the past two years to respond to a research paper that suggested that sea surface temperature (SST) measured at Scripps Pier was no longer correlated with sardine recruitment success.

The results from the recent sardine workshops confirm that sea surface temperature and other environmental factors have a significant correlation with recruitment success in the northern stock of sardine. The best statistical fit ($R^2 = 0.76$) was with the annual aggregated 5-15 meter midwater temperature from the CalCOFI data (i.e. the non-linear fit with Ln(R/S) in Table APP.E.6 in 1b_ATT1_SARDINE_WKSHP_RPT_APR2013BB.pdf.)

The workshop participants decided that annual SST would cause too much variation in harvest levels so the 3-season temperature time series from the CalCOFI grid was the prime environmental variable in the new sardine simulation model. It should be noted that the R^2 with the 3-season CalCOFI temperature data was lower than the R^2 with the 3-season Scripps Pier SST (0.58 vs 0.61). In fact it appears that it makes little statistical difference which of the five environmental time series was used, as the R^2s with the five 3-season data sets varied only from 0.57 to 0.66.

Population simulations made with the updated information show that the sardine stock is about 50% more productive than shown in the Amendment 8 analysis; (i.e. average surplus production going from 12% to 19%). They also show that productivity drops off much more quickly at higher biomass levels, resulting in

lower biomass in the new model. Median unfished biomass was 2.849 MMT in the Amendment 8 analysis and 1.402 MMT in the Hurtado and Punt analysis.

DEVELOPMENT OF NEW REFERENCE POINTS:

Given the new analyses, new reference points for sardine need to be established. Sardine, like the other CPS species and hake, have highly variable population levels with skewed temporal distribution of biomass, which results in average biomass not being a valid measure of central tendency. For example, median biomass with a MSY fishery is 300,500 mt and the average biomass is hundreds of thousands of metric tons higher (i.e. 571,700 mt : Hurtado and Punt 2014). The average unfished biomass is also much higher than the median (i.e. 1,572,000 vs 1,401,800 mt). To avoid this same problem, the 2013 Pacific hake reference points use medians rather than averages. Due to the highly skewed temporal distribution of biomass in the northern stock of sardine; medians, rather than averages, should be used as reference levels (Table 1).

Table 1. Sardine Reference Points: Based on information in Hurtado and Punt (2014): (biomass and catch in 1000s mt)

Median Unfished Biomass (age 1+)	1,402	
Median Biomass with MSY Fishery (age 1+)	301	
Median Catch with MSY Fishery	52	
Exploitation rate at MSY	19	%
Median Depletion with MSY Fishery	21	%

The new sardine analyses were reviewed by the CPSMT, and after examining additional runs of the Hurtado and Punt model, the management team recommended a harvest control rule that is significantly more conservative than the Amendment 8 rule. If the CPSMT had recommended a neutral rule, that is a rule with the same median (average) depletion as the Amendment 8 control rule, the median (average) depletion would have remained at the same levels as the original rule. (Table 2.) Given the increased productivity and lower unfished biomass levels in the Hurtado and Punt analysis, the comparable harvest rule to the Amendment 8 rule would, in round numbers, be:

	Amendment 8	Hurtado and Punt
CUTOFF	150,000 mt	77,000 mt
MAXCAT	200,000 mt	125,000 mt
FRACTION	5-15%	8-24 %

With the highly skewed temporal distribution of age 1+ biomass, median depletion is the best reference point to describe how conservative or liberal a control rule is. The Amendment 8 control rule had a median depletion of 58% and the CPSMT recommended control rule has a median depletion of 67%. Corresponding average depletions were 64% and 75%.

Table 2. Comparison of Amendment 8 and CPSMT recommended harvest control rules and reference points (biomass and catch in 1000s mt).

	Amendment 8		CPSMT	
CUTOFF	150		150	
MAXCAT	200		200	
FRACTION	5-15	%	10-20	%
Exploitation Rate at MSY	12	%	19	%

Median Unfished Biomass	2,849	1,402
Median Biomass	1,648	945
Median Catch	182	107
Median Depletion	58 %	67 %
Average Depletion	64 %	75 %

The Management Team's recommended harvest control rule has a median depletion that is more than 3 times the Fmsy median depletion.

Clearly, the CPSMT recommended control rule significantly reduces the allocation of surplus production to the fishery in favor of considerably higher biomass levels for forage.

RECENT TRENDS IN SARDINE BIOMASS LEVELS:

There is considerable concern about the fact that the sardine population is declining; however, anyone familiar with either the Amendment 8 sardine analysis or the recent Hurtado and Punt analysis would expect the biomass to have very high variation and would expect the biomass to occasionally go to low levels. Note that with a MSY fishery (i.e. a constant harvest rate of 19%) the median biomass is 300,100 mt and the biomass would be below 400,000 mt in 55.8% of the years (Hurtado and Punt 2014). With the Amendment 8 control rule, the Hurtado and Punt analysis shows that the biomass would be expected to be below 400,000 mt in 7.6% of the years and below 150,000 mt in 4.7% of the years. This analysis shows that the biomass would fall below 400,000 mt in 1.4% of the years if it was unfished.

The time series from the Hurtado and Punt analysis allows visual assessment of the differences in biomass levels and possible ecosystem effects between fished and unfished scenarios (their Figure 8). This information suggests that environmental conditions have the major role in the determination of the size of the sardine stock and it's effect on ecosystem processes. It shows that control rules similar to the original HG J (red line) and variants (blue line) produce population levels that track the unfished population levels. In contrast, the Fmsy scenerio (black line) has multi-decadal periods with very low biomass and it completely misses some population outbreaks (i.e. compare the period between 50 and 100 years in their Figure 8.

Figure 8. Example 150-year time-trajectories of 1+ biomass for three harvest control rule variants. The horizontal gray line indicates 150,000t.

The Council should compare the long-term effects of getting the control rule right in comparison to the very small effect of changing the catch quota in any single year.

It is clear that the northern sardine stock has been declining during a period of colder sea temperatures, that the Scripps Pier SST did not pick up the colder temperatures that occurred further north in the recent decade and that the CalCOFI temperature relationship should therefore be incorporated in the current harvest control rule.

So what are the recent environmental conditions? The SST in the California Current was very cold during the 2013 sardine spawning season and a warm mass of water was advecting towards the west coast in the North Pacific Current (Figure 1). In the 2014 spawning season, SST was anomalously warm in the whole eastern, North Pacific (Figure 2). The most recent data show that a very warm anomaly now covers the entire eastern Pacific (Figure 3). In addition, an El Niño has been forecast to occur this winter, and the strength of this forecast is now questioned, pointing out that we are unable to predict oceanographic conditions more than a few months ahead.

Figure 1. April 1, 2013 sea surface temperature anomaly.

Figure 2. April 3, 2014 sea surface temperature anomaly.

Figure 3. September 15, 2014 sea surface temperature anomaly

What can be forecast for sardine with the presently available information? The cold SST during the 2013 spawning season and little evidence of the 2013 year-class in this year's fishery suggests that we can expect a very small 2013 year-class, and the age 1+ biomass of the northern stock could be expected to fall below 300,000 mt unless the 2014 year-class is fairly strong. If a poor year class is assumed for the warm spawning season of 2014, the biomass would be expected to fall below 250,000 mt

During the population declines in the early 1950s and 1960s, the northern sardine stock abandoned the Pacific Northwest and central California during years when the sea surface temperature was considerably colder than at present. This did not happened during the sardine decline in the early 2000s (Figure 4) and it has not happened during the recent decline as seen in the fact that the 2014 summer season quota was easily caught in the Pacific Northwest and there have been recent sardine landings in central California.

Figure 4.

As one of the principals in both the Amendment 8 and recent analyses, it will be very interesting to me to see if the Council follows the CPSMT recommendation, which is even more precautionary than the Amendment 8 policy, or if it bypasses the very large amount of recent research and analysis illustrating the productivity of the northern sardine stock.

Richard Parrish

References:

Coastal Pelagic Species Management Team Report on Pacific Sardine Harvest Fraction. C1b_Sup_CPSMT_Rpt_SEPT2014BB

International Joint Technical Committee for Pacific hake. 2013. Status of the Pacific hake (whiting) stock in U.S. and Canadian waters in 2013. Final Document. 3/4/2013. 190p.

Hurtado-Ferro, F., and A.E. Punt. 2014. Revised analyses related to Pacific sardine harvest parameters. Pacific Fishery Management Council. Agenda Item I.1.b, Revised Analysis March 2014, 40p.

PFMC, 2013. Draft Report of the Pacific Sardine Harvest Parameter Workshop: Agenda Item I.1.b, Attachment 1, April 2013, 63p.

CALIFORNIA WETFISH PRODUCERS ASSOCIATION
PO Box 1951 • Buellton, CA 93427 • Office: (805) 693-5430 • Mobile: (805) 350-3231 • Fax: (805) 686-9312 • www.californiawetfish.org

October 14, 2014

Ms. Dorothy Lowman, Chair
And Members of the Pacific Fishery Management
Council 7700 NE Ambassador Place #100
Portland OR 97220-1384

RE: Agenda Item E.2 Pacific Sardine Harvest Fraction

Dear Ms. Lowman and Council members,

As Executive Director of the California Wetfish Producers Association (CWPA), representing the majority of coastal pelagic species 'wetfish' fishermen and processors in California, I appreciate your consideration of the following points in the continuing discussion regarding modifications to the sardine harvest control rule (HCR). These comments in part reprise the gist of our earlier testimony. We also highlight comments from Dr. Richard Parrish, one of the authors of Amendment 8, in particular the letter he submitted for the November Briefing Book (Agenda Item F.2.c - Sardine Harvest Fraction FPA).

Council action at the November meeting is to adopt the Pacific sardine harvest fraction. At the March meeting the CPS Management Team and Advisory Subpanel supported a 10-20% range of harvest fractions, as consistent with Amendment 8 policy, bracketing the new E_{msy} of 18% produced in the reanalysis conducted by Felipe Hurtado. At the September meeting, after reanalyzing all the options, the management team reiterated its support for the 10-20% range.

During Council discussion, however, some Council members expressed concern about the Management Team's recommendation, after hearing public comment accusing the CPSMT of choosing a more "aggressive" harvest policy at a time the sardine population appears to be declining. In light of those concerns, the Council did not select a preferred alternative. Yet when questioned by Council staff, Council members unanimously opted against changing Amendment 8 policy to be more conservative.

In his March 2014 letter to the Council, Dr. Parrish stated:

> *"The bottom line is that all of the scenarios in the CPSMT's Table 2 are much more conservative than HG J in Amendment 8; median catch levels are far lower and average depletion levels are considerably higher."*

Dr. Parrish illustrates this point in his November 2014 statement to the Council. Quoting from his letter:

> *Although no one can predict the environmental conditions that will occur in the future, the pessimistic view is that the northern stock will continue to decline and the optimistic view is that the present warm water conditions will herald increased recruitment.*
>
> *Whichever occurs first,* ***the past, present and CPSMT-recommended sardine harvest control rules were all designed to automatically regulate the exploitation rates both by reducing the quota and reducing the harvest rates as the stock declines****, and by shutting down the fishery if the biomass falls below 150,000 mt.*

After comparing average and median reference numbers for both Amendment 8 and the Management Team recommendation, Dr. Parrish notes:

> *The Management Team's recommended harvest control rule has a median depletion that is* ***more than 3 times the Fmsy median depletion.***
>
> ***Clearly, the CPSMT recommended control rule significantly reduces the allocation of surplus production to the fishery in favor of considerably higher biomass levels for forage.***

In reality, as the Management Team stated and Dr. Parrish's analysis illustrates, **the 10-20% Fraction is even MORE CONSERVATIVE than Amendment 8**. The numbers tell the tale. Again quoting from Dr. Parrish's comments:

> *If the CPSMT had recommended a neutral rule, that is a rule with the same median (average) depletion as the Amendment 8 control rule, the median (average) depletion would have remained at the same levels as the original rule. (Table 2.) Given the increased productivity and lower unfished biomass levels in the Hurtado and Punt analysis, the comparable harvest rule to the Amendment 8 rule would, in round numbers, be:*

	Amendment 8	*Hurtado and Punt*
CUTOFF	*150,000 mt*	*77,000 mt*
MAXCAT	*200,000 mt*	*125,000 mt*
FRACTION	*5-15%*	*8-24 %*

Dr Parrish also notes:

> *Sardine, like the other CPS species and hake, have highly variable population levels with skewed temporal distribution of biomass, which results in* ***average biomass not being a valid measure of central tendency****. For example, median biomass with a MSY fishery is 300,500 mt and the average biomass is hundreds of thousands of metric tons higher (i.e. 571,700 mt : Hurtado and Punt 2014). The average unfished biomass is also much higher than the median (i.e. 1,572,000 vs 1,401,800 mt).* ***To avoid this same problem, the 2013 Pacific hake reference points use medians rather than averages. Due to the highly skewed temporal distribution of biomass in the northern stock of sardine; medians, rather than averages, should be used as reference levels*** *…*

And he recommends:

> *With the highly skewed temporal distribution of age 1+ biomass,* ***median depletion is the best reference point to describe how conservative or liberal a control rule is****. The Amendment 8 control rule had a median depletion of 58% and the CPSMT recommended control rule has a median depletion of 67%. Corresponding average depletions were 64% and 75%.*

Dr. Parrish also illustrates the change in ocean conditions as depicted in comparative sea surface temperature anomalies, and makes the point that even with sophisticated technology, we are unable to predict oceanic conditions more than a few months ahead. The current sardine harvest policy already accounts for population fluctuations, and the Management Team recommendation is even more precautionary than Amendment 8. He suggests:

> *The Council should compare the long-term effects of getting the control rule right in comparison to the very small effect of changing the catch quota in any single year.*

In conclusion, we recommend the following:

- Adopt the Management Team recommendation of 10-20% as the Pacific Sardine harvest Fraction parameter
- Support Dr. Parrish's recommendation to use median reference levels to account for the variability in sardine population abundance, similar to hake.

And to repeat an earlier recommendation:

- Now that we're managing the sardine fishery based on the "northern" stock, future work should include reanalysis that incorporates only the northern stock.

Finally, please understand that achieving **Optimum Yield requires balancing both fishery opportunity and economic stability and forage needs.** We would appreciate the Council's recognition of the continuing importance of the sardine resource to California's historic wetfish industry.

Thank you for your attention to these comments.

Best regards,

Diane Pleschner-Steele
Executive Director

October 20, 2014

Ms. Dorothy Lowman, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220
(Submitted via email to pfmc.comments@noaa.gov)

Mr. Charlton Bonham, Director
California Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814
(Submitted via email to Director@wildlife.ca.gov)

RE: Item E.2 Sardine Harvest Fraction

Dear Chair Lowman, Pacific Fishery Management Council members and California Department of Fish and Wildlife Director Bonham:

The Pacific sardine population found in waters off the United States West Coast is in crisis. In March 2014, the National Oceanic and Atmospheric Administration released the latest Pacific sardine stock assessment concluding that the Pacific sardine population has precipitously crashed 74 percent since 2007 with no signs of recovery. While ocean conditions are a contributor to the population collapse, the directed commercial fishery for Pacific sardines accelerates the rate of this decline and impedes the ability of the population to recover. I am concerned about the current collapse of the Pacific sardine population and the subsequent effect the lack of this important forage fish is having on other marine animals that rely on this small, but important fish as a critical part of their diet. As sardine populations have plummeted, I am also concerned about recent increases in Northern anchovy fishing off California, which may place increasing pressure on this important forage fish, and which is currently not actively managed. The last thing we need is for Northern anchovy to be overfished before it has a chance to recover. Therefore, I am writing to request that you do not allow for any increases to the current harvest rate framework for sardines, and that you begin actively managing Northern anchovy by establishing appropriate safeguards to protect this important forage species.

While I commend the Council for reducing sardine catch levels in response to the decline, these actions have not gone far enough. I urge you to take a more precautionary approach to the management of this critical food source by leaving more sardines in the ocean and immediately closing the sardine fishery until the population recovers to healthy levels.

Ocean wildlife like sea lions, whales, dolphins, and seabirds rely heavily on Pacific sardines and Northern anchovies as a critical part of their diets. Yet some species of ocean wildlife are being

severely impacted by a lack of prey. In 2013, more than 1,600 California sea lions were found stranded and malnourished along the Southern California coastline. These sea lion pups were admitted to rehabilitation facilities, emaciated, dehydrated and very underweight for their age because nursing California sea lion pups were not getting the necessary nutrition and fats from their mothers, due to a lack of sardines and anchovies. Also, California brown pelican nesting failures at the Channel Islands and Baja California have been documented, and the nesting failures are occurring because of a lack of Pacific sardines and anchovies. Scientists completed a survey of breeding colonies in Mexico's Gulf of California and found that this year areas that typically host hundreds or thousands of nesting pairs held only a few hundred at most, and in some cases zero nesting pairs. Not only do our oceans need enough Pacific sardines to prevent crises like these, but abundant sardine populations are critical to the recovery of key commercial and recreational fish populations.

I strongly urge your leadership to ensure we leave more sardines in the water to allow the population to recover and prevent increases in anchovy harvest until appropriate management safeguards are in place and the stock is assessed. Sardine management needs to be more conservative, not more aggressive, than it currently is, and there should not be any sardine fishing at this time given the dire status of the Pacific sardine population. Please take precautionary and proactive action for the benefit of ocean wildlife and healthy fisheries.

Sincerely,

The following 4,604 California residents, 620 Oregon residents, 891 Washington residents, and 94 Idaho residents.

First Name	Last Name	City	State	Zip	First Name	Last Name	City	State	Zip
Wayne	Thelwell	SACRAMENTO	CA	95842	S	Packer	Del Mar	CA	92014
Jeff	Abare	Fair Oaks	CA	95628	McKayla	Paddock	Santa Cruz	CA	95060
Johanna	Abate	San Francisco	CA	94109	Grace	Padelford	Los Angeles	CA	90064
Marrisha	Abbot	Boulder Creek	CA	95006	Lisa	Padgalskas	Laguna Beach	CA	92651
Leanne	Abbott	Yucca Valley	CA	92284	Pat	Padilla	Porterville	CA	93257
Lawrence	Abbott	San Leandro	CA	94577	Urmila	Padmanabhan	Fremont	CA	94538
Omar	Abdelghany	San Diego	CA	92128	Janet	Page	Granite Bay	CA	95746
Suzanne	a'Becket	Cupertino	CA	95014	Margot	Paige	Woodland Hills	CA	91364
Maria	Abrahms	Daly City	CA	94015	Roy	Pales	Sebastopol	CA	95472
Paul	Abram	Wishon	CA	93669	Beatriz	Pallanes	Santa Ana	CA	92704
Sally	Abrams	san francisco	CA	94110	Matthew	Palmer	Long Beach	CA	90808
Frank	Ackerman	Walnut Creek	CA	94595	Sharon	Palmer	Petaluma	CA	94952
Sondra Gail	Adam	walnut creek	CA	94595	Rosiris	Paniagua	Altadena	CA	91001
Paige	Adamczyk	Burbank	CA	91505	Bonnie	Pannell	Crockett	CA	94525
Leonard	Adame	Fresno	CA	93728	Jeff	Pantukhoff	San Clemente	CA	92673
Mary	Adams	Folsom	CA	95630	mike	panza	canoga park	CA	91303
Eileen	Adams	Berkeley	CA	94708	Maggie	Pappageorge	Oakland	CA	94609
Spencer	Adams	LOS ANGELES	CA	90034	Robert	Paquette	Pasadena	CA	91107
Melissa	Adams	Huntington Beach	CA	92647	Gabby	paredes	Quail valley	CA	92587
Scott	Adams	Roseville	CA	95747	heather	pargen	whittier	CA	90603
Pamela	Adams	Laguna Beach	CA	92651	Melina	Paris	Palos Verdes Peninsula	CA	90274
A	Adams	Cupertino	CA	95014	Amy	Parish	Los Angeles	CA	90089
David	Adams	Penn Valley	CA	95946	Jason	Park	Arcadia	CA	91006
Elizabeth	Adan	Carmichael	CA	95608	Jennifer	Parker	Los Angeles	CA	90068
Steve	Aderhold	Fallbrook	CA	92028	Colin	Parker	San Diego	CA	92116
Julia	Adkins	Napa	CA	94559	Marie	Parker	Burbank	CA	91506
Jane	Adler	Santa Monica	CA	90405	Robin	Parkes	Encinitas	CA	92023
Maggie	Adrian	North hollywood	CA	91605	Cheryl	Parkins	Oakland	CA	94611
Willy	Aenlle	Altadena	CA	91001	Warren	Parks	Mariposa	CA	95338
Victor	Afanasiev	La Grange	CA	95329	Karen	Parlette	Eureka	CA	95501
Kate	Ague	Menlo Park	CA	94025	elaine	parr	Azusa	CA	91702
Marco	Aguilera	Carlsbad	CA	92008	Orsola	Parra	San Diego	CA	92117
Melissa	Aguirre	Anaheim	CA	92806	Joan	Parrish	Santa Cruz	CA	95060
Edwin	Aiken	Sunnyvale	CA	94087	Amy	Parsons	Redwood City	CA	94062
Evangeline	Airth	Oakland	CA	94609	Ron	Parsons	South San Francisco	CA	94080
Sierra	Aizer	Berkeley	CA	95409	Denise	Parsons	Daly City	CA	94015
Fred	Albach	Burbank	CA	91510	Stacy	pasetta	Los Angeles	CA	90068
Gloria	Albert	Santa Monica	CA	90403	Alison	Paskal	Emeryville	CA	94608
Tim	Albin	torrance	CA	90501	Robert	Paskus	Santa Monica	CA	90402
Susan	Alcott Jardine	Sherman Oaks	CA	91413	John	Pasqua	valley center	CA	92082
John	Aldrich	Long Beach	CA	90815	Jill	Pasquinelli	San Rafael CA	CA	94903
Frances	Alet	Calabasas	CA	91302	Elodie	Patarias	Santa Maria	CA	93455
Marilyn	Alexander	Santa Monica	CA	90404	Atul	Patel	Carlsbad	CA	92009
Thomas	Alexander	quincy	CA	95971	Sarosh	Patel	SUNNYVALE	CA	94087
Natalie	Alexander	Irvine	CA	92620	Philip	Patino	Pico Rivera	CA	90660
Cheryl Ann	Alexander	Los Angeles	CA	90031	Tatjana	Patitz	Los Olivos	CA	93441

Elaine	Alfaro	Felton	CA	95018
Gail	Alford	Santa Rosa	CA	95403
Alice	Alice	Blythe	CA	92226
Dennis	Allen	Santa Barbara	CA	93105
Lynne	Allen	Burbank	CA	91507
Tami	Allen	Westlake Village	CA	91362
Donna	Alleyne-Chin	Montara	CA	94037
Beverly	Allphin	Berkeley	CA	94703
Charles	Almack	Calexico	CA	92231
Gabriel	Almazan	La Verne	CA	91750
Rawan	almomani	monterey park	CA	91755
Gregory	Alper	Pacific Palisades	CA	90272
Laura	Altman	Clovis	CA	93611
Syl	AlTukhaim	Sac	CA	95821
Maria	Alvarez	San Francisco	CA	94115
Sonia	Alvarez	Laguna Niguel	CA	92677
Thomasin	Alyxander	Windsor	CA	95492
Nicole	Amato	Vacaville	CA	95688
Julie	Amato	Mountain View	CA	94043
Ilfredo	Amaya	Covina	CA	91722
Antoinette	Ambrosio	Long Beach	CA	90802
Michael	Ames	Castro Valley	CA	94546
Tom	Amick	Camarillo	CA	93010
Leslie	Ancona	Los Angeles	CA	90045
Jon	Anderholm	Cazadero	CA	95421
Evette	Andersen	Grass Valley	CA	95945
Clark	Anderson	San Francisco	CA	95449
Leslie	Anderson	Walnut Creek	CA	94596
candace	anderson	Galt	CA	95632
janie	anderson	san jose	CA	95123
Judith	Anderson	Long Beach	CA	90807
Jefree	Anderson	San Francisco	CA	94110
Stephen	Anderson	Simi Valley	CA	93063
Nancy	Anderson	San Diego	CA	92128
Joan	Andersson	Topanga	CA	90290
Maribel	Andonian	Cupertino	CA	95014
Leticia	Andreas	El Cerrito	CA	94530
Sharyl	Andreatta	Rancho Murieta	CA	95683
kristy	andres	Oakland	CA	94607
Jean	Andrews	Santa Cruz	CA	95060
Frank	Andrews	San Rafael	CA	94901
Marcia	Andrews	Willits	CA	95490
Phillip	Andrews	La Jolla	CA	92037
J	Angell	rescue	CA	95672
Sophia	Anguiano	Chula Vista	CA	91913
Lisa	Annecone	Santa Rosa	CA	95407
Martin	Ansell	WEST HOLLYWOOD	CA	90069

Cressie	Patterson	Chino	CA	91710
Carol	Patton	KENSINGTON	CA	94708
James	Patton	Los Altos	CA	94024
Steven	Patton	Pacifica	CA	94044
Jasmina	Pavlin	Aptos	CA	95003
Amy	Pawlukiewicz	tarzana	CA	91356
Dale	Payne	South Lake Tahoe	CA	96150
Suzanne	PeÃ±a	Fullerton	CA	92835
Johanne	Peale	Glendora	CA	91741
Steven	Pearce	Vallejo	CA	94589
Bunny	Pearce	LA	CA	90012
Nora	Pearl	petaluma	CA	94952
Greg	Pearl	Hermosa Beach	CA	90254
Ann	Peck	Los Gatos	CA	95031
Sarah	Peck	Capitola	CA	95010
John	Peck	Capitola	CA	95010
Laura	Peck	Indio	CA	92201
Rolf	Pedersen	Oakland	CA	94602
Ashley	Pedersen	San Diego	CA	92108
Josh	Pederson	Santa Cruz	CA	95060
Carlos	Peeler	San Francisco	CA	94102
Jeffrey	Pekrul	San Francisco	CA	94114
Andrea	Pellicani	Santa Rosa	CA	95401
Stephanie	Pellingra	San Jose	CA	95123
Lori	Pellizzari	Costa Mesa	CA	92627
Ernesto	Pellos	San Diego	CA	92120
Nicola	Peluso	Santa Rosa	CA	95405
Wendy	Pendleton	Carmel Valley	CA	93924
Vivian	Penniman	LaQuinta	CA	92253
linda	Penrose	Atascadero	CA	93422
Megan	Penrose	San Francisco	CA	94114
Alison	Peper	Los Angeles	CA	90069
Llauren	Peralta	Los Angeles	CA	90042
Luise	Perenne	Fountain Valley	CA	92708
Margarita	Perez	Sylmar	CA	91342
Marie	Perez	Sacramento	CA	95831
Natalie	Perkins	San Francisco	CA	94107
Robert	Perkins	Newark	CA	94560
William	Perren	Redondo Beach	CA	90277
Karen	Perry	Yucca Valley	CA	92284
P	Perry	hvl	CA	95467
Cyrle	Perry	Orinda	CA	94563
J	Perryman	Daly City	CA	94015
Yuka	Persico	Simi Valley	CA	93065
Joy	Pesigan	San Jose	CA	95126
Susannah	Peskin	San Rafael	CA	94901
MaryAnn	Peters	Los Angeles	CA	90057

gina	ANSON	Orange	CA	92867
Linda	Antone	Santa Barbara	CA	93105
Craig	Antrim	San Pedro	CA	90731
Joshua	Antus	Poway	CA	92064
Annette	Anzalone	Novato	CA	94947
susan	apgar	Tujunga	CA	91042
Laura	Apley	Atascadero	CA	93423
Ramon	Apodaca	San Francisco	CA	94103
Daniela	Apostol	BOULDER CREEK	CA	95006
Robert	Applebaum	San Jose	CA	95135
Anne	Applegate	Sacramento	CA	95866
Marylucia	Arace	Fullerton	CA	92835
Marina	Aragon	El segundo	CA	90245
Jeanette	Araiza	San Francisco	CA	94124
Susaan	Aram	Laguna Beach	CA	92651
Michael	Arbaugh	Milpitas	CA	95035
Nancy	Arbuckle	Redwood City	CA	94061
Tracey	Archer	West Sacramento	CA	95691
Anthony	Arcure	Fresno	CA	93722
Michelle	Ardon	Downey	CA	90241
Cindy	Arent	Aptos	CA	95003
Lynn	Armstrong	El Cerrito	CA	94530
Marsha	Armstrong	Los Gatos	CA	95032
Rebecca	Armstrong	Oakland	CA	94611
Anello	Arne	Castella	CA	96017
Alisa	Arnold	Marina Del Rey	CA	90292
Lisa	Arnone	Bakersfield	CA	93306
Elaine	Aron	Tiburon	CA	94920
Murray	Aronson	West Hollywood	CA	90046
Reevyn	Aronson	Redwood City	CA	94061
Allen	Aronson	Wilimington	CA	90744
Sergio	Arroyo	Anaheim	CA	92805
Lynn	Arthur	Van Nuys	CA	91406
Meli	Arturet	Sd	CA	92109
Andarin	Arvola	Fort Bragg	CA	95437
Britt	Ascher	Lafayette	CA	94549
Sarah	Ashley	Altadena	CA	91001
Kate	Ashley	Redwood City	CA	94061
Leo	Ashton	San Jose	CA	95136
Sissi	Asperti	Laguna Beach	CA	92651
Claudy	Assalit	MONTEREY	CA	93942
J	Atwell	Burbank	CA	91506
Paul	Aubert	Boulder	CA	94941
Lynn	Augstein	sausalito	CA	94965
Jane	August	Topanga	CA	90290
Emma	Ausman	Toluca Lake	CA	91602
Julie	Austin	Los Angeles	CA	90045

Freya	Peters	Carmel Valley	CA	93924
Garrine	Petersen	Sun Valley	CA	91352
Don	Petersen	Pleasanton	CA	94566
Eileen	Petersen	South San Francisco	CA	94080
Alex	Peterson	Stockton	CA	95210
Nancy	Peterson	Scotts Valley	CA	95066
Dale	Peterson	Berkeley	CA	94704
Kim	Peterson	Cloverdale	CA	95425
Jenna	Peterson	Fairfax	CA	94930
Tatyanna	Peterson	Novato	CA	94949
Sheila	Peterson	Fallbrook	CA	92028
Stanley	Peterson	Los Banos	CA	93635
Megan	Peterson	Monrovia	CA	91016
Carolyn	Petis	Santa Clarita	CA	91387
Jim	Petkiewicz	San Jose	CA	95125
Margaret	Petkiewicz	San Jose	CA	95125
Kyle	Petlock	Los Angeles	CA	90042
Chris	Petrakis	Los Angeles	CA	90025
Nancy	Petranto	Novato	CA	94949
Lusine	Petrosyan	Granada Hills	CA	91344
Linda	Petrulias	Cazadero	CA	95421
Gabor	Petry	Oceanside	CA	92054
Tamara	Petty	Sylmar	CA	91342
Lois	Petty	san luis obispo	CA	93405
Lisa	Pezzella	Oceanside	CA	92054
Peter	pfeiffer	Altadena	CA	91001
Wendy	Pfile	San Jose	CA	95139
John	Pham	Encintas	CA	92024
Tami	Phelps	Redding	CA	96003
ray	philips	chico	CA	95928
Regina	Phillips	Winnetka	CA	91306
E	Phillips	Valencia	CA	91355
Annie	Phillips	San Diego	CA	92101
Randall	Phillips	Santa Ana	CA	92701
Tanya	Phillips	Carlsbad	CA	92009
Jim	Phillips	Sonoma	CA	95476
Andy	Philpot	Solvang	CA	93463
Ken	Phungrasamee	Santa Barbara	CA	93109
Julia	Piatt	Santa Ana	CA	92705
Michael	Picardi	Chino Hills	CA	91709
Laureen	Picciani	fort bragg	CA	95437
Vanna	Pichel	Petaluma	CA	94952
Thomas	Pick	L.A.	CA	90018
Tom	Pickens	Danville	CA	94526
Judith	Pickle	Redondo Beach	CA	90278
Janet	Pielke	Claremont	CA	91711
Gretta	Pierret	La Mirada	CA	90638

Lynda	Austin	sacramento	CA	95821
Jean	Autrey	Walnut Creek	CA	94595
Wendy	Aversano	Newport Beach	CA	92657
Theresa	Avila	Pala	CA	92059
Christopher	Aycock	San Francisco	CA	94116
David	Aylward	Mountain View	CA	94043
Diana	Aylward	Woodland Hills	CA	91367
Emilio	Aymat	S.F.	CA	94110
Edie	Azar	Malibu	CA	90265
Michael	azoulai	Woodland hills	CA	91367
Florence	Azria	Los Angeles	CA	90077
Paul	Babbini	Santa Rosa	CA	95401
Helen	Babcock	Ventura	CA	93001
Christina	Babst	W.Hollywood	CA	90069
Laura	Bachelder	manhattan beach	CA	90266
Jon	Bachmann	Playa Vista	CA	90094
Gloria	Badella	forestville	CA	95436
Terry	Badger	paso robles	CA	93446
Shauna	Badheka	Laguna Beach	CA	92651
Mariamelia	Badoza	Sacramento	CA	95828
Veronica	Badzey	HUNTINGTON BEACH	CA	92648
Frank	Baele	Playa del Rey	CA	90293
Nadege	Baer	los angeles	CA	90065
Tracy	Baer	Los Angeles	CA	90066
Cynthia	Baer	Encino	CA	91436
Rosa	Baeza	Reseda	CA	91335
Janet	Bagby	Boulder Creek	CA	95006
Mir	Bahmanyar	Van Nuys	CA	91406
Dawn	Baier	oakhurst	CA	93644
Carol	Baier	San Diego	CA	92103
Larry	Bailey	Redding	CA	96099
Kate	Baird	San Diego	CA	92106
Kenneth	Baird	Templeton	CA	93465
Paul	Baker	Pasadena	CA	91106
Deesa	Balasingam	Salinas	CA	93901
Jolanda	Baldi	Los Angeles	CA	90044
Barbara	Baldock	Monterey	CA	93940
Natylie	Baldwin	Concord	CA	94521
Tanya	Baldwin	Los Gatos	CA	95032
Lee	Baldwin	Norwalk	CA	90650
Shirley	Bales	Oceanside	CA	92056
Kathleen	Bales	Menlo Park	CA	94025
Jeff	Ball	Sacramento	CA	95825
Pamela	Ball	San Leandro	CA	94577
Lee	Ballen	Santa Cruz	CA	94611
Michael	Ballot	Stockton	CA	95207
Ranko	Balog	Irvine	CA	92603

Jason	Pineda	Salinas	CA	93901
Linda	pink	westlake	CA	91359
Tina	Pirazzi	Long Beach	CA	90814
Charlotte	Pirch	Fountain Valley	CA	92708
Jayne	Pitchford	santa monica	CA	90403
Tom	Pitman	Burbank	CA	91506
Peter	Pitsker	Manhattan Beach	CA	90266
Susan	Pittas	Soquel	CA	95073
Valerie	Pittmann	Santa Cruz	CA	95062
Diane	pizza	novato	CA	94949
J	Pizzo	Monterey	CA	93942
Stephanie	Plattner	Los Angeles	CA	90025
Minette	Plaza	sacramento	CA	95822
Miriam	Plotkin	La Mesa	CA	91941
Paula	Plotnick	Los Angeles	CA	90048
Pam	Plummer	long beach	CA	90808
David	Podsakoff	Long Beach	CA	90802
Philippe	Poezach	Los Angeles	CA	90046
Keelin	Pohl	San Rafael	CA	94903
Debra	Polansky	Auburn	CA	95603
Ian	Polcyn	Encinitas	CA	92024
Deborah	Polfus	needles	CA	92363
Melissa	Polick	mill valley	CA	94941
Bret	Polish	Los Angeles	CA	90034
Jeri	Pollock-Leite	ALTADENA	CA	91001
Jon	Polly	San Francisco	CA	94131
Jackie	Pomies	San Francisco	CA	94122
Beverly	Poncia	Lower Lake	CA	95457
Joan	Pool	Vacaville	CA	95687
Kelsey	Poole	Tahoe City	CA	96145
Professor	PoopyPants	Nevada City	CA	95959
Samuel	Popailo	west hollywood	CA	90046
Diana	Pope	Auburn	CA	95602
Frank & Coralee	Poppie	Monterey Park	CA	91755
Eleanor	Porciello	Ventura	CA	93003
Susan	Porter	Pasadena	CA	91103
sharon	porter	Paradise	CA	95969
Ted	Porter	north hollywood	CA	91601
Jon	Porter	Rossmoor	CA	90720
Mari	Postier	Laguna Woods	CA	92637
Kelly	Potter	North Hollywood	CA	91605
Lori	Pottinger	Berkeley	CA	94707
Elisabeth	Potts	Santa Cruz	CA	95060
Stephen	Poulios	San Francisco	CA	94123
Jon	Povill	Topanga	CA	90290
Cynthia	Powell	Newport Beach	CA	92661
Kathleen	Powell	Vallejo	CA	94590

John	Balsano	Winnetka	CA	91306
Darlene	Balzan	Pleasanton	CA	94588
Tins	Banda	Oakland	CA	94609
Lynette	banda	Claremont	CA	91711
Lynette	Banda	Covina	CA	91722
Carol	Banever	los angeles	CA	90046
Barbara	Bank	San Diego	CA	92129
Walter	Bankovitch	Berkeley	CA	94703
Maxine	Banks	Beverly Hills	CA	90210
Graciela	Barajas	San Diego	CA	92102
Diana	Barbee	Calabasas	CA	91302
Amie	Barber	West Hollywood	CA	90046
Diane	Barbera	Sonoma	CA	95476
Lyssette	Barbosa	San Diego	CA	92103
Nancy	Barcellona	Los Angeles	CA	90004
Anne	Barker	San Rafael	CA	94901
Curt	Barlage	Los Angeles	CA	90042
Scott	Barlow	Sunnyvale	CA	94087
Mike	Barnes	Carlsbad	CA	92011
Candice	Barnett	Santa Monica	CA	90405
S.	Barnhart	Berkeley	CA	94705
Cara	Barnhill	Coarsegold	CA	93614
Christopher	Barnickel	San Luis Obispo	CA	93405
Sergio	Baron-Pulecio	Oakland	CA	94611
Kirsten	Barquist	Rohnert Park	CA	94928
Rose	Barragan	Sonoma	CA	95476
Odelkis	Barrera	Montclair	CA	91763
Lynnette	Barrera	La Grange	CA	95329
Keiko	Barrett	National City	CA	91950
George	Barrett Iii	Los Angeles	CA	90025
Tim	Barrington	San Jose	CA	95126
Azya	Barron	Berkeley	CA	94709
Ellen	Barron	Santa cruz	CA	95060
Tiobe	Barron	Oak View	CA	93022
Daniel	Barros	Sunnyvale	CA	94087
Sue	Barry	Beverly Hills	CA	90210
David	Barrymore	Redwood City	CA	94063
Kate	Bartenhagen	San Jose	CA	95123
Ellen	Barth	Berkeley	CA	94707
Mark	Bartleman	Laguna Beach	CA	92651
Joselyn	Bartlett	Caspar	CA	95420
Deanna	Bartlett	Riverside	CA	92509
Carrie	Bartley	San Diego	CA	92116
Alexis	Barton	Davis	CA	95618
Christine	Bassett	Sebastopol	CA	95472
Cindy	Bassman	Toluca Lake	CA	91602
Janis	Bates	Sherman Oaks,	CA	91401

Marcy	Powers	Morgan Hill	CA	95037
Bev-Sue	Powers	Marina Del Rey	CA	90292
Gypsy	Powers	Santa Cruz	CA	95062
claudia	Prado	Brentwood	CA	94513
Carol	Prager	Northridge	CA	91325
Larry	Praissman	sb	CA	93105
Kamal	Prasad	Santa Rosa	CA	95404
Shannon	Prasuhn	Carlsbad	CA	92009
Jim	Pratt	San Diego	CA	92109
Bernice	Precourt	Riverside	CA	92503
Karie	Prescott	Los Angeles	CA	90041
Lynne	Preston	San Francisco	CA	94107
Natalie	Price	San Francisco	CA	94118
Chelsea	Price	Beverly Hills	CA	90212
Bonnie	Price	Spring Valley	CA	91977
Charles	price	Hopland	CA	95449
Launa	Prince	van nuys	CA	91406
Chris	Prince	San Diego	CA	92124
Jenelle	Prins	Emeryville	CA	94608
Fiona	Priskich	Swan View	CA	90210
Penelope	Prochazka	SImi Valley	CA	93063
Mitch	Proctor	San Clemente	CA	92672
Micaela	Pronio	Oakland	CA	94609
Mary	Proteau	Los Angeles	CA	90036
James	Provenzano	Los Angeles	CA	90049
Jeanne	Pryor	Santa Rosa	CA	95409
Steve	Pryputniewicz	Forestville	CA	95436
Cindy	Psareas	Irvine	CA	92612
Richard	Puaoi	Novato	CA	94949
Mark	Pugh	San Francisco	CA	94122
Diane	Pulsifer	Cool	CA	95614
Rose	Puntillo	Los angeles	CA	90048
Russell	Purcey	Rancho Cucamonga	CA	91730
Paula	Purviance	Granite bay	CA	95746
Holly	Putman	Anaheim	CA	92808
Linda	Pydeski	Placentia	CA	92870
Niko	Qaddadeh	Bodega Bay	CA	94923
Michael	Quarterman	LOS ANGELES	CA	90034
Leah	Quenelle	Morgan hill	CA	95037
Nikkelley	Quijano	San Ramon	CA	94582
Mary	Quimby	Arcadia	CA	91006
Melynda	Quinn	Folsom	CA	95630
John	Quinn	Santa Rosa	CA	95409
Mary	Quinn-Dollar	Sonoma	CA	95476
Adam	Quintanilla	South El Monte	CA	91733
George	Quirin	Santa Barbara	CA	93101
Marjorie	Quon	Redwood City	CA	94063

Dianne	Bates	San Francisco	CA	94107
Abigail	Bates	Los Angeles	CA	90034
Glenis	Batley	Burbank	CA	91502
Nonie	Batra	Beverly Hills	CA	90210
David	Batt	Berkeley	CA	94710
Candace	Batten	Los Angeles	CA	90031
Mijanou	Bauchau	Agoura	CA	91301
Alwen	Bauer	Palos Verdes Estates	CA	90274
Karen	Bauer	Boulder Creek	CA	95006
Laurie	Bauer	Rohnert Park	CA	94928
Anna	Bauert	Los Angeles	CA	90211
Miriam	Baum	Alta Loma	CA	91701
Jolianne	Baum	Santa Monica	CA	90405
Wendy	baus	Los Angeles	CA	90057
Robert	Bausch	Belmont	CA	94002
EDWARD	BAUTISTA	SUNNYVALE	CA	94089
G	Baxel	Joshua Tree	CA	92252
ben	Baxter	Running Springs	CA	92382
Monica	Baxter	Redding	CA	96003
Terran	Bayer	San Diego	CA	92126
Judith	Bayer	san diego	CA	92126
Adrine	Bazikyan	Burbank	CA	91501
g	beam	Los Angeles	CA	90101
Brandon	Bean	thousand oaks	CA	91362
Jackie	Bear	Los Angeles	CA	90048
Clara	Beard	Los Angeles	CA	90066
Kirstin	Beard	Anaheim	CA	92805
Jim	Bearden	Milpitas	CA	95035
Barbara	Beasley	Belmont	CA	94002
Dale	Beasley	Visalia	CA	93291
Celia	Beatts	Los Altos	CA	94023
Adina	Beaumont	San Rafael	CA	94901
Corinna	Bechko	Los Angeles	CA	90065
gary	beck	grass valley	CA	95949
Anne	Becker	Saratoga	CA	95070
Carol	Becker	sherman Oaks	CA	91423
Sandy	Becker	Santa Rosa	CA	95404
Marie	Beckham	Aptos	CA	95003
Peter	Bedard	Los Angeles	CA	90042
Margaret	Beebe	Lompoc	CA	93436
Shawn	Beem	San Clemente	CA	92673
Julie	Beer	Palo Alto	CA	94306
Victoria	Behar	Thousand Oaks	CA	91360
Paris	Behroozi	Smartsville	CA	95977
Ann	Bein	Los Angeles	CA	90064
John	BeL	Los Angeles	CA	90065
Charles	Bell	Los Angeles	CA	90066

Paul	Rabjohns	Los Angeles	CA	90027
Tom	Racanelli	San Diego	CA	92110
Allie	Rackerby	riverside	CA	92507
Richard	Racobs	Yucca Valley	CA	92286
Carolin	Radcliff	Sacramento	CA	95841
Brad	Rae	Lake Forest	CA	92630
Christine	Raffetto	healdsburg	CA	95448
Francesca	Rago	Pleasant Hill	CA	94523
Annette	Raible	Petaluma	CA	94952
Diyonne	Raines	Huntington Beach	CA	92648
Terryll	Rainey	San Francisco	CA	94102
Elizabeth	rakestraw	Sebastopol	CA	95472
David	Ramer	San Francisco	CA	94012
Saeed	Rami	WOODLAND HILLS	CA	91365
Hank	Ramirez	San Diego	CA	92116
Jessica	Ramirez	Westchester	CA	90045
Concepcion	Ramirez	Arvin	CA	93203
Vanessa	Ramirez	Atwater	CA	95301
Armando	Ramirez	campbell	CA	95008
Laura	Ramon	La Mirada	CA	90638
Walter	Ramsey	Oakley	CA	94561
Elizabeth	Ramsey	Davis	CA	95616
Eric	Ramstrom	Redding	CA	96002
Anet	Ranaldo	Hollywood	CA	90068
India	Rance	Encino	CA	91316
Phillip	Randall	Woodland Hills	CA	91367
Dee	Randolph	Chico	CA	95926
Louise	Rangel	Santa Paula	CA	93060
Emily	rankin	Orange	CA	92868
Lauren	Ranz	Lafayette	CA	94549
Pradeep	Rao	Palo Alto	CA	94306
Joan	Raphael	San Diego	CA	92126
James	Rasco	Riverside	CA	92501
Valerie	Raskin	san Francisco	CA	94133
Nicole	Raskin	Granada Hills	CA	91344
Dorri	Raskin	Northridge	CA	91326
Virginia	Rater	MB	CA	90266
Adam	Ratner	Mill Valley	CA	94941
Ron	Rattner	San Francisco	CA	94109
Karen	Ratzlaff	Santa Rosa	CA	95404
Lance	Rava	Laguna Niguel	CA	92677
John	Ravenscroft	Berkeley	CA	94705
Dave	Rawcliffe	Pleasanton	CA	94566
Wendy	Rawlings	Long Beach	CA	90808
Sean	Ray	Los Angeles	CA	90069
Carol	Ray	Fontana	CA	92335
Robin	Ray	Orange	CA	92856

Peri	Beller	Oakland	CA	94608
jorrge	belloso-curiel	richmond	CA	94801
Jorge	Belloso-Curiel	Richmond	CA	94801
Susan	Beltran	San Diego	CA	92105
Paul	Belz	Oakland	CA	94611
Joanne	Belzer	San Diego	CA	92103
Alex	Ben	venice	CA	90291
W	Benavides	Manteca	CA	95336
Hilarey	Benda	Los Angeles	CA	90035
Jeanne	Benioff	Redwood City	CA	94062
Elaine	Benjamin	Alpine	CA	91901
Corey	Benjamin	los angeles	CA	90006
Colleen	Benn	VALENCIA	CA	91355
Elizabeth	Bennett	Corralitos	CA	95076
Patricia	Bennett	Atascadero	CA	93422
Maris	Bennett	Antioch	CA	94509
Joli	Bennett	Pacifica	CA	94044
Barbara	Bennigson	Palo Alto	CA	94301
Beth	Bennion	McKinleyville	CA	95519
Tod	Bensen	Woodside	CA	94062
Richard	Benson	Lawndale	CA	93003
Susan	Benson	Calexico	CA	92232
Jango	Bento	West Hollywood	CA	90046
Suzanne	Benton	Toluca Lake	CA	91602
Heide	Benveniste	Los Angeles	CA	90025
Michelle	Berditschevsky	Mount Shasta	CA	96067
Keely	Berg	San Jose	CA	95136
Nicole	Berg	Oakland	CA	94611
Eileen	Bergan	Ventura	CA	93001
Jon	Berges	San Clemente	CA	92673
Darcy	Bergh	San Diego	CA	92102
Colleen	Bergh	Santa Ana	CA	92704
Tari	Berglund	Laguna Beach	CA	92651
Debi	Bergsma	FONTANA	CA	92336
Bryan	Bergstrand	Fortuna	CA	95540
Heather	Berk	Fountain Valley	CA	92708
James	Berkheimer	Fremont	CA	94538
June	Berkhimer	Los Angeles	CA	90067
Diane	Berliner	Los Angeles	CA	90046
Steve	Berman	Berkeley	CA	94703
Paul	Berman	Los Angeles	CA	90048
e B	Berman	Van Nuys	CA	91403
Jennifer	Berman	Los Angeles	CA	90066
Anamaria	Bermeo	Bellflower	CA	90706
Lynda	Bernal	Oxnard	CA	93035
Kevin	Bernhagen	San Francisco	CA	94116
Shauna	Bernie	Agua Dulce	CA	91390
Linda	Ray	San Francisco	CA	94110
Susan	Ray	Los Angeles	CA	90046
Wendy	Raymond	Monrovia	CA	91016
George	Raymond	Palm Springs	CA	92264
Mirella	Raynard	Camarillo	CA	93010
vicki	reagan	Oroville	CA	95966
Mark	Reback	Los Angeles	CA	90042
Stephen	Rebello	Los Angeles	CA	90019
Diana	Rebman	Berkeley	CA	94708
Robert	Rector	Encinitas	CA	92023
Hali	Rederer	SACRAMENTO	CA	95820
Maryellen	Redish	Palm Springs	CA	92264
Linda	Redman	West Hollywood	CA	90069
Lisa	Reed	Rancho Cordova	CA	95742
Gordon	Reed	Huntington Beach	CA	92646
Angel	Reed	San Francisco	CA	94114
Robert	Reed	Lake Elsinore	CA	92530
Roberta	Reed	Huntington Beach	CA	92648
Dirk	Reed	Soquel	CA	95073
Stefany	Reed	San Diego	CA	92117
Austin	Reed	Carmel	CA	93952
Christie	Reed	Concord	CA	94520
Brian	Reelfs	North Hollywood	CA	91601
ted	rees	Mountain View	CA	94040
Ronald	Rees	Orange	CA	92869
Gabrielle	Reeves	Burbank	CA	91505
Geoff	Regalado	Burbank	CA	91503
Karen	Reggio	Castro Valley	CA	94546
A	Reichenthal	Palo Alto	CA	94303
Carl	Reid	Los Angeles	CA	90034
James	Reid	San Francisco	CA	94114
jena	reid	temecula	CA	92592
Karen	Reid	Santa Rosa	CA	95403
Misti	Reif	San Francicso	CA	94118
Christopher	Reiger	San Francisco	CA	94117
Jesse	Reisch	Sebastopol	CA	95472
Stephanie	Remington	Costa Mesa	CA	92627
Michael	Remski	Long Beach	CA	90803
Deborah	Remy	Carmel Valley	CA	93924
Ann	Rennacker	Ft Bragg	CA	95437
Kristen	Renton	North Hollywood	CA	91602
Matthew	Reola	San Clemente	CA	92672
Louisa	Reppucci	San Francisco	CA	94118
Neil	Resico	San Lorenzo	CA	94580
Victoria	Resurreccion	Bellflower	CA	90706
Ethan	Retherford	Eureka	CA	95501
Allan	Reubelt	Vista	CA	92083

Daisy	Berns	Oakland	CA	94611
Barbara	Bersell	los Ãµngeles	CA	90064
Nicole	Bessette	San Clemente	CA	92672
Zan	Best	Redondo Beach	CA	90277
Claudette	Bethune	Carlsbad	CA	92009
Elizabeth	Bettenhausen	Cambria	CA	93428
Annetta	Bettis	Tustin	CA	92780
Linsey	Betts	Claremont	CA	91711
Arturo	Beyeler	San Francisco	CA	94103
Blaze	Bhence	Cypress	CA	90630
K	Bhojwani	Beverly Hills	CA	90210
Barbara	Bibel	Berkeley	CA	94708
Karen	Bien	Clovis	CA	93612
Helen	Bierlich	Los Angeles	CA	90029
Elaine	Bierman	San Diego	CA	92128
Mark	Biewers	Newport Coast	CA	92657
Monique	Biglia	North Hollywood	CA	91601
Eileen	Bill	Santa Rosa	CA	95404
Patti	Biller	Encinitas	CA	92024
Gina	Bilwin	Santa Barbara	CA	93101
Gomi	Bin	Westminster	CA	92683
Dana	Bingham	Corona	CA	92883
Jennifer	Bird	Los Angeles	CA	90039
Tamara	Birdsall	Berkeley	CA	94702
Anne	Bishop	San Ramon	CA	94582
Dru	Bishop	Inglewood	CA	90302
Jill	Bittner	San Francisco	CA	94109
John	Black	Fremont	CA	94555
Hillary	Black	San Pedro	CA	90731
Sandra	Blackburn	La Puente	CA	91744
Kathy	Blackwell	San Francisco	CA	94110
Pat	Blackwell-Marchant	Castro Valley	CA	94552
Richard	Blain	Temecula	CA	92592
Jennifer	Blair	Palm Desert	CA	92211
Patricia	Blair	Los Gatos	CA	95032
Jill	Blaisdell	La Canada Flintridge	CA	91011
Cynthia	Blake	Foresthill	CA	95631
Richard	Blakemore	Mariposa	CA	95338
G	Blanchard	Los Angeles	CA	90008
Carol	Blaney	Redlands	CA	92373
Karl	Blankenbiller	Tujunga	CA	91042
Elise	Blazek	San Jose	CA	95125
michael	blechman	Berkeley	CA	94703
Donald	Blesi	Redwood City	CA	94065
Roland	Bleu	La Mesa	CA	91941
Patricia	Blevins	San Jose	CA	95118
Bambi	Blitz	marina del rey	CA	90292

F	Reuscher	Corona del Mar	CA	92625
Laura	Reyes	Davis	CA	95616
Jim	Reynolds	Montague	CA	96064
Wallace	Rhine	Cazadero	CA	95421
Joseph	Rhoades	Vacaville	CA	95688
Janet	Rhodes	Cathedral City	CA	92234
Marie	Ribatto	Palm Desert	CA	92260
Genevieve	Riber	San Diego	CA	92103
Patty	ricca	Dublin	CA	94568
Kyra	Rice	oakland	CA	94611
Palma	Rice	Oxnard	CA	93035
Megan	Rice	Topanga	CA	90290
Chris	Rice	LA	CA	90049
Grant	Rich	Oakland	CA	94609
Sarah	Richards	Rialto	CA	92376
Jocelyn	Richards	San Francisco	CA	94118
Crisman	Richards	Livermore	CA	94550
Laura	Richardson	Van Nuys	CA	91405
Kimberley	Richardson	Santa Cruz	CA	95062
Thomas	Richman	Los Angeles	CA	90051
Lonna	Richmond	muir beach	CA	94965
Lynette	Ridder	Concord	CA	94521
Catherine	Ridder	Altadena	CA	91001
Christine	Ridgway	Suisun City	CA	94585
Allison	Riemer	Arcata	CA	95521
jon	riendeau	ventura	CA	93002
Marilyn	Rietzel	North Hollywood	CA	91601
Carol	Rigrod	Encino	CA	91316
Cathy	Riker	Palo Alto	CA	94303
jennie	riker	santa barbara	CA	93105
zorine	rinaldi	Santa Monica	CA	90405
Stephanie	Rios	El Cerrito	CA	94530
Jen	Rios	San Jose	CA	95124
Brenda	Rios	Sacramento	CA	95826
Paul	Ripley	Santa Cruz	CA	95062
Robert	Rippetoe	Rancho Mirage	CA	92270
Maria	Riter Wilson	San Dimas	CA	91773
Nancy	Ritter	Los Angeles	CA	90049
swid	rivas	pacifica	CA	94044
Mario	Rivas	Sherman Oaks	CA	91423
Amy	Rivera	Encinitas	CA	92024
Scarlet	Rivera	Encino	CA	91436
Joe	Rivera	monterey park	CA	91754
Clarice	Rivera	Moorpark	CA	93021
Maria	Rivero	San Francisco	CA	94115
Rosalyn	Rivkin	Berkeley	CA	94708
Barbara	Rizzo	Richmond	CA	94804

Clare	Block	San Diego	CA	92130
Inken	Blondiau	San Pedro	CA	90731
Inken	Blondiau	Los Angeles	CA	90731
Larry	Blood	Santa Cruz	CA	95060
Sl	Bloodhart	Half Mon Bay	CA	94019
Richard	Bloom	Cotati	CA	94931
Johnny	Bloom	Manteca	CA	95336
Milton	Blough	Claremont	CA	91711
Truett	Bobo	Santa Cruz	CA	95065
Linda	Boccia	San rafael	CA	94903
Lorie	Bock	Angwin	CA	94508
Loretta	Bodiford	Soulsbyville	CA	95372
Marianna	Bodnar	Winchester	CA	92596
Sondra	Boes	Campbell	CA	95008
Robert	Bogart	San Diego	CA	92129
Phyllis	Bogartz	Tarzana	CA	91335
Radu	Bogdan	Los Angeles	CA	90066
Ronald	Bogin	El Cerrito	CA	94530
Constantine	Bogios	Walnut Creek	CA	94597
Stephen	Bohac	Twain Harte	CA	95383
Beverly	Boise-Cossart	Gaviota	CA	93117
Michele	Bollo	Encinitas	CA	92024
Diane	Bolman	Novato, CA 94949	CA	94949
Diane	Bolon	Santa Ana	CA	92706
Debbie	Bolsky	Santa Monica	CA	90403
maria	bon	simi valley	CA	93063
Lyzette	Bonaparte	Cypress	CA	90630
Ken	Bone	Gilroy	CA	95020
Jay	Bonestell	Los Osos	CA	93402
Rick	Bonilla	San Mateo	CA	94401
Janine	Bonk	fair oaks	CA	95628
Andrea	Bonnett	Altadena	CA	91001
A	Bonvouloir	Sunnyvale	CA	94086
Joseph	Boone	San Luis Obispo,	CA	93401
Carolyn	Boor	Rancho Cucamonga	CA	91730
Rebecca	Booth	San Diego	CA	92110
Greg	Booth	Richmond	CA	94805
Margie	Borchers	santa barbara	CA	93101
Robert	Borchert	Boulder Creek	CA	95006
Michael	Bordenave	fresno	CA	93728
Les	Borean	Torrance	CA	90505
Karen	Borgardt	Rocklin	CA	95765
Barbara	Boros	Santa Barbara	CA	93105
Judith	Borstein	Los Angeles	CA	90026
Beate	Borstelmann-Min	San Francisco	CA	94131
Robert	Bortolin	REDONDO BEACH	CA	90277
Vic	Bostock	Altadena	CA	91001

Patrice	Roarty	Santa Barbara	CA	93103
Gail	Roberts	Jamul	CA	91935
Virginia	Roberts	El Dorado Hills	CA	95762
Darryl	Roberts	Healdsburg	CA	95448
James	Roberts	sugarloaf	CA	92386
Francis	Roberts	El Cajon	CA	92019
Katherine	Roberts	SF	CA	94117
Arleta	Roberts	Long Beach	CA	90804
les	roberts	fresno	CA	93704
Kirstin	Robertson	Napa	CA	94558
Eddy	Robey	Sherman Oaks	CA	91401
Steve	Robey	Berkeley	CA	94708
Jessica	Robie	San Diego	CA	92101
Etta	Robin	Bakersfield	CA	93312
Patricia	Robinson	Garden Grove	CA	92845
Amy	Robinson	San Rafael	CA	94912
Craig	Robinson	Camarillo	CA	93010
Jimmy	Robinson	Redway	CA	95560
Juneko	Robinson	San Rafael	CA	94901
Robert	Robinson	San Diego	CA	92128
David	Robinson	Santa Cruz	CA	95060
Chuck	rocco	simi valley	CA	93065
Silvia	Rocha	Azusa	CA	91702
Candy	Rocha	Los Angeles	CA	90033
Candace	Rocha	Los Angeles	CA	90031
Emilio	Rocha	Downey	CA	90242
Suzette	Rochat	Sebastopol	CA	95472
Maureen	Roche	petrolia	CA	95558
David	Rock	Los Angeles	CA	90042
Terrell	Rodefer	Van Nuys	CA	91405
Colleen	Rodger	San Francisco	CA	94114
Sandy	Rodgers	Carmichael	CA	95608
Dr. Joan	Rodman	Manhattan Beach	CA	90266
Linda	Rodriguez	Visalia	CA	93291
ROCKY	RODRIGUEZ	Pasadena	CA	91103
Josue	Rodriguez	Covina	CA	91722
Natalyn	Rodriguez	Riverside	CA	92505
Carmen	Rodriguez	Union City	CA	94587
Tahirah	Roe	Stockton	CA	95207
Gregg	Roebuck	Los Angeles	CA	90014
Debi	Roemmich	Rancho MIrage	CA	92270
John	Roevekamp	Santa Cruz	CA	95060
madalyn	rofer-choate	ECHO PARK	CA	90026
Judith	Rogers	El Cerrito	CA	94530
Lilith	Rogers	Sebastopol	CA	95473
Helen	Rogers	SACRAMENTO	CA	95865
Prof	Rogers	Laguna Beach	CA	92651

Gavin	Boston	San Francisco	CA	94114
Michele	Boswell	San Diego	CA	92123
David	Bott	Sacramento	CA	95816
Tasha	Boucher	Los Angeles	CA	90066
Chris	Bouckaert	Thousand Oaks	CA	91360
Carrie	Bourget	Aliso Viejo	CA	92656
Rick	Boutin	Red Bluff	CA	96080
Lauren	Bouyea	Muir Beach	CA	94965
Craig	Bovia	Topanga	CA	90290
Karen	Bowden	Escondido	CA	92027
Eleanor	Bowen	Oceanside	CA	92058
Julie	Bower	Lake Forest	CA	92630
Denise	Bowland	Lake Elsinore	CA	92530
Lbowlen	Bowlen	Fresno	CA	93710
Sheila	Bowman	Monterey	CA	93940
Jason	Bowman	Placerville	CA	95667
Candy	Bowman	Sacramento	CA	95823
Heidi	Bowman	Santa Monica	CA	90404
Bruce	Bowser	Bolinas	CA	94924
Janice	Boyd	Valencia	CA	91355
Mame	Boyd	Rancho Mirage	CA	92270
Anna	Boyiazis	Los Angeles	CA	90045
Lea	Boyle	Danville	CA	94526
Kyle	Bracken	Los Angeles	CA	90066
Joan	Brackett	San Jose	CA	95120
Michael	Bradbury	San Bernardino	CA	92405
Jade	Bradbury	Los Gatos	CA	95032
Lori	Braden	San Marcos	CA	92078
Renee	Bradford	studio city	CA	91604
Susan	bradford	san Rafael	CA	94901
Mark	Bradley	Concord	CA	94520
Shelle	Brady	Playa Del Rey	CA	90293
Sarah	Brady	Los Angeles	CA	90026
Cheryl	Braginsky	Monterey	CA	93940
Kimyn	Braithwaite	San Francisco	CA	94114
Roxanne	Braithwaite	Culver City	CA	90230
Leslie	Branco	Visalia	CA	93277
Dennis	Brand	Santa Cruz	CA	95062
Richard	Brandes	Marina del Rey	CA	90292
Sara	Brandon	San Francisco	CA	94121
David	Brandon	Oakland	CA	94607
Tammy	Bransford	Middletown	CA	95461
Gladys	Bransford	Cobb	CA	95426
Kevin	Branstetter	Applegate	CA	95703
Karen	Brant	San Francisco	CA	94117
Eric	Bratcher	Hayward	CA	94544
Rebecca	Braun	Bakersfield	CA	93308

Margaret	Rogers	Redwood City	CA	94062
Stacey	Rohrbaugh	Willits	CA	95490
Mary	Rojeski	santa monica	CA	90405
Raymie	Roland	santa rosa	CA	95405
Mike	Rolbeck	Placerville	CA	95667
Sheri	Rollison	Novato	CA	94945
Nora	Roman	San Francisco	CA	94110
Rebecca	Romans	Oakland	CA	94606
Cynthia	Romer	San Francisco	CA	94108
Valerie	Romero	Quincy,	CA	95971
Audrey	Romero	Thornton	CA	95686
Lloyd	Romine	Magalia	CA	95954
Roberto	Romo	San Francisco	CA	94121
Charlene	Root	Whittier	CA	90602
Danica	Rosales	Placentia	CA	92870
Brittany	Rosas	oxnard	CA	93035
Donna	Rose	Morgan Hill	CA	95037
Rachel	Rose	Fresno	CA	93728
Kiana	Rose	Petaluma	CA	95473
Prema	Rose	Scotts Valley	CA	95066
Shakti	Rose	walnut creek	CA	94595
Peter	Rose	Marina del Rey	CA	90292
Helena	Rosen	Foster city	CA	94404
Larry	Rosenberg	Tahoe City	CA	96145
Jamie	Rosenblood	Los Angeles	CA	90049
Sara	Rosenbrock	castro valley	CA	94552
Henry	Rosenfeld	Riverside	CA	92506
Zachary	Rosenfeld	Riverside	CA	92506
Richard	Rosenthal	Los Angeles	CA	90019
Illia	Rosenthal	San Francisco	CA	94133
Janice	Ross	Atherton	CA	94027
Jonsie	Ross	Santa Clarita	CA	91390
Darlene	Ross	Woodbridge	CA	95258
Melanie	Ross	San Diego	CA	92104
Elizabeth	Ross	San Leandro	CA	94577
Antoinette	Rossi	San Pablo	CA	94806
Steve	Roth	Santa Rosa	CA	95409
David	Rothe	Chico	CA	95928
Eileen	Rothschild	San Jose	CA	95112
Patrik	Rousselot	Kensington	CA	94708
Judith	Routledge	Los Angeles	CA	90077
D	Rowe	Santa Monica	CA	90403
Margaret	Rowe	Santa Rosa	CA	95409
William	Rowland	Los Angeles	CA	90076
Joan	Royal	fallbrook	CA	92028
Brandi	Royster	Long Beach	CA	90802
Nichole	Royston	Huntington Beach	CA	92647

Olympia	bravo	Rialto	CA	92377
Angie	Bray	Venice	CA	90291
Sandra	Brazi	Los Osos	CA	93402
Devren	Breaux	San Jose	CA	95117
Joseph	Breazeale	Concord	CA	94521
Bonnie	Breckenridge	San Diego	CA	92105
Dorothy	Breiner	San Rafael	CA	94901
Paul	Breitkreuz	Corona	CA	92882
Mary	Brennan	Bakersfielf	CA	93307
Nadia	Brenner	Los Osos	CA	93402
Nancy	Brenner	Murrieta	CA	92562
Isis	Brenner-Ward	Ukiah	CA	95482
Rosalind	Bresnahan	San Bernardino	CA	92405
Astrid	Brett	Tustin	CA	92780
Georgia	Brewer	Sherman Oaks	CA	91401
Laurel	Brewer	Moorpark	CA	93021
Kimberly	Bridgeman	La Selva Beach	CA	95076
Joseph	Bridgwater-Rowe	Tulare	CA	93274
Helen	Brierley	Pacific Palisades	CA	90272
Janice	Briggs	Martinez	CA	94553
W	Briggs	Hermosa Beach	CA	90254
Ruth	Bright	Union City	CA	94587
Molly	Brink	Los Angeles	CA	90048
Lisabette	Brinkman	Santa Barbara	CA	93101
Patty	Brinson	saugus	CA	91350
Jordan	Briskin	Palo Alto	CA	94306
Jade	Brite	Los Angeles	CA	90004
Michael and Pamela	Britton	Rancho Cordova	CA	95670
Joanne	Britton	San Diego	CA	92115
Bonnie	Britzman	Brea	CA	92821
David	Broadwater	Atascadero	CA	93422
Jason	Brock	Los Angeles	CA	90045
Blaise	Brockman	Arcadia	CA	91007
Nancy	Brodersen	North Hollywood	CA	91602
Dan	Brook	San Jose	CA	95192
Robin	Brooke	Laguna Beach	CA	92651
Ed	Brooks	Lompoc	CA	93436
Cathy	Brooks	huntington beach	CA	92649
Deborah	Brooks	Irvine	CA	92618
Eric	Brooks	San Francisco	CA	94109
Jennifer	Brooks	Los Altos	CA	94022
Kermit	Brooms	Emeryville	CA	94662
Sharlyn	Brooner	Beverly Hills	CA	90210
Heather	Brophy	Santa Barbara	CA	93109
John	Brophy	Vista	CA	92081
Robert	Brosius	Tarzana	CA	91356
CT	Bross	Walnut Creek	CA	94597

Angelic	Rubalcava	Fontana	CA	92336
Scott	Rubel	Los Angeles	CA	90031
Merrill	Rubens	Santa Monica	CA	90404
Marissa	Rubin	Santa Monica	CA	90405
Lois	Ruble	San Marcos	CA	92078
Jacki	Rucker	ATASCADERO	CA	93422
Peggy	Rudd	San Jose	CA	95123
Mark	Rudningen	Citrus Heights	CA	95621
Christoph	Ruegg	Studio City	CA	91604
Dennis	Ruffer	Santa Clara	CA	95051
Marc	Ruffolo	San Francisco	CA	94121
Suzanne	Rugg	Riverside	CA	92508
Tiffany	Ruiz-Murillo	burbank	CA	91504
paul	Runion	ben lomond	CA	95005
Robert	Rusky	San Francisco	CA	94114
Gaby	Ruso	Arcata	CA	95521
Patrick	Russell	Oakland	CA	94618
Michael	Russell	San Francisco	CA	94110
Maureen	Russell	Burbank	CA	91501
Linda	Russell	Santa Rosa	CA	95402
Caitlin	Russell	Santa Ana	CA	92704
Robin	Russell	Beverly Hills	CA	90210
Robert	Russo	Glendora	CA	91741
Rene	Ruston	Westlake Village	CA	91361
John	Ruttner	San Bernardino	CA	92404
Miri	Rutzky	El Cajon	CA	92019
Luanne	Ryan	Fresno	CA	93720
Anne	Ryan	San Francisco	CA	94121
Dominique	Ryba	Vista	CA	92083
Per	Rydstrom	San Clemente	CA	92674
Gail	Ryland	Pebble Beach	CA	93953
Somia	Saadat	Lake Elsinore	CA	92530
Markos	Saavedra	Moreno Valley	CA	92557
Kathy	Sabatini	Fair Oaks	CA	95628
Rosalind	Sabella Clark	San Anselmo	CA	94960
Roger	Sadler	Highland	CA	92346
Marla	Sadowski	Morro Bay	CA	93442
Sharman	Saffier	Stockton	CA	95207
Nancy	Sagatelian	Pasadena	CA	91106
Kat	Sal	Sherman OAks	CA	91423
Wanda	Salaiz	Merced	CA	95340
Vidal	Salas	Highland	CA	92346
Mila	Salazar	San Francisco	CA	94117
Alicia	Salazar	Los Angeles	CA	90063
Joe	Salazar	Santa Rosa	CA	95407
Tammie	Salem	Oceanside	CA	92057
Frida	Salgado	San Juan Capistrano	CA	92675

Kate	Brotherton	lake forest	CA	92630
Justin	Broussard	Hesperia	CA	92344
Patricia	Brower	San Diego	CA	92104
Walter	Brown	palm desert	CA	92261
Shelly	Brown	Los Angeles	CA	90028
LM	Brown	Santee	CA	92071
Vera	Brown	Redwood City	CA	94065
Allison	Brown	Ventura	CA	93003
Sarah	Brown	Santa Barbara	CA	93108
Wilson	Brown	Atwater	CA	95301
Julia	Brown	Newbury Park	CA	91320
Donna	Brown	Baytown	CA	94965
Bridget	brown	Chowchilla	CA	93610
Emma	Brown	Sacramento	CA	95817
Roderick and Cynthia	Brown	San Diego	CA	92116
deirdre	brownell	burbank	CA	91504
Nigel	Bruce	Los Angeles	CA	90039
edie	bruce	El Cerrito	CA	94530
Jane	Bruce-Munro	Santa Cruz	CA	95062
Scott	Bruner	Alameda	CA	94501
Matthew	Brunner	Blue Lake	CA	95525
Babette	Bruton	Los Gatos	CA	95032
Pat	Bryan	Lemon Grove	CA	91945
Mary	Bryant	Sausalito	CA	94965
Emily	Bryant	Los Alamitos	CA	90720
Scott	Buchanan	SAN ANSELMO	CA	94960
Margaret	Buck	San Clemente	CA	92672
Sharon	Buckley	Fairfield	CA	94534
Laurie	Buckley	N. Hollywood	CA	91602
Kimberley	Buckley	Anaheim	CA	92804
Sharon	Budde	Concord	CA	94521
Heidi	Buech	Marina Del Rey	CA	90292
Antonio	Buensuceso	Poway	CA	92064
Rebecca	Buer	Davis	CA	95618
Dawn	Bugay	sacramento	CA	95823
Mechelle	Buhan	Auburn	CA	95603
Joe	Buhowsky	San Ramon	CA	94582
Richard	Buksa	Long Beach	CA	90815
Jay	Bulgier	Seaside	CA	93955
Susan	Bullen	san rafael	CA	94915
Duponte	Bullock	Alameda	CA	94501
Zandra	Bunce	Truckee	CA	96161
Eugene	Bunch	Alameda	CA	94501
Carmen	Buono	San Jose	CA	95123
dennis	Burge	Ridgecrest	CA	93555
Kat	Burgess	santa monica	CA	90404
Barbara	Burgess	Napa	CA	94559

Dawn	Salisbury	Albany	CA	94706
Tanya	Salof	Arcadia	CA	91006
mats	salomonsson	Castro Valley	CA	94552
Halo	salon	roseville	CA	95678
Antoinette	Samardzic	Los Angeles	CA	90034
Christina	Samson	Long Beach	CA	90805
Malene	Samuelsen	Gualala	CA	95445
Terry	San Cartier	Santa Maria	CA	93455
Mary	Sanborn	Poway	CA	92064
Juanita	Sanchez	San Jose	CA	95118
Paul	Sanchez	Sacramento	CA	95815
Leslie	Sanchez	San Jose	CA	95118
Lynette	Sanchez	Covina	CA	91722
David	Sandage	La Honda	CA	94020
Kevin	Sandbloom	So Pasadena	CA	91031
Petrea	Sandel	Pasadena	CA	91104
Garreth	Sanders	Visalia	CA	93277
David	Sanders	los angeles	CA	90026
Michele	Sanderson	Walnut Creek	CA	94595
michele dawn	sanderson	Walnut Creek	CA	94595
Lou	Sanderson	Capistrano Beach	CA	92624
Austin	Sandler	San Francisco	CA	94133
Gustavo	Sandoval	San Mateo	CA	94403
Alexis	Sandoval	Rancho Cucamonga	CA	91730
Gina	Sanfilippo	san francisco	CA	94114
Julia	Sanford	Van Nuys	CA	91406
Carol	Sangster	Ojai	CA	93024
Dr. Frank W.	Sannella	Stockton	CA	95204
Susan	Sanocki	Azusa	CA	91702
Elizabeth	Sanoff	Santa Cruz	CA	95062
Kathryn	Santana	Bradbury	CA	91008
Severino	Santiago	Foster City	CA	94404
Michele	Santoro	Davis	CA	95616
Ahsheena	Santos	Garberville	CA	95542
Patricia	SANTOS	San Leandro	CA	94577
michael	sarabia	stockton	CA	95207
Cheryl	Sarandrea	San Rafael	CA	94903
Paul	Sardis	Rancho Mission Viejo	CA	92694
Deborah	Sargent	Poway	CA	92064
Ximena	Sarinana	Santa monica	CA	90405
Sabrina	Sarne	Danville	CA	94526
Marijeanne	Sarraille	Pittsburg	CA	94565
David	Sarricks	Running Springs	CA	92382
D.	Sartori	LB	CA	90803
Julie	Sasaoka	concord	CA	94518
John	Satchell	San Miguel	CA	93451
jorge	saucedo	Oakland	CA	94605

Holly	Burgin	Van Nuys	CA	91405
Lyn	Burke	Laguna Niguel	CA	92677
Russell	Burke	Anytown	CA	95446
Ben	Burkhalter	Manhattan Beach	CA	90266
George	Burnash	Rancho Cordova	CA	95670
Scott	Burnell	Los Angeles	CA	90019
Richard	Burnett	Sunnyvale	CA	94085
Rita	Burnham	La Crescenta	CA	91214
Kathryn	Burns	Buena Park	CA	90620
Bruce	Burns	Santa Cruz	CA	95060
RuthBurns	burns	Nuevo	CA	92567
Sophia	Bursulaya	Escondido	CA	92029
Christina	Burton	Apple Valley	CA	92308
Kymberlee	Burton	Foothill Ranch	CA	92610
Robert	Burton	Fowler	CA	93625
Joselynn	Burton	Santa Cruz	CA	95060
Charles	Busby	North Hollywood	CA	91606
Joan	Bush	Thousand Oaks	CA	91360
Anne	Bush	Berkeley	CA	94710
Laurie	Bushman	San Francisco	CA	94114
Sharon	Bushman	Los Angeles	CA	90066
James	Bustamante	SAN DIEGO	CA	92103
Shelley	Butler	Chatsworth	CA	91311
Lisa	Butterfield	Eureka	CA	95501
Judith	Butts	Mountain View	CA	94040
sharon	byers	Downey	CA	90242
Craig	Byrd	Los Angeles	CA	90026
Charles	Byrne	San Francisco	CA	94109
Patricia	Cachopo	Santa Clara	CA	95050
Kevin	Cade	Los Angeles	CA	90013
Francoise	Caillat	Pasadena	CA	91105
Tamara	Cain	Sacramento	CA	95826
Liz	Caine	San Francisco	CA	94109
Christina	Cairns	San Francisco	CA	94123
Carlo	Calabi	Angwin, CA 94508	CA	94508
Socrates	Calderon	Spring Valley	CA	91977
AnneMarie	Call	San Jose	CA	95121
Nancy	Calsbeek	Carlsbad	CA	92009
Armando	Camacho	San Diego	CA	92103
Patrick	Cameron	El Cajon	CA	92021
Pat	cameron	Oceanside	CA	92057
Mike	Cameron	San Diego	CA	92037
Jenna	Camisasca	Laguna niguel	CA	92677
David	Camp	Burbank	CA	91501
Anna	Campa	Hayward	CA	94541
Yvonne	Campbell	Chula Vista	CA	91910
Claudia	Campbell	Sacramento	CA	95816

Susan	Saunders	Los Angeles	CA	90036
Alexandra	Saunders	Danville	CA	94526
Alexandra	Saunders	Pleasanton	CA	94588
Nicole	Savage	San Francisco	CA	94121
Elke	Savala	El Cerrito	CA	94530
Carol	Savary	San Francisco	CA	94131
Sophia	Savich	The Sea Ranch	CA	95497
Carl	Sawyer	Del Mar	CA	92014
Robyn	Saxer	Templeton	CA	93465
Jillian	Saxty	Alameda	CA	94501
Eva-Genevieve	Scarborough	Riverside	CA	92506
Paul	Schaaf	Fremont	CA	94538
Kira	Schabram	Valley Springs	CA	95252
Sandra	Schachter	Carmel Valley	CA	93924
Edie	Schaffer	San Francisco	CA	94112
Raina	Schally	El Granada	CA	94018
Ronaldo	Scheer	LA	CA	90045
Ed	Schehl	Santa Cruz	CA	95063
Barbara	Scheinman	Mission Viejo	CA	92691
Andromeda	Scheller	Modesto	CA	95355
Alan	Schenck	Sunnyvale	CA	94087
Kathie	Schenk	Simi Valley	CA	93063
Teresa	Scherzer	San Francisco	CA	94110
Lauren	Schiffman	El Cerruti	CA	94530
Shanti	Schiller	Laguna Beach	CA	92651
Esther	Schiller	Newbury Park	CA	91320
Christy	Schilling	Glendale	CA	91202
Julie	Schisler	Concord	CA	94518
Rose	Schlecker	SSF	CA	94080
Cathy	Schlesinger	Studio City	CA	91604
Fern	Schlesinger	Murrieta	CA	92562
Hank	Schlinger	Burbank	CA	91501
Babara	Schlitz	belmont	CA	94002
Steven	Schloemer	Santa Cruz	CA	95062
Walter	Schlosser	Los Angeles	CA	90005
Ron	Schmidt	San Francisco	CA	94132
Arne	Schmidt	Los Angeles	CA	90049
Tamara	Schmidt	Berkeley	CA	94708
Molly	Schminke	Berkeley	CA	94702
Ed	Schmookler	Berkeley	CA	94710
Jay	Schneider	Anaheim	CA	92802
Peter	Schneider	Bryn Mawr	CA	92318
stefanie	schneider	Morongo Valley	CA	92256
Leah	Schocket	Newark	CA	94560
William	Schoene	Santa Monica	CA	90405
Deana	Schreindl	Truckee	CA	96161
Mary	Schreiner	Santa Clara	CA	95051

Marilyn	Campbell	Fremont	CA	94555
Michelle	Campbell	San Jose	CA	95123
Allan	Campbell	San Jose	CA	95132
Cindy	Campbell-Carney	Fair Oaks	CA	95628
Joyce	CampbellPhD	Torrance	CA	90505
Kim	Campion	Ventura	CA	93003
ALICIA	CAMPOS	SANTA ROSA	CA	95403
Jim	Canady	Oregon House	CA	95962
Dianita	Canizalez	Santee	CA	92071
A	Cannara	Menlo Pk.	CA	94025
Seychelle	Cannes	Newport Beach	CA	92660
Tom	Canning	calabasas	CA	91302
HC	Cannon	Forestville	CA	95436
Brenda	Cano	Alpine	CA	91901
M	Canter	Tiburon	CA	94920
Rosanne	Capalbo	San Francisco	CA	94112
Marina	Capella	San Pedro	CA	90731
Mark	Cappetta	Rancho Mirage	CA	92270
Dina	Capra	Ventura	CA	93001
Ellen	Caprio	San Diego	CA	92131
Fillip	Caps	Santa Cruz	CA	95065
Junko	Card	Exeter	CA	93221
Geraldine	Card-Derr	Exeter	CA	93221
Richard	Cardella	Hydesville	CA	95547
Sylvia	Cardella	Hydesville	CA	95547
Maria	Cardenas	Azusa	CA	91702
Christina	Cardenas	stevenson ranch	CA	91381
Camille	Cardinale	Los Angeles	CA	90049
Patricia	Cardosa	Sacramento	CA	95833
Michael	Cardoza	Los Angeles	CA	90032
Dina	Carella	Agoura Hills	CA	91301
Jered	Cargman	Los Angeles	CA	90077
Guy	Cargulia	san diego	CA	92120
Walter	Carlin	Del Mar	CA	92014
Rick	Carlos	Martinez	CA	94553
Patricia	Carlson	Los Angeles	CA	90034
Judith	Carlson	Redondo Beach	CA	90278
Glen	Carlson	Cabazon	CA	92230
Judy	Carlson	Newport Beach	CA	92660
David	Carlson	Los Angeles	CA	90069
Matthew	Carlstroem	Berkeley	CA	94707
Andy	Carman	Santa Cruz	CA	95060
Victor	Carmichael	Pacifica	CA	94044
laura	carmona-mancilla	ventura	CA	93001
Summer	Carnahan	San Marcos	CA	92069
Wendy	Carney	Trinidad	CA	95570
Frances	Carney	Encinitas	CA	92024

Amy	Schuchman	Mill Valley	CA	94941
Marian	Schuchman	Mill Valley	CA	94941
Ivor	Schucking	Laguna Beach	CA	92651
Lindon	Schultz	Los Angeles	CA	90026
Lesley	Schultz	Oakland	CA	94610
Bonny	Schumaker	La Canada- Flintridge	CA	91011
Tracey	Schuster	Los Angeles	CA	90025
Arna	Schutz	West Hills	CA	91307
and	Schwartz	Petaluma	CA	94952
Don	Schwartz	Larkspur	CA	94939
Michael	Schwartz	Lake Forest	CA	92630
randy	schwartz	mountain view	CA	94043
Cindy	Schwarz	Pleasant Hill	CA	94523
Thomas	Schweickart	Studio City	CA	91602
Eric	Schweitzer	West Hills	CA	91307
Laura	Sciurba	San Dimas	CA	91773
Sherry	Sclafani	Torrance	CA	90505
John	Scott	Oroville	CA	95965
Wendy	Scott	Ceres	CA	95307
Thomas	Scott	Lake Arrowhead	CA	92352
Celia	Scott	Santa Cruz	CA	95060
Pamela	Scott	Boulder Creek	CA	95006
Greg	Scott	Santa Barbara	CA	93109
L.D.	Scott	Los Angles	CA	90039
Andrea	Scott	Los Angeles	CA	90077
O	Scotti	Los Angeles	CA	90015
Alexandra	Scratch	Sherman Oaks	CA	91423
Kathy	Seal	Santa Monica	CA	90405
Chris	Seaton	santa barbara	CA	93105
Brock	Seaton	Encino	CA	91316
Ann	Seccombe	Redwood City	CA	94061
patrick	seeholzer	Monterey Park	CA	91754
Erica	Seelig	ukiah	CA	95482
John	Sefton	Trabuco Canyon	CA	92678
Rhoda	Seidler	Encino	CA	91436
Suzanne	Selby	Los Angeles	CA	90042
Elijah	Selby	San Francisco	CA	94131
Jennifer	Sellers	Concord	CA	94521
Rob	Seltzer	Malibu	CA	90265
Greg	Semancik	Ontario	CA	91764
Ron	Semenza	San Jose	CA	95119
Aaron	Senegal	Richmond	CA	94804
Eric	Sentianin	Long Beach	CA	90815
Christine	Sepulveda	Anaheim	CA	92802
gerry	sepulveda	chatsworth	CA	91311
christina	serafica	Glendale	CA	91202
Cathie	Serletic	San Francisco	CA	94109

Gina	Carollo	San Diego	CA	92103
Lori	Carone	Valley Village	CA	91607
Caryl	Carr	Palo Alto	CA	94301
J	Carr	Lompoc	CA	93438
Donna	Carr, MD	Encinitas	CA	92024
Coralie	Carraway	Auburn	CA	95602
Margo	Carrera	Carlsbad	CA	92009
Stephen	Carrillo	Fuquay-Varina	CA	94706
Dan	Carrillo	San Bruno	CA	94066
Kathryn	Carroll	Oakland	CA	94611
Kelley	Carroll	Truckee	CA	96161
John	Carroll	Elk Grove	CA	95624
Daniel	Carroll	Palm Springs	CA	92262
Charles	Carroux	Belmont	CA	94002
Lori	Carter	Whittier	CA	90603
Michelle	Carter	San Francisco	CA	94110
Jennifer	Cartmill	palm springs	CA	92262
Carl	Cartwright	Whittier	CA	90605
Jennifer	Cartwright	Costa Mesa	CA	92628
Elizabeth	Carvalho	Calabasas	CA	91302
Edwin	Carvel	san francisco	CA	94109
georgia	carver	Rancho Cordova	CA	95670
Barbara	Casey	Burlingame	CA	94010
Tina	Cash	San Rafael	CA	94901
Barbara	Casillas	Torrance	CA	90501
Stephen	Cass	San Francisco	CA	94117
Michael	Cass	Novato	CA	94947
Angelena	Cassady	Livermore	CA	94550
Scott	Cassell	Napa	CA	94558
Edward	Cassidy	san diego	CA	92103
Killian	Cassidy	escondido	CA	92027
Brian	Cassidy	Capitola	CA	95010
Kathryne	Cassis	Emeryville	CA	94608
REECE	castellano	San Diego	CA	92116
Anthony	Castello	Valencia	CA	91355
Anthony	Castillo	Venice	CA	90291
Marilyn	Caston	San Francisco	CA	94123
Cathy	Castro	Long Beach	CA	90807
Javier	Castro	Covina	CA	91722
Gail	Caswell	San Francisco	CA	94109
Lori	Caudill	Los Osos	CA	93402
Gl	Caviglia	Morgan Hill	CA	95038
David	Cayford	santa rosa	CA	95401
Ruth	Cedeno	Los Angeles	CA	90011
Alfred	Cellier	Rancho Palos Verdes	CA	90275
Rachel	Cellinese	los angeles	CA	90039
Carol	Cenci	Sonoma	CA	95476

Pagasa	Serrano	Norwalk	CA	90650
Gregg	Service	Goleta	CA	93117
Neena	Sessa	South San Francisco	CA	94080
Michael	Sexton	ARLETA	CA	91331
Gordon	Seyfarth	manhattan beach	CA	90266
Elizabeth	Shafer	Huntington Beach	CA	92646
Krupa	Shah	Cincinnati	CA	94903
Mariam	Shah-Rais	Los Angeles	CA	90035
Gerald	Shaia	Sun Valley	CA	91352
Laura	Shamas	Pacific Palisades	CA	90272
Laura	Shames	carlsbad	CA	92009
Evan	Shamoon	LA	CA	90038
David	Shannahoff-Khalsa	Del Mar	CA	92014
Susan	Shapira	San Rafael	CA	94901
Irving	Shapiro	Cypress	CA	90630
James	Sharcot	San Diego	CA	92117
Baebara	Sharma	LOS ANGELES	CA	90029
Amina	Sharma	Santa Monica	CA	90404
Peggy	Sharp	Marina	CA	93933
Judith	Sharp	San DIego	CA	92120
Karen	Sharp	Sacramento	CA	95819
Julie	shaw	Sebastopol	CA	95472
Melinda	Shaw	Cloverdale	CA	95425
frances	shaw	san Diego	CA	92104
Anore	Shaw	San Ramon	CA	94582
Gabriel	Sheets	Merced	CA	95341
Mike	Sheirel	Redding	CA	96003
Mary	Shelton	San Rafael	CA	94903
doug	shepard	Lake Forest	CA	92630
Marilyn	Shepherd	Trinidad	CA	95570
Thomas	Sherer	Indio	CA	92203
Amrit	Shergill	Rancho Santa Fe	CA	92091
George	Sheridan	Garden Valley	CA	95633
Jodi	Sherman	Campbell	CA	95008
David	Sherman	Santa Rosa	CA	95405
Richard	Sherman and family	Berkeley	CA	94707
T	Sherrill	Garden Grove	CA	92845
Jane	Shevtsov	Valley Village	CA	91607
Sundae	Shields	Oxnard	CA	93036
Earl	Shimaoka	Sunnyvale	CA	94086
Fawn	Shimer	Jamestown	CA	95327
Kristy	Shipley	Redladns	CA	92374
rosemarie	shishkin	san francisco	CA	94121
J	Shoemaker	Sacramento	CA	95825
Martha	Shogren	Sebastopol	CA	95472
Amit	Shoham	Oakland	CA	94606
Elizabeth	Shopes	Del mar	CA	92014

Bobbie V.	Centurion	Alameda	CA	94501
Shelley	Cerasaro	Redding	CA	96001
Jayne	Cerny	Inverness	CA	94937
rick	cerutti	kentfield	CA	94914
Carina	Chadwick	Glendale	CA	91206
Holly	Chadwin	Santa Barbara	CA	93110
Joseph	Chaiklin	Concord	CA	94521
Cory	Chamberlain	Novato	CA	94949
Claire	Chambers	Murrieta	CA	92563
Keith	Chambers	SACRAMENTO	CA	95811
Arthur	Chan	Concord	CA	94518
Roberta	Chan	Gualala	CA	95445
stephany	chan	Walnut	CA	91789
Nicole	Chancellor	Bayside	CA	95524
Dolores	Chandler	Redondo Beach	CA	90277
Vickie	Chandler	San Jose	CA	95124
Michele	Chang	Rosemead	CA	91107
Cherie	Chantal	Moorpark	CA	93021
S	Chapek	San Francisco	CA	94118
Bruce	Chapman	Napa	CA	94581
Zoe	Chapman	Whitethorn	CA	95589
Scott	Chapman	san luis obispo	CA	93406
LeAnn	Chapman	Portola	CA	96122
Elizabeth	Char	Berkeley	CA	94702
Elaine	Charkowski	Fort Bragg	CA	95437
Stacie	Charlebois	SEBASTOPOL	CA	95472
Felicia	Chase	Encino	CA	91436
Paul	Chase	Los Angeles	CA	90066
Cheryl	Chase	Stockton	CA	95210
Phyllis	Chavez	Santa Monica	CA	90405
Julian	Chazin	San Pablo	CA	94806
Aimee	Cheek	San Diego	CA	92115
Jean	Cheesman	Santa Barbara	CA	93103
Lois	Cheesman	Sonoma	CA	95476
Melvin	Cheitlin	San Francisco	CA	94109
Allan	Chen	Alameda	CA	94502
J	Chen	Los Angeles	CA	90024
jon	chevelle	Antelope	CA	95843
Peter	Childs	Miranda	CA	95553
Nat	Childs	Miranda	CA	95553
Winnie	Chin	San Francisco	CA	94109
R	Ching	Redondo Beach	CA	90277
Marilyn	Chinivasagam	San Jose	CA	95125
Karen	Chinn	Cloverdale	CA	95425
Natalie	Chipana	Hawthorne	CA	90250
Wendy	Chipps	Rohnert Park	CA	94928
Robert	Chirpin	Northridge	CA	91324

Elizabeth	Shore	san anselmo	CA	94979
Kate	Shorter	HOLLYWOOD	CA	90027
David	Shreve	El Segundo	CA	90245
Michelle	Shrode	Costa Mesa	CA	92626
Joseph	Shulman	San Diego	CA	92115
Carolyn	Shuman	San Francisco	CA	94127
Paula and Laurence	Shuman	Los Angeles, CA	CA	90066
Marguerite	Shuster	Sierra Madre	CA	91024
Thomas	Sickler	Chula Vista	CA	91913
Eric	Siegmann	Westminster	CA	92683
A	Sievert	San Jose	CA	95110
DG	Sifuentes	MAMMOTH LAKES	CA	93546
Liz	Sigel	TUSTIN	CA	92780
Sheila	Silan	Somerset	CA	95684
Alma	Sills	Visalia	CA	93292
Dan	Silver	Los Angeles	CA	90012
Marc	Silverman	Los Angeles	CA	90068
Judy	Silverstein	Monterey	CA	93940
Sivan	Siman-Tov	Sherman Oaks	CA	91403
James	Simcoe	Santa Ynez	CA	93460
MIKE	SIMMONS	San Anselmo	CA	94960
Adrienne	Simmons	Redding	CA	96003
Willard	Simms	Woodland Hills	CA	91367
zoe	simon	Los Angeles	CA	90068
Nancy	Simon	santa barbara	CA	93101
Haidie	Simonet	Fresno	CA	93720
Alice	Simpson	Fulton	CA	95439
Meaghan	Simpson	Fortuna	CA	95540
Edward	Sims	Hayward	CA	94545
Scott	Sinclair	San Rafael	CA	94901
Randle	Sink	Huntington Beach	CA	92649
Amara	Siva	Vista	CA	92081
K	Siwek	Santa Ana	CA	92705
Michael	Sixtus	Santee	CA	92071
Ingrid	Skei	Thousand Oaks	CA	91362
Stacey	Sklute	Los Angeles	CA	90034
Vicki	Slamal	San Clemente	CA	92672
Deirdre	Slater	Oakland	CA	94602
Julie	Slater-Giglioli	West Hollywood	CA	90046
Pam	Slater-Price	Del Mar	CA	92014
Peter	Slattery	Salinas	CA	93907
Suzette	Slaughter	San Francisco	CA	94110
Kevin	Slauson	alameda	CA	94501
Darryl	Slavin	Santa Clarita	CA	91351
Annette	Slikker	Martinez	CA	94553
Susan	Sloan	Los Angeles	CA	90064
Grace	Sloan	Escondido	CA	92027

Albert	Chiu	Oakland	CA	94611
Joseph	Chlubna	El Granada	CA	94018
Maile	Chock	San Jose	CA	95123
Sabrina	Choi	San Jose	CA	95129
Ana	Chou	Palo Alto	CA	94306
Fletcher	Chouinard	ventura	CA	93001
Yvon	Chouinard	ventura	CA	93001
Josi	Chow	Los Angeles	CA	90046
Carolyn	Chris	San Francisco	CA	94112
Patricia	Christen	Oakland	CA	94621
K	Christensen	Baldwin Park	CA	91706
Amy	Christenson	Seaside	CA	93955
Diane	Christiansen	Fesno	CA	93711
janis	Christiansen	Menlo Park	CA	94025
Rick	Christmas	Orcutt	CA	93455
Kelly	Christoffersen	Long Beach	CA	90808
Natalie	Chronister	Camarillo	CA	93012
Sandra	Chrstopher	Burbank	CA	91505
Jonathan	Chu	Freont	CA	94539
Iris	Chynoweth	Midpines	CA	95345
Carla	Cicchi	Placervillle	CA	95667
Al	Cintra-Leite	San Mateo	CA	94403
Oana	Cioaca Taylor	Valencia	CA	91354
laura	cipollari	manhattan beach	CA	90266
monica	cisneros-mcbain	Morgan Hill	CA	95038
Kelley	Clare	Tahoe City	CA	96145
Jennifer	Clark	Moss Beach	CA	94038
Gillian	Clark	Culver CIty	CA	90232
Julie	Clark	Forestville	CA	95436
Diana	Clark	Rancho Santa Fe	CA	92067
Mary	Clark	Simi Valley	CA	93065
Steph	Clark	concord	CA	94520
Donna	Clark	Alhambra	CA	91803
Susan	Clark	San Miguel	CA	93451
David	Clark	Saratoga	CA	95070
Rachel	Clark	Los Angeles	CA	90023
Leigh	Clark	Granada Hills	CA	91344
Frances	Clark	Needles	CA	92363
Jeffrey	Clark	Anaheim	CA	92806
Kim	Clark	Sierra Madre	CA	91024
Darrell	Clarke	Pasadena	CA	91101
Walter	Claus	Los Angeles	CA	90066
Ted	Clausen	Healdsburg	CA	95448
Ana	Claybourne	Sacramento	CA	95814
Carol	Clements	Glendale	CA	91206
Kathy	Clements	Orange	CA	92867
Stephanie	Clemons	Alta Loma	CA	91701

John	Sloman	Woodland Hills	CA	91364
Judy	Smario-Johnson	Hayward	CA	94545
Wesley	Smart	Bellflower	CA	90706
Virginia	Smedberg	Palo Alto	CA	94301
Mariah	Smethwyck	Concord	CA	94520
Terra	Smiddy	Irvine	CA	92612
maggie	smith	Felton	CA	95018
Holli	Smith	San Francisco	CA	94114
Margaret	Smith	Aptos	CA	95003
Larry	Smith	Walnut Creek	CA	94596
Carrie	Smith	Pomona	CA	91766
Nancy	Smith	San Diego	CA	92106
Nancy	Smith	San Jose	CA	95124
Lindsay	Smith	Santa Rosa	CA	95407
Bret	Smith	Santa Cruz	CA	95063
Richard	Smith	Woodland Hills	CA	91367
Clark	Smith	Berkeley	CA	94708
Linda	Smith	Carmel	CA	93921
I	Smith	West Hollywood	CA	90069
Evan	Smith	San Francisco	CA	94114
Jennifer	Smith	Vallejo	CA	94591
Julie	Smith	Los Osos	CA	93402
David	Smith	Irvine	CA	92617
Patricia	Smith	Oakland	CA	94611
Nicki	Smith	Palo Alto	CA	94301
Judith	Smith	Oakland	CA	94601
Donna	Smith	Pinole	CA	94564
Darrel	Smith	Grass Valley	CA	95945
Lori	Smith	Clovis	CA	93612
Gayle	Smith	Carmel	CA	93923
Elizabeth	Smith	vista	CA	92081
marci	smith	Tehachapi	CA	93561
Scott	Smith	Berkeley	CA	94703
Arlene	Snooks	Ventura	CA	93004
M	Snow	Santa Clara	CA	95051
Theodore	Snyder	Granada Hills	CA	91344
jon	snyder	Upland	CA	91784
April	Snyder	san marcos	CA	92069
Emily	Snyder	Crockett	CA	94525
Joanne	Snyder	San Diego	CA	92123
Tiffiny	Snyder	San Juan Capistrano	CA	92675
Stephanie	Snyder	Willits	CA	95490
Faye	Soares	Pollock Pines	CA	95726
David	Soares	Pollock Pines	CA	95726
Alan	Socol	Los Angeles	CA	90019
Julie	Soinila	Redwood Valley	CA	95470
Isabelle	Soleil	Venice	CA	90291

Susan	Cliff	Mount Shasta	CA	96067
Ruth	Clifford	San Jose	CA	95126
Devlon	Clouser	Novato	CA	94949
Chantal	Cloutier	los olivos	CA	93441
Scott	Coahran	Los Banos	CA	93635
Joe	Coakley	Dublin	CA	94568
Michele	Coakley	Rancho Cordova	CA	95670
kylie	cobb	GREENBRAE	CA	94904
Don	Coburn	Napa	CA	94559
Lynne	Coenen	Costa Mesa	CA	92626
Cameron	Coffman	North Hollywood	CA	91601
Lisa	Coffman	Palo Alto	CA	94303
Howard	Cohen	Palo Alto	CA	94306
Eileen	Cohen	Berkeley	CA	94702
Dolores	Cohenour	San Diego	CA	92106
Elizabeth	Cole	Burlingame	CA	94010
Carole	Cole	Santa Barbara	CA	93103
Patricia	Cole	San Francisco	CA	94109
Judith	Collas	Pacific Palisades	CA	90272
Hugh	Collier-Byrd	Redwood City	CA	94062
Suzanne	Collins	San Francisco	CA	94112
Rebekah	Collins	Fairfax	CA	94930
Kim	Collins	Belmont	CA	94002
Carolyn	Collins	SAN DIEGO	CA	92128
Laura	Collins	sacramento	CA	95818
Carlos	Colon	Friant	CA	93626
Steve	Colton	Glendale	CA	91206
James	Columbia	Bakersfield	CA	93306
Leslie	Colyer	Hercules	CA	94547
David	Comfort	Santa Rosa	CA	95404
Denise	Comiskey	McKinleyville	CA	95519
Sandy	Commons	Sacramento	CA	95821
Janine	Comrack	Ojai	CA	93023
Anthony	Condelli	Grover Beach	CA	93433
ELIZABETH	CONGO	Monterey	CA	93940
ray	conlon	Monterey Park	CA	91754
Kristen	Conner	San Pablo	CA	94806
Cindi	Conners	Big Bear Lake	CA	92315
Cherie	Connick	Crescent City	CA	95531
Julie	Connolly	San Diego	CA	92101
James	Connolly	Chico	CA	95926
Arthur	Connor	Idyllwild	CA	92549
Sonia	Connors	Santa Barbara	CA	93109
Jamie	Conrad	San Leandro	CA	94577
Steve	Conrad	Cedar Glen	CA	92321
K	Conrad-Antoville	Arcata	CA	95518
Faith	Conroy	Calabasas	CA	91372
Dorina	Solymar	Hollywood	CA	90046
Erica	Sommers	ventura	CA	93004
Mildred	Sondermann	Los Angeles	CA	90049
Rachel	Sonnenblick	Santa Cruz	CA	95062
S	Soo	Alameda	CA	94501
Janet	Soppeland	Barstow	CA	92311
Carl	Sorem	Livermore	CA	94550
Rofek	Sos	Santa Ana	CA	92707
Gabriela	Sosa	Hollywood	CA	90027
Diana	Soto	San Francisco	CA	94112
Dayana	Soudin	Calabasas	CA	91302
Amanda	Sousa	San Diego	CA	92109
James	South	Torrance	CA	90505
Steve	Souza	Vacaville	CA	95688
Allison	Souza	San Diego	CA	92109
Tony	Souza	Grass Valley	CA	95945
Mike	Souza	San Diego	CA	92108
Michael	Spadoni	Rail Road Flat	CA	95248
Chris	Spanos	Los Angeles	CA	90048
Linda	Spanski	Oceanside	CA	92054
jon	spar	palo alto	CA	94301
Rick	Sparks	Toluca Lake	CA	91602
D.	Sparks	Los Angeles	CA	90029
Dana	Spautz	La Crescenta	CA	91214
M	Spear	Jamul	CA	91935
Jeremy	Spencer	Pacifica	CA	94044
Brent	Spencer	Long Beach	CA	90808
D	Spencer	San Diego	CA	92104
Gayle	Spencer	Menlo Park	CA	94025
Jennifer	Spencer	San Diego	CA	92119
Chuck	Spencer	Long Beach	CA	90801
Janine	Sperandeo	Culver City	CA	90232
Karen	Spiegel	Burbank	CA	91501
Margery	Spielman	Ventura,	CA	93001
Ashley	Spiker	San Diego	CA	92102
Lynn	Spina	Ventura	CA	93001
Jon	Spitz	Laytonville	CA	95454
Leslie	Spoon	Los Osos	CA	93402
Johanna	Spooner	Santa Clara	CA	95054
Robin	Springer	San Francisco	CA	94103
R	St Angelo	Cloverdale	CA	95425
Aj	St. Clair	Santa Monica	CA	90405
Lynne	St.John	Santee	CA	92071
Dennis	St.Pierre	Forest Knolls	CA	94933
Ken	Stack	Los Angeles	CA	90026
Martha	Stainninger	Yucca Vallet	CA	92284
John	Stallone	San Jose	CA	95125

Esther	Conrriquez	San Diego	CA	92113
Barbara	Consbruck	Sylmar	CA	91342
Cathy	Consoli	Whittier	CA	90604
Juanita	Contreras	San Francisco	CA	94110
Cristian	Contreras	Bell	CA	90201
gaby	contreras	LA	CA	90018
barbara	converse	L.A.	CA	90066
Terry	Cook	Palm Springs	CA	92262
Gordon	Cook	Penn Valley	CA	95946
Jerrold	Cook	Thousand Oaks	CA	91362
dan	cooley	san pablo	CA	94806
Maria	Cooper	newport beach	CA	92658
Sandra	Cope	Irvine	CA	92612
Sebastian	Copeland	Los Angeles	CA	90046
Patricia	Copenhaver	Vallejo	CA	94589
Peter	Corkey	San Francisco	CA	94121
George	Cornell	Pleasanton	CA	94588
Sophia	corpus	Garden Grove	CA	92841
Sylvea	Corrie	Irvine	CA	92612
Anne	Corrigan	San Diego	CA	92104
Lilia	Cortes	San Jose	CA	95112
MC	Corvalan	Redondo Beach	CA	90278
Cecil	Corwin	San Francisco	CA	94102
Deborah	Cosentino	Sacramento	CA	95864
Charlie	Costello	Berkeley	CA	94708
Carol	Cotton	Folsom	CA	95630
Jack	Couch	Sacramento	CA	95823
Jennifer	Coute	Oakland	CA	94611
Sandi	Covell	San Francisco	CA	94112
Dave	Cowen	San Diego	CA	92127
Caryn	Cowin	South Pasadena	CA	91030
Bonnie	Cox	Newport Beach	CA	92660
Amber	cox	Newport Beach	CA	92664
nora	coyle	Anaheim	CA	92807
Stephen	Coyle	Oakland	CA	94611
Jeanne	Crabb	Fremont	CA	94536
Taylor	Crandall	La Jolla	CA	92037
William	Crane	CHATSWORTH	CA	91311
Courtney	crane	Laguna hills	CA	92653
Mark	Crane	Elk Grove	CA	95758
Steve	Crase	Antioch	CA	94509
Erin	Crawford	oakland	CA	94608
Sheilagh	Creighton	Fairfax	CA	94930
Irene	Creighton	Palm Desert	CA	92260
Kathleen	Cridge	Rough and Ready	CA	95975
Marla	Crites	Chico	CA	95928
Cynthia	Crittenton	Newbury Park	CA	91320

Steven	Standard	Los Angeles	CA	90023
Suzanne	Stanford	Granite Bay	CA	95746
Joanna	Stanford	Palm Desert	CA	92260
Mary	Stanke	Richmond	CA	94805
Colleen	Stanturf	Davis	CA	95616
Emma	Stark	Los Angeles	CA	90068
jan	stark	westminister	CA	92683
Linda	Start	Rancho Cucamonga	CA	91701
Jill	Stassinos	Carpinteria	CA	93013
Carrie	Staton	Santa Cruz	CA	95060
carrie	STAUBER	los angeles	CA	90039
Roberta	Stauffacher	Belmont	CA	94002
Mary	Stawski	Sausalito	CA	94965
James	Stearns	Chico	CA	95926
Barrie	Stebbings	Bolinas	CA	94924
Tanya	Stedman	Redding	CA	96001
Jenifer	Steele	Berkeley	CA	94703
Mary	Steele	Laguna Niguel	CA	92677
Karen	Steele	Landers	CA	92285
Cheryle	Steele	La Habra	CA	90631
Wayne	Steffes	Redding	CA	96001
Bonnie	Steiger	San Francisco	CA	94109
Amy	Steiner	San Francisco	CA	94109
Neal	Steiner	Los Angeles	CA	90034
Robert	Stellato	REDWOOD CITY	CA	94063
Mathew	Stephenitch	Riverside	CA	92505
Aubree	Stephens	Yucaipa	CA	92399
John	Steponaitis	San Francisco	CA	94109
laurie	stern	El Cerrito	CA	94530
Rose-Leslye	Stern	Oxnard	CA	93030
David	Sternberg	San Francisco	CA	94118
Melissa	Stevens	oakland	CA	94609
susan	stevick	Atherton	CA	94027
Laura	Stewarr	Vista	CA	92083
Jan	Stewart	Hermosa Beach	CA	90254
Katie	Stewart	Nipomo	CA	93444
John	Stewart	Redway	CA	95560
Glenn	Stewart	La Verne	CA	91750
Michele	Stewart	Vista	CA	92081
Rebecca	Stewart	Sacramento	CA	95833
Nancy	Stewart	Altadena	CA	91001
Jeffrey	Stewart	Igo	CA	96047
Angela	Steyer	Redwood City	CA	94062
John	Stickney	mill valley	CA	94941
Deanne	Stiff	Santa Barbara	CA	93105
Eric	Stiff	Santa Barbara	CA	93105
Egil	Stigum	Carmel By The Sea	CA	93921

Connie	Cronin	Oakland	CA	94618
Joan	Cronin	Sebastopol	CA	95472
Nanette	Cronk	truckee	CA	96161
Elizabeth	Cross	Rancho Mirage	CA	92270
Ronald	Cross	North Hollywood	CA	91605
Glenis	Croucher	Pleasant Hill	CA	94523
Carolyn	Crow	Burlingame	CA	94010
Kurt	Cruger	LONG BEACH	CA	90803
Robert	Crum	Fillmore	CA	93016
Jennifer	Crum	La Mesa	CA	91942
Renee	Crump	Fallbrook	CA	92028
Marian	Cruz	Hollister	CA	95023
Efren	Cruz	San Francisco	CA	94105
Marjo	Cruz	oakland	CA	94619
Chandra	Cruz	La Mirada	CA	90638
Joel	Cruzada	Beaumont	CA	92223
Marjorie	Crystal	San Diego	CA	92110
Daniel	Csaszar	San Diego	CA	92128
tara	cufaude	loomis	CA	95650
Kermit	Cuff	Mountain View	CA	94041
John	Culloty	Ben Lomond	CA	95005
Matthew	Culmore	Windsor	CA	95492
Sherrell	Cuneo	Los Angeles	CA	90027
Debra	Cunningham	Encinitas	CA	92024
Grace	Cunningham	Camarillo	CA	93010
Stephanie	Curran	san diego	CA	92107
Dennis	Curry	Paso Robles	CA	93446
Kevin	Curtis	Fullerton	CA	92832
angelique	curtis	Burbank	CA	91521
Corrine	Cushing	Los Angeles	CA	90025
Joe	Cuviello	Solana Beach	CA	92075
Starr	Da Mauer	Downey	CA	90240
Carole	Dadurka	San Clemente,	CA	92673
Douglas	Daetz	Sunnyvale	CA	94087
Kevin	Dafesh	Playa Del Rey	CA	90293
Rebecca	Dailey	Costa Mesa	CA	92627
namita	dalal	los altos	CA	94022
Steven	Dale	Sacramento	CA	95814
Marcia	Dale-Lewinter	San Francisco	CA	94115
Rev	Daley	Richmond	CA	94803
Mitch	Dalition	San Francisco	CA	94117
Karen	Dallow	El Sobrante	CA	94803
Patricia	D'Ambrosio	Albany	CA	94706
Donna	D'Amico	Carmichael	CA	95608
Tess	Damon	North Hollywood	CA	91601
Rhea	Damon	Calabasas	CA	91302
Laura	Dana	Brentwood	CA	94513

Holly	Still	Menlo Park	CA	94025
Carl	Stilwell	Pasadena	CA	91106
Katrina	Stimson	Burbank	CA	91505
Vanessa	Stine	Van Nuys	CA	91409
Linda	stock	Cypress	CA	90630
Brian	Stockdale	Rancho Cordova	CA	95670
loren	stolley	Lower Lake	CA	95457
Valerie	Stone	Norfolk	CA	90210
Stephanie	Stone	Petaluma	CA	94954
theresa	stone	Palm Springs	CA	92263
Whitney	Stone	Pacific Grove	CA	93950
Laurie	Storlie	Los angeles	CA	90034
Tiffany	Story	Summerland	CA	93067
robert	stout	fairfax	CA	94930
Faith	Strailey	Quincy	CA	95971
Marisa	Strange	Long Beach	CA	90803
Kat	Stranger	San Rafael	CA	94901
Gerald	Stratman	Glen Ellen	CA	95442
Ann	Stratten	La Mesa	CA	91941
Jewels	Stratton	san francisco	CA	94133
Linda	Straussburg	El Segundo	CA	90245
Terry	Strauss-White	Mill Valley	CA	94941
Marjorie	Streeter	Alameda	CA	94501
Mary	Strote	Calabasas	CA	91302
Lois	Stuart	Rsm	CA	92688
Bruce	Stubbs	Carlsbad	CA	92010
Jennifer	Stutzman	Clovis	CA	93619
Toby	Suckow	san francisco	CA	94114
Teresa	Sullivan	Los Angeles	CA	90065
Tad	Sullivan	Corona del Mar	CA	92625
Edward	Sullivan	San Francisco	CA	94116
Peter	Sullivan	Santa Monica	CA	90404
Mary	Sullivan	Huntington Beach	CA	92647
Chris	Sulots	Santa Cruz	CA	95063
Joanne	Sultar	berkeley	CA	94705
Kate	Sulzbach	Goleta	CA	93117
Kathleen	Sumida	San Diego	CA	92120
Kathryn	Summers	Santa Monica	CA	90402
Patrice	Summers	Santa Barbara	CA	93101
Amber	Sumrall	Soquel	CA	95073
Jane	Sun	Santa Barbara	CA	93103
Reya	Sunshine	Goleta	CA	93111
Herschel	Surdam	San Mateo	CA	94402
Hugh	Sutherland	Goleta	CA	93117
Constance	Sutton	Berkeley	CA	94707
Erin	Suyehara	Torrance	CA	90501
Kristen	Svetik	Fremont	CA	94536

nancy j	danard	berkeley	CA	94703
William	Dane	Ontario	CA	91761
Matthew	Danielczyk	Santa Rosa	CA	95404
Robert	Daniels	Ojai	CA	93023
Diana	Daniels	Sacramento	CA	95818
Thomas	Dannecker	Los Angeles	CA	90029
Barrett	Daris	San Diego	CA	92109
John	Darke	Los Angeles	CA	90012
Kathleen	Darland	Santee	CA	92071
Michael	Darling	Frazier Park	CA	93225
Aimee	Darrow	venice	CA	90291
Terry	Daugherty	Seal BEACH	CA	90740
Pamela	Daukayev	Los Angeles	CA	90004
Susan	Davenport	Simi Valley	CA	93063
Karen	Daves	Simi Valley	CA	93063
Marjorie	David	Venice	CA	90291
Michelle	Davidson	Yorba Linda	CA	92886
Katherine	Davis	San Clemente	CA	92672
Hillary	Davis	Novato	CA	94949
Mary	Davis	San Juan Capo	CA	92675
Nicole	Davis	San Pedro	CA	90731
Nancy	Davis	Perris	CA	92570
Sherry	Davis	Concord	CA	94519
Carla	Davis	CORTE MADERA	CA	94925
Holly	Davis	Los Angeles	CA	90065
Ryan	Davis	Burbank	CA	91502
Clark	Davis	Los Osos	CA	93402
Mandy	Davis	Los Osos	CA	93412
Donna	Davis	San Jose	CA	95124
Rebecca	Davis	Santa Monica	CA	90404
Tammy	Davis	Los Angeles	CA	90014
Misty	Day	Fullerton	CA	92831
Maria	de Almeida	Berkeley	CA	94720
Jorge	De Cecco	Ukiah	CA	95482
John	de Forest	San Francisco	CA	94121
Rochelle	De Forrest	San Jose	CA	95123
Olivia	de la Garza	Victorville	CA	92395
Francois	de la Giroday	Los Angeles	CA	90027
Russell	De La Mare	RSM	CA	92688
Raymond	de Milton	Irvine	CA	92612
Leslie	De Palo	San Rafael	CA	94912
Shanti	de Ruyter	Newbury Park	CA	91320
Victor	de Vlaming	Sacramento	CA	95821
Megan	De Wilde	Sun Valley	CA	91352
Dan	De Yo	Yorba Linda	CA	92886
Leslie	Dean	Mountain View	CA	94040
Vic	DeAngelo	San Francisco	CA	94121

Joan	Svetik	Brisbane	CA	94005
Mariano	Svidler	San Mateo	CA	94403
Andrea	Svoma	Venice	CA	90291
Susan	Swan	Carlsbad	CA	92009
Kelsey	Swann	San Marcos	CA	92078
Rebecca	Swanson	Mariposa	CA	95338
Daniel A	Swanson	Carnelian bay	CA	96140
George	Swanson	San Francisco	CA	94110
Robyn	Swanson	Berkeley	CA	94707
Anne	Swanson	Campbell	CA	95008
Ed	Sweeney	Vallejo	CA	94589
Carolyn	Sweeney	Richmond	CA	94804
C	Swenning	Richmond	CA	94805
Chelsea	Swick	Bayside	CA	95524
Darren	Swift	Westminster	CA	92683
Mark	Swoiskin	Greenbrae	CA	94904
Jim	Syfers	Sonoma	CA	95476
Sof	Sylve	San Francisco	CA	94102
Angee	Sylvester	Lancaster	CA	93536
F	Sylvester	Millbrae	CA	94030
Geoffrey	Symcox	Pacific Palisades	CA	90272
Russell	Symonds	Costa Mesa,	CA	92627
Val	Szymanski	El Sobrante	CA	94803
Karen	taatjes	Lompoc	CA	93436
Kenneth	Tabachnick	West Hills	CA	91307
Linda	Tabb	North Hills	CA	91343
Barbara	Tacker	Camarillo	CA	93012
Adrian	Tafolla	San Bernardino	CA	92410
Gilda	Tafreshi	San diego	CA	92037
Ann	Tait	Pasadena	CA	91104
Richard	Takagi	Fullerton	CA	92831
Kecia	Talbot	Ross	CA	94957
K	Talbot	foster city	CA	94404
Naomi	Taniguchi	Encino	CA	91436
Mariana	tanjuakio	Riverside	CA	92506
Barbara	Taps	Laguna Niguel	CA	92677
Terance	Tashiro	los angeles	CA	90045
David	Tasker	Carson	CA	90745
mike	tasker	huntington Beach	CA	92646
Leslie	Tate	National City	CA	91950
Tammy	Taunt	Oceanside	CA	92057
Linda	Taylor	San Pedro	CA	90731
Gregory	Taylor	Castro Valley	CA	94546
Elaine	Taylor	Glendale	CA	91205
Sandi	Taylor	Citrus Heights	CA	95610
Elizabeth	Taylor	Encinitas	CA	92024
Korinne	Taylor	Desert Hot Springs	CA	92240

Helena	Dearnell	Nevada City	CA	95959
Brian	Debasitis	San Jose	CA	95123
JeriLynn	DeBonis	Concord	CA	94520
Thom	Decant	San Francisco	CA	94118
Yves	Decargouet	Sebastopol	CA	95472
Jessica	Dechant	Mission Hills	CA	91345
Craig	Decker	La Jolla	CA	92037
Christie	Decker	San Francisco	CA	94109
Heather	DeCotes	Salyer	CA	95563
Diana	Dee	North Hollywood	CA	91606
J	Deem	Mill Valley	CA	94941
Suzanne	Deerlyjohnson	Long Beach	CA	90806
Vito	Degrigoli	Palm Springs	CA	92262
Sheedy	Dehdashti	del mar	CA	92014
Peter	Deitch	Los Angeles	CA	90034
Dianne	Dejea	LOS BANOS	CA	93635
Gayl	del Pero	san mateo	CA	94403
Prof	Delevoryas	San Jose	CA	95124
Gladys	Delgadillo	Escondido	CA	92027
John	Delgado	San Martin	CA	95046
Fred	Delmer	Placer vile	CA	95667
Elizabeth	Deloughrey	los angeles	CA	90066
Louise	Denish	San Rafael	CA	94901
Patricia	Dennis	Los Angeles	CA	90028
Sean	Denny	Del Mar	CA	92014
Michael	Denton	San Leandro	CA	94578
Amy	DeOliveira	Culver City	CA	90232
Renee	Deprey	Sebastopol	CA	95472
Wendy	Derbort	Redlands	CA	92374
Owen	Derby	San Leandro	CA	94577
Veero	Derkarabetian	Los Angeles	CA	90019
Shirley	DeRuchie	Templeton	CA	93464
John	DesJardin	South Pasadena	CA	91030
Jennifer	Desmond	Mill Valley	CA	94941
Jeanette	Desmond	Carpinteria	CA	93013
Sheila	Desmond	Cameron Park	CA	95682
Frank	DeStefano	Pine Grove	CA	95665
Elizabeth	Detrich	Pacifica	CA	94044
Carola	Detrick	San Rafael	CA	94901
steve	Deutsch	Berkeley	CA	94705
Terri	Devine	Long Beach	CA	90807
Sue	DeVries	Albany	CA	94706
Dolores	DeVries	Vista	CA	92083
David	Dexter	Mill Valley	CA	94941
Nina	Diamante	Los Angeles	CA	90048
James	Diamond	Berkeley	CA	94703
Catherine	Diamond	Berkeley	CA	94707

Crystal	Taylor	North Hollywood	CA	91602
Michele	Taylor	Oceanside	CA	92054
Deborah	Taylor	San Jose	CA	95112
Anika	Taylor-Cohen	Portola Valley	CA	94028
Cherie L	Tchick	Pacific Grove	CA	93950
John	Teevan	Chula Vista	CA	91913
cindy	tejeda	los angeles	CA	90064
Debra	Temple	San Leandro	CA	94577
Joanne	Tenney	Escondido	CA	92026
Lisa	Tenorio	Concord	CA	94520
Terry	Tenzing	Pacifica	CA	94044
Paul	Teplitz	Thousand Oaks	CA	91362
Diego	Teran	Santa Ana	CA	92705
Ambrose	Terrence	Marina del Rey	CA	90292
Ruth	Terrill	La Honda	CA	94020
Ruben	Terveen	Alhambra	CA	91801
Dawn	Tesluk	oceanside	CA	92054
Elizabeth	Tessier	Lucerne	CA	95458
Fran	Tessmer	San Diego	CA	92122
Samuel	Test	Oakland	CA	94611
Dena	Thaler	Oakland	CA	94618
Ernest	Thayer	San Francisco	CA	94114
Jeff	Thayer	San Diego	CA	92117
Gail	Thibault	Victorville	CA	92395
David	Thibodeau	Corte Madera	CA	94925
Joanne	Thielen	Banning	CA	92220
Ron	Thomas	west hollywood	CA	90048
Katrina	Thomas	San Diego	CA	92117
Leonard	Thomas	Antelope	CA	95843
Robert	Thomas	San Francisco	CA	94114
Carrie	Thomas	Huntington Beach	CA	92648
JASON	THOMAS	Shasta Lake	CA	96019
Eleanor	Thomas	Livermore	CA	94550
Laura	Thomas	Oxnard	CA	93035
David	Thomas	Kensington	CA	94707
Jc	Thomas	Los Angeles	CA	90049
Andrea	Thomas	south lake tahoe	CA	96151
Ralph	Thomas	Mount Shasta	CA	96067
Anita	Thomason	Culver City	CA	90230
Gordon	Thompson	Beaumont	CA	92223
Roberta	Thompson	Anaheim	CA	92802
Doug	Thompson	Morongo Valley	CA	92256
Heather	Thompson	South San Francisco	CA	94080
Sabrina	Thompson	El Dorado Hills	CA	95762
Irene	Thompson	San Pablo	CA	94806
Courtney	Thompson	Oakland	CA	94611
Roberta	Thompson	Sun Valley	CA	91352

Sandy	Diaz	barstow	CA	92311
Michael	Diaz	Walnut Creek	CA	94597
Leigh Ann	DiCarlo	Winchester	CA	92596
Carol	Dickason	sonoma	CA	95476
Harim	Dieffenbacher	Fontana	CA	92336
Larry	Dieli	Kagel Canyon	CA	91342
Cathe	Dietrich	Berkeley	CA	94706
Robert	Dietrich	Richmond	CA	94801
Chris	Dietrich	San Jose	CA	95117
Robert	DiGiovanni	Monterey	CA	93940
Holly	Dignard	Los Angeles	CA	90028
Jeffrey	DiLallo	La Mesa	CA	91942
Elizabeth	Dill	San Bruno	CA	94066
Terry	Dillard	Belmont	CA	94002
Maureen	Dillon	Pacific Grove	CA	93950
Howard	Dillon	Bolinas	CA	94924
Kay	Dillon	San Francisco	CA	94121
John	Dillon	redding	CA	96003
Mark	DiMaria	Los Angeles	CA	90034
Richard	DiMatteo	San Diego	CA	92101
Michael	Dimattia	Encino	CA	91316
Martha	Dingilian	Santa Barbara	CA	93103
Beverly	Dir	Valley Springs	CA	95252
Christine	DiSimone	San Diego	CA	92117
Lawrence	DiStasi	Bolinas	CA	94924
Laura	Divenere	LA	CA	90014
Gus	diZerega	Sebastopol	CA	95473
Bruce	Doan	Grass Valley	CA	95945
Dana	Dodge	Newark	CA	94560
Eric	Dodge	san jose	CA	95112
David	DOering	San Francisco	CA	94109
David	Dolotta	Santa Barbara	CA	93109
Gabriel	Domenech	San Francisco	CA	94103
Michael	Dominguez	West Covina	CA	91791
Yvette	Dominguez	Hacienda heights	CA	91745
Mal	Domser	Stockton	CA	95219
Josh	Donald	San Francisco	CA	94110
Hera	Donaldo	Vallejo	CA	94591
Karen	Donaldson	Grass Valley	CA	95945
Karlene	Donato	Alhambra	CA	91801
Stephen	Dondershine	Burlingame	CA	94010
Terrance	Donley	Reseda	CA	91335
Alisa	Doran	Oxnard	CA	93030
Michael	Dorer	Fremont	CA	94538
Jeffery	dorer	Los Angeles	CA	90042
Larry	Dorshkind	Redwood City	CA	94061
Herschel	Dosier	San Francisco	CA	94115

Pat	Thompson	Roseville	CA	95678
Jackie	Thompson	Shingle Springs	CA	95682
Nancy	Thomsen	Napa	CA	94559
Gary	Thomsen	Newport Beach	CA	92661
Cathy	Thornburn	Los Angeles	CA	90041
Robert	Thornhill	Los Angeles	CA	90042
Louise	Thornton	Laguna Beach	CA	92651
John	Thorp	Roseville	CA	95678
Travis	Thumm	San Francisco	CA	94102
Erif	Thunen	Albion	CA	95410
Nadya	Tichman	Oakland	CA	94602
Amber	Tidwell	Los Angeles	CA	90068
Cindy	Tierney	Guadalupe	CA	93434
Brett	Tietjen	Los Angeles	CA	90019
Linda	Tiffany	Berkeley	CA	94705
Shannon	tilston	San Francisco	CA	94122
Guisinger	Tim	Camarillo	CA	93010
Sara	Tincher	Salinas	CA	93906
Jude	Todd	Santa Cruz	CA	95062
Zachary	Todd	Brea	CA	92823
Michael	Todisco	Laguna Niguel	CA	92677
Nobuko	Tohara	Sunnyvale	CA	94087
Justin	Toledo	San Diego	CA	92117
Jennifer	Tolentino	Huntington Beach	CA	92646
Lisa	Toliver	Encinitas	CA	92024
Pela	Tomasello	Santa Cruz	CA	95062
Michael	Tomczyszyn	San Francisco	CA	94132
Margaret	Tomenko	Carmichael	CA	95608
Jennifer	Tomic	Pleasanton	CA	94588
Andy	Tomsky	san marcos	CA	92079
Michael	Tonetti	Chico	CA	95973
Kevin	Toney	Richmond	CA	94803
RN	Toni Wolfson	Felton	CA	95018
Michael	Toobert	GRASS VALLEY	CA	95945
Manmeet	Toor	Los Angeles	CA	90024
Michele	Tornabene	summerland	CA	93067
Philip	Torres	Benicia	CA	94510
gabriela	torres	Los Angeles	CA	90026
carol	torres	riverbank	CA	95367
Jennifer	Toth	Santa Clarita	CA	91350
Donna	Toward	Palm Springs	CA	92264
Patricia	Towers	West Hills	CA	91304
Sarah	Townsend	Sunnyvale	CA	94086
Carlos	Townsend	Fountain Valley	CA	92708
karen	toyohara	La Mesa	CA	91941
Michael	Traa	Cardiff	CA	92007
Meghan	Tracy	Long Beach	CA	90808

Laura	Doty	Santa Rosa	CA	95404
Ben	Dover	San Rafael	CA	94912
Linda	Dow	Berkeley	CA	94703
Holly	Dowling	Pope Valley	CA	94567
Gary	Dowling	pope valley	CA	94567
Lowell	Downey	Pine st	CA	94559
Jerilyn	Downing	sf	CA	94134
Nikki	Doyle	Oakland	CA	94602
Kauffman	Dr. George B	Fresno	CA	93720
Donna	Drabek	Santa Rosa	CA	95401
Linda	Dragavon	San Francisco	CA	94114
Gloria	drake	Aromas	CA	95004
mynka	Draper	l.A.	CA	90042
Linda	Drattell	Pleasanton	CA	94588
Mia	Dravis	Rancho Cucamonga	CA	91730
Diana	Dring	Corte Madera	CA	94925
Gwyn	Drischell	Tujunga	CA	91042
Francesca	Droll	Oceanside	CA	92056
Dale	Drouin	Concord	CA	94521
Tonya	Drumm	san jose	CA	95118
Julie	du Bois	Canoga Park	CA	91304
Jennifer	Dubois	Los Angeles	CA	90034
Nancy	Dubuc	Pasadena	CA	91104
Robert	Duckson	Hemet	CA	92543
John	Duckworth	Concord	CA	94521
Claire	Dudan	Walnut Creek	CA	94596
D	Dude	San Luis Obispo	CA	93401
Pat	Dufau	San Clemente	CA	92673
fredrica	duke	Pacific Palisades	CA	90272
Dr Kelly	Dunn	Manhattan beach	CA	90266
Karen	Dunson	Castro Valley	CA	94546
Sue	Dunson-Reggio	Castro Valley	CA	94546
Kym	DuPont	Camptonville	CA	95922
Toni	Dupont-Mora	North Highlands	CA	95660
Dani	Duran NIEKERK	NORTHRIDGE	CA	91325
P	Durieux	san jose	CA	95128
Samuel	Durkin	Fairfield	CA	94534
Carol Sue	Durr	Escondido	CA	92025
Nina	Dusedau	Sherman Oaks	CA	91403
Damon	Duval	Santa Monica	CA	90404
Stefan	Dwornik	West Hollywood	CA	90069
Douglas	Dyakon	Los Angeles	CA	90046
Michele	Dye	Danville	CA	94506
Elizabeth	Dyer	Los Angeles	CA	90041
Tonya	Dysart	san diego	CA	92109
Reverend	Eagle	graton	CA	95444
Nancy	Easterling	San Diego	CA	92102

Ron	Tragni	Antioch	CA	94509
Jon	Trainer	Los Gatos	CA	95030
Sophie	Tramel	Fairfield	CA	94534
Kim	Tran	Santa Ana	CA	92707
Steve	Trangsrud	Los Angeles	CA	90039
Gene	Trapp	Davis	CA	95616
Adam	Trauger	Long Beach	CA	90815
Beti	Trauth	McKinleyville	CA	95519
Richard	Travis	san diego	CA	92130
Matthew	Trbovich	Los Angeles	CA	90035
Carol	Tredo	Eureka	CA	95503
Michael	Treece	San Francisco	CA	94122
Barbara	Trees	Tujunga	CA	91042
Nancy	Treffry	Aromas	CA	95004
Jason	Triefenbach	Long Beach	CA	90802
Wendy	Tripp	San Jose	CA	95125
Yael	Trock	Encino	CA	91436
Elaine	Trogman	Van Nuys	CA	91405
Debra	Trumbo	Orange	CA	92867
Erica	Trumbull	Corte Madera	CA	94925
Kim	Trupiano	Clayton	CA	94517
Edith	Tsacle	Modesto	CA	95355
Wendy	Tsien	La Jolla	CA	92037
vicky	tsoi	SANTA MONICA	CA	90404
Lee	Tucker	modesto	CA	95355
Adrienne	Tucker	San Jose	CA	95119
Michael	Tucker	Berkeley	CA	94703
Trish	Tuley	Idyllwild	CA	92549
Michael	Tullius	Encino	CA	91316
Mary	Tullock	Rohnert Park	CA	94928
RG	Tuomi	Thousand Oaks	CA	91362
Steven	Tupper	Berkeley	CA	94702
Jean	Turley-Sinclair	Grass Valley	CA	95949
Joy	Turlo	Redondo Beach	CA	90277
Ian	Turner	Sacramento	CA	95831
Irene	Turner	Sacramento	CA	95816
pat	turney	Hayward	CA	94542
Ilya	Turov	Moreno Valley	CA	92555
Regina	Tuzzolino	Venice	CA	90291
Glen	Twombly	Arcata	CA	95521
Patrick	Twomey	Oakland	CA	94611
Sergio	Tyohoon	redlands	CA	92374
Terian	Tyre	Oceanside	CA	92054
Ardy	Tyszka	Riverside	CA	92507
Roger	Underhill	San Francisco	CA	94132
Cyrene	Underhill	Rancho Santa Margarita	CA	92688
Ruth	Ungar	Oakland	CA	94619

Catherine	Eastman	Los Angeles	CA	90065
Chris	Eaton	Tujunga	CA	91042
Stephanie	Ebbert	Costa Mesa	CA	92626
Gabrielle	Ebert	los angeles	CA	90039
Gerhard	Eckardt	stockton	CA	95207
Gladys	Eddy-Lee	San Diego	CA	92115
Jonathan	Eden	Berkeley	CA	94707
John	Edman	Morgan Hill	CA	95037
Nancy	Edmondson	San Anselmo	CA	94960
Pandora	Edmonston	Mariposa	CA	95338
Jane	Edwards	La Palma	CA	90623
Ariel	Edwards	San Francisco	CA	94122
Mindy	Edwards	Westlake Village	CA	91362
Linda	Edwards	Penngrove	CA	94951
Katherine	Edwinson	Mill Valley	CA	94941
Lynne	Eggers	San Francisco	CA	94110
Daniel	Egolf	Hayward	CA	94541
Vivian	Ehresman	Chatsworth	CA	91311
Annette	Ehrlich	Los Angeles	CA	90068
Donis	Eichhorn	Carmichael	CA	95608
Nancy	Eichler	Oakland	CA	94608
Karen	Eikeland	Alameda	CA	94501
Louise	Eiler	Whittier	CA	90601
Jerry	Eisenberg	CANYON CNTRY	CA	91387
J	EISER	LONG BEACH	CA	90803
Naomi	Eisley	valley glen	CA	91401
Gregg	Eisman	Valley Center	CA	92082
Andrea	Eitelman	Fontana	CA	92335
Steve	Eklund	Salinas	CA	93901
Maret	Ekner	Nynashamn	CA	93433
Malcolm	Elgut	Simi Valley	CA	93065
Rob	Elia	Moraga	CA	94556
Michael	Elkins	Vista	CA	92083
Ed	Elliott	Ben Lomond	CA	95005
Julie	Elliott	Los Angeles	CA	90064
Douglas	Elliott	Vista	CA	92083
Norm	Ellis	Laguna Hills	CA	92653
Marie	Ellis	Watsonville	CA	95076
David	Ellis	Clovis	CA	93611
joan	Ello	Los Angeles	CA	90024
Alison	Ellsworth	San Francisco	CA	94117
heidi	elowitch	Newbury Park	CA	91320
Lisa	Elsea	San Diego	CA	92107
Sharon	Elzey	Idyllwild	CA	92549
Bruce	Embrey	Los Angeles	CA	90026
Snyder	Emily	Crockett	CA	94525
Shari	Emling	Mountain View	CA	94040

John	Unger	Fort Bragg	CA	95437
Doreen	Uphouse	Concord	CA	94518
Mary Lis	UrueÂ¤a	Palo Alto	CA	94304
Martha	Urueta	Culver City	CA	90230
Henry	VÃ¡squez	Colton	CA	92324
Jolene	Vadillo	San Marcos	CA	92069
Erika	Vadopalas	Moss Beach	CA	94038
Josie	Valderrama	San Francisco	CA	94103
Adela	Valdez	San Diego	CA	92115
Susan	Valker	Sylmar	CA	91342
Jitka	Valkova	San Francisco	CA	94121
Carol	Vallejo	Stockton	CA	95209
Stephanie	Valys	scotts valley	CA	95066
Dg	van Arsdale	burlingame	CA	94010
Berington	Van Campen	Alhambra	CA	91801
Devon	Van Dam	Trinidad	CA	95579
Aniko	van der Lee	San Francisco	CA	94115
Ingrid	Van Dorn	Stevenson Ranch	CA	91381
Corinne	Van Houten	Sacramento	CA	95835
Ruth	Van Sciver	Los Gatos	CA	95033
Maria	van Sunder	Fremont	CA	94539
Mathias	Van Thiel	Hayward	CA	94542
Ivan	Van Wingerden	Carpinteria	CA	93013
Ali	Van Zee	Oakland	CA	94610
Natalie	van Zelm	Santa Barbara	CA	93108
Geert	Vancompernolle	Fremont	CA	94536
Maureen	Vanderbosch	Laguna Niguel	CA	92677
Mariana	Vanderburg	Menifee	CA	92585
Brook	Vanderford	Oakland	CA	94607
Janet	Vandergrift	Fullerton	CA	92831
Denise	Vandermeer	Woodland Hills	CA	91367
M	Vandever	San Jose	CA	95129
Marjanne	Vangenechten	Stad	CA	94203
Charlotte	Vardan	Los Angeles	CA	90028
Sandi	Vare	American Canyon	CA	94503
Dorothy	Varellas	San Francisco	CA	94124
John	Varga	Huntington Beach	CA	92648
David	Varnum	San Francisco	CA	94117
Richard	Vartanian	Altadena	CA	91116
Suparna	Vashisht	Monte Sereno	CA	95030
Sherry	Vatter	Los Angeles	CA	90034
Amy	Vaughn	Long Beach	CA	90801
Christina	Vawser	Silverado	CA	92676
Pavel	Vazharov	San Diego	CA	92126
Reuben	Veek	Mountain View	CA	94043
Bonika	Vega	Rohnert Park	CA	94928
Tara	Veino	San Diego	CA	92101

Matthew	Emmer	Marina del Rey	CA	90292
Trudy	Emmons	penngrove	CA	94951
Laurel	Emsley	Carmel	CA	93923
Chelsea	Eng	San Francisco	CA	94127
Gayle	Engle	Ventura	CA	93004
Helen	Engledow	Sonora	CA	95370
Klaudia	Englund	Thousand Oaks	CA	91360
Robin	Enos	Newcastle	CA	95658
Daniela	Enyedi	santa clara	CA	95051
martha	epler-kurtz	la mesa	CA	91941
Inger	Eppland	BH	CA	90211
Ruth	Epstein	Los Angeles	CA	90025
Annie	Erb	Santa Rosa	CA	95405
Victoria	Erickson	Aptos	CA	95003
Barbara	Erickson	Westlake Village	CA	91361
William	Erickson	Chatsworth	CA	91311
Susan	Erikson	Sacramento	CA	95828
Kelle	Erwin	Long Beach	CA	90808
Mark	Escajeda	Lafayette	CA	94549
Edward	Escobar	San Leandro	CA	94578
Shanovia	Escoe	La Canada-Flintridge	CA	91012
Diane	Esper	Burbank	CA	91501
Randall	Esperas	Cupertino	CA	95014
Linda	Espino	San Diego	CA	92101
Erika	Espinoza	Whittier	CA	90604
Lynette	Espinoza	Cherry Valley	CA	92223
Jay	Esposito	Los Angeles	CA	90034
Dan	Esposito	Manhattan Beach	CA	90266
Carrick	Esquivel	San Diego	CA	92104
Barbara	Essenmacher	Modesto	CA	95351
Nicholas	Esser	Simi Valley	CA	93065
John	Essman	Healdsburg	CA	95448
Renee	Estrella	los angeles	CA	90043
Albert	Eurs	Cypress	CA	90630
Megan	Evans	Davis	CA	95616
John	Evans	Walnut Creek	CA	94598
Michael	Evans	Los Angeles	CA	90034
Ava	Evans	Encino	CA	91436
Dinda	Evans	san diego	CA	92177
Ellen	Evans	Atascadero	CA	93422
Michael	Evans	Altadena	CA	91001
Cal	Evans	Sherman oaks	CA	91423
Joe	Evans	Bideford	CA	12365
Dale	Evilsizer	QUARTZ HILL	CA	93536
Tracy	Ewing	Artesia	CA	90701
Cindy	Ewing	Carmel	CA	93923
Donna	Fabiano	Forestville	CA	95436

Valerie	Velazquez	Santa Barbara	CA	93105
Lorena	Vellanoweth	Whittier	CA	90601
Samara	velloo	Petaluma	CA	94954
Michele	Vellucci	Westminster	CA	92683
Amy	Veloz	Van Nuys	CA	91406
Clairann	Venable	Reseda	CA	91335
Ruby	Vencill	landers	CA	92285
Brittany	Venturelli	San Mateo	CA	94402
Anne	Veraldi	sf	CA	94110
Naida	Verbeek	Oakland	CA	94601
Jonathan	Verduzco	Los Angeles	CA	90020
Enrico	Verga	seal beach	CA	90740
Lynne	Vernon	Pasadena	CA	91103
Jackie	Vescio	Escondido	CA	92026
Jackie	Vescio	Simi Valley	CA	93065
Sakura	Vesely	Martinez	CA	94553
Paul	Vesper	Berkeley	CA	94703
Carlene	Vi	Concord	CA	94521
Thanna	Vickerman	La	CA	90026
Margaret	Vickers	San Francisco	CA	94116
Tanya	Vidmar	Studio City	CA	91604
James	Villalobos	Los Angeles	CA	90027
Chelsea	Villegas	El Segundo	CA	90245
Elise	Villemaire	Santa Rosa	CA	95448
Audrey	Vincent	Santa Paula	CA	93060
Robyn	Virga	Sacramento	CA	95825
MJ	Visconti	Carmel	CA	93921
William	Visscher	San Francisco	CA	94117
Paul	Vitale	San Juan Capistrano	CA	92675
P	Vliet	La Mirada	CA	90638
Nathan	Vogel	san francisco	CA	94171
Alan	Voigt	SanAnselmo	CA	94960
Alexander	Vollmer	San Rafael	CA	94901
Joe and Mary	Volpe	ventura	CA	93002
Melitta	Von Abele	Oakland	CA	94602
Antoinette	Von Grone	Boonv	CA	95415
Kay	Von Tress	Menlo Park	CA	94025
Ty	Vonhoetzendorff	Canoga Park	CA	91303
NathanielVose	Vose	San Rafael	CA	94901
Victor	Vuyas	San Francisco	CA	94109
Amy	Vye	Santa Cruz	CA	95062
Iain	Wade	Santa Monica	CA	90403
James	Wagner	Vista	CA	92084
Mana-Jean	Wagnon	Alameda	CA	94501
Katherine	Waid	Mendocino	CA	95460
Jeriene	Walberg	Mountain View	CA	94040
Sue	Walden	San Francisco	CA	94109

janice	fagan	calabasas	CA	91372
Vivian	Fahlgren	Paradise	CA	95969
Rita	Fahrner	San Francisco	CA	94110
cecelia	faigin	Granada Hills	CA	91344
Carol	Fairweather	Alameda	CA	94501
Jamie	Falgoust	shingle springs	CA	95682
Deborah	Fallender	santa monica	CA	90405
Tom	Falvey	San Diego	CA	92104
Dominick	Falzone	Los Angeles	CA	90005
sophia	fardella	walnut creek	CA	94596
Sam	Fargnoli	L.A.	CA	90034
Lorna	Farnum	Rossmoor	CA	90720
Leonard	Farr	Tarzana	CA	91356
Kelleen	Farrell	Placerville	CA	95667
Richard	Farrell	Los Angeles	CA	90064
Brian	Farrow	Oakland	CA	94618
Jeff	Fasano	los angeles	CA	90275
Ruth	Faulkner	SAN FRANCISCO	CA	94123
Vernon	Faulkner	Torrance	CA	90510
David	Fears	solana beach	CA	92075
Wendy	Fears	irvine	CA	92604
Mary	Feeguson	Laguna Beach	CA	92651
Daniel	Fehr	Redding	CA	96001
Md	Fein	Newport Beach	CA	92659
Sharon	Feissel	Santa Rosa	CA	95409
John	Feissel	Chico	CA	95928
Will	Feldman	Encino	CA	91316
Mark	Feldman	Santa Rosa	CA	95401
Robin	Fellner	McKinleyville	CA	95519
Amanda	Felt	Covina	CA	91722
Chris	Felton	Auburn	CA	95602
Catherine	Felty	Tulare	CA	93274
Ana-Paula	Fernandes	Redwood City	CA	94065
annemarie	ferrero	los angeles	CA	90045
Sherrie	Ferris	Concord	CA	94521
Lin	Ffarley	vista	CA	92083
Patricia	Field	Los Angeles	CA	90049
Shannon	Fields	Thousand Oaks	CA	91362
Ana	Figueroa	Pittsburg	CA	94565
Daphne	Figueroa	San Diego	CA	92107
Thomas	Filip	Moorpark	CA	93020
Will	Finch	Los Angeles	CA	90066
Mary	Finger	Ashland	CA	94964
Christine	Fink	Stockton	CA	95207
Michael	Finucan	Santa Barbara	CA	93109
Bunny	Firebaugh	Arnold	CA	95223
Pam	Firestone	Los Angeles	CA	90066

Sandra	Walker	Los Angeles	CA	90042
Aurea	Walker	Los Angeles	CA	90004
Christine	Walker	Stanton	CA	90680
Sandra	Walker	RSM	CA	92688
Barbara	Walker	Escondido	CA	92026
Verla	Walker	West Covina	CA	91791
Steve	Walker	La Habra	CA	90631
Peter	Walker	Morgan Hill	CA	95037
E	Wall	Santa Barbara	CA	93110
Barbara	Wallace	Long beach	CA	90815
Robert	Wallace	Whittier	CA	90602
Aleta	Wallach	Santa Monica	CA	90402
Ron	Wallen	Palm Springs	CA	92262
Paul	Waller	Woodland Hills	CA	91367
Kathy	Wallington	El Cajon	CA	92021
Steven	Wallis	Carnelian Bay	CA	96140
JOHN	WALSH	Los Angeles	CA	90028
Cody	Walters	bakersfield	CA	93312
Ernie	Walters	Union City	CA	94587
Kari	Walters	Pacific Palisades	CA	90272
John	Walton	Gualala	CA	95445
Terri	Walton	Monrovia	CA	91016
Janet	Walton	Concord	CA	94520
Velinda	Walton	Antioch	CA	94509
Alicia	Wang	San Francisco	CA	94118
jingbo	Wang	Frazier Park	CA	93225
William	Warburton	Westlake Village	CA	91361
Linda	Ward	La Habra	CA	90631
Scott	Wardle	Santa Cruz	CA	95060
Christopher	Ware	Fremont	CA	94539
Suanne	Ware-Diaz	Los Angeles	CA	90066
Dee	Warenycia	Roseville	CA	95661
Thomas	Wargo	La Honda	CA	94020
Ronald	Warren	Glendale	CA	91206
Cathryn	Wasas	Placentia	CA	92870
Akilah	Washington	San Francisco	CA	94122
Jennifer	Wasikoski	Menifee	CA	92585
Scott	Watanabe	Los Angeles	CA	90066
Tayah	Waterhouse	San Diego	CA	92107
Kim	Waterson	Stanton	CA	90680
Anita	Watkins	Oakland	CA	94611
Fran	Watson	Spring Valley	CA	91977
Courtney	Watson	Corona Del Mar	CA	92625
Shawna	Watson	Ontario	CA	92627
Claire	Watson	Pleasant Hill	CA	94523
Donna	Watson	Sacramento	CA	95833
Richard	Watson	Long Beach	CA	90807

Klara	Firestone	Beverly Hills	CA	90212
Margaret	Fish	Boonville	CA	95415
Jason	Fish	Lincoln	CA	95648
Michael	Fisher	Monte Rio	CA	95462
Melanie	Fisher	calabasas	CA	91302
jackie	Fisher	Valencia	CA	91381
Karen	Fishkin	San Francisco	CA	94117
Ted	Fishman	San Jose	CA	95123
Todd	Fisk	San Diego	CA	92131
Shelley	Fitch	Santa Rosa	CA	95404
Stan	Fitzgerald	San Jose	CA	95135
Allie	Fitzgerald	san clemente	CA	92672
Erica	Fix	Monterey	CA	93940
Georgia	Fizdale	Thousand Oaks	CA	91320
Molly	Flaherty	Huntington Beach	CA	92648
Floyd	Flanagan	Long Beach	CA	90803
Marcia	Flannery	oakland	CA	94609
Katharine	Flebotte	Fortuna	CA	95540
Elizabeth	Fleming	Oakhurst	CA	93644
Loretta	Fleming	Elk Grove	CA	95624
Russell	Fletcher	Ventura	CA	93003
Charles	Fletcher	Mt. Center	CA	92561
Jude	Fletcher	Oakland	CA	94607
Diana	Florentin	Van Nuys	CA	91405
Regina	Flores	Lake Elsinore	CA	92532
Brian	Flores	San Diego	CA	92113
Brian	Flores	Castro Valley	CA	94546
Debra	Floyd	Coronado	CA	92118
Sara	Fogan	Santa Clarita	CA	91385
Terje	Fokstuen	Berkeley	CA	94704
Adrienne	Fong	San Francisco	CA	94115
Chatham	Forbes	Los Gatos	CA	95030
Michael	Ford and Marks	Watsonville	CA	95076
Gabriella	Forrester	Orange	CA	92869
Nicole	Fortunato	Carlsbad	CA	92011
Pam	Fosgate	Shasta lake	CA	96019
Barbara	Foster	Simi Valley	CA	93065
Lesley	Foster	Walnut Creek	CA	94597
Leotis	Foster	Oakland	CA	94621
Genette	Foster	Pasadena	CA	91106
Alyce	Foster	Carmel	CA	93923
Sam	Foster	san francisco	CA	94112
Heidi	Foubare	Burbank	CA	91502
Nicole	Fountain	Oakland	CA	94610
Barbara	Fowler	Claremont	CA	91711
Liz	Fowler	Richmond	CA	94805
Kimberly	Fowler	San Ramon	CA	94582
Don	Wattenbarger	Eureka	CA	95503
Anne	Watts	Santa Rosa	CA	95401
Susan	Watts	Riverside	CA	92506
Alan	Watwood	San Jose	CA	95136
Rebecca	Wave	Santa Barbara	CA	93105
Sandra	Wawrytko	San Diego	CA	92126
Susan	Wayne	xxx	CA	92354
Gila	Wdowinski	Laguna Beach	CA	92651
Beverly	Weatherill	Orange	CA	92867
Pat	Weaver	Redway	CA	95560
Andrew	Weaver	Castaic	CA	91384
Donna	Webb	Nevada City	CA	95959
Helene	Webb	Santa Barbara	CA	93109
Glenn	Webb	Pinole	CA	94564
Sally & Don	Webb	Santa Barbara	CA	93108
Jack	Weber	El Segundo	CA	90245
L	Webster	Culver City	CA	90230
Noreen	Weeden	San Francisco	CA	94107
Jeff	Weicher	Santa Monica	CA	90403
Laurie	Weichman	LA	CA	90049
Cheryl	Weiden	Los Altos	CA	94022
Dawn	Weider	Redding	CA	96003
Kenneth	Weidner	Berkeley	CA	94702
Helene	Weil	San Jose	CA	95125
Margaret	Weimer	San Mateo	CA	94403
Ron	Weinberg	La Mirada	CA	90638
Henry	Weinberg	Santa Barbara	CA	93110
Mark	Weinberger	San Francisco	CA	94121
Nona	Weiner	San Jose	CA	95127
Dena	Weirich	Oceanside	CA	92056
Joe	Weis	Reedley	CA	93654
Jocelyn	Weisbrich	Berkeley	CA	94709
Lynne	Weiske	Los Angeles	CA	90048
Mike	Weiss	Benicia	CA	94510
Arleen	Weiss	San Lorenzo	CA	94580
Lizette	Weiss	Fort Bragg,	CA	95437
Russell	Weisz	Santa Cruz	CA	95060
Stephen	Weitz	Oakland	CA	94619
Jeff	Wells	San Diego	CA	92176
R	Wells	Los Angeles	CA	90020
Ted	Wells	Newport Beach	CA	92660
Julie	Werthman	Sacramento	CA	95822
Ken	Wertz	Redwood City	CA	94062
Karen	West	Santa Ana	CA	92705
Alan	Westbrook	San Jose	CA	95117
Marly	Wexler	San Diego	CA	92103
Barbara	Wheeler	Hemet	CA	92545

Kathleen	Fowler	Alturas	CA	96101
Gene	Fox	Encinitas	CA	92024
Wendy	Frado	Los Angeles	CA	90036
Darren	Frale	Los Angeles	CA	90065
Natasha	Fraley	Santa Cruz	CA	95060
Lena	Francis	Sebastopol	CA	95472
Angie	Franck	Concord	CA	94518
Rita	Franco	Sunland	CA	91040
Linda	Frankel	Oakland	CA	94610
James	Franken	Burbank	CA	91506
Constance	Franklin	Los Angeles	CA	90026
Claudia	Frantz	Fair Oaks	CA	95628
Ellen	Franzen	Berkeley	CA	94710
Jean	Fraschina	San Rafael	CA	94901
Cary	Frazee	Eureka	CA	95503
Barbara	Frazer	Sacramento	CA	95816
Cynthia	Frederick	Pasadena	CA	91104
Jacqueline	Fredericks	San Pablo	CA	94806
Jodi	Frediani	Santa Cruz	CA	95060
Makayla	Freed	Williams	CA	95987
Steve	Freedman	Venice	CA	90292
Paula	Freedman	San Rafael	CA	94901
Amy	Freemire	San Francisco	CA	94131
Fernando	Fregoso	Burbank	CA	91506
Matthew	Freiberg	Tustin	CA	92782
Gina	Freitas	San Diego	CA	92117
john	fremont	Los Angeles	CA	90027
Michael	French	Los Angeles	CA	90013
Michael	Frey	Santa Barbara	CA	93130
Andrew	Frey	Pasadena	CA	91106
Mona	Friedman	Culver City	CA	90230
Susan	Friedman	San Jose	CA	95126
Leslie	Friedman	Mountain View	CA	94041
Leanne	Friedman	Davis	CA	95616
Christina	Friend	Spring Valley	CA	91977
Julia	Frisk	Plumas Lake	CA	95961
Nicolette	Froehlich	Acampo	CA	95220
Jeff	Fromberg	Los Angeles	CA	90049
Linda	Frost	Oceanside	CA	92054
David	Frost	Oceanside	CA	92054
Earl	Frounfelter	Santa Maria	CA	93454
Ricardo	Frustockl	Santa Barbara	CA	93103
Bryna	Fuchslocher	Thousand Oaks	CA	91360
Luis	fuentes	San Diego	CA	92103
Gerardo	Fuentes	Watsonville	CA	95076
John	Fuhrer	Newport Beach	CA	92663
Mi	Fukuda	San Francisco	CA	94122

LuAnn	Wherry	San Diego	CA	92116
Howard	Whitaker	Gold River	CA	95670
Judith	Whitcomb	Menlo Park	CA	94026
Mary	White	Berkeley	CA	94709
Ann	White	Eureka	CA	95501
Tina	White	Fillmore	CA	93015
Michael	White	Los Angeles	CA	90059
Jessica	White	coronado	CA	92118
Joyce	White	Merced	CA	95340
Christina	White	Albany	CA	94706
Barbara	White	Laguna Beach	CA	92651
Angelica	Whitefeather	Los Angeles	CA	90006
Crystal	Whitehead	Pasadena	CA	91104
Arleen	Whitmore	San Anselmo	CA	94960
Robert	Whitmore	San Jose	CA	95124
Tamra	Whitney	Fort Bragg	CA	95437
Erika	Whitton	Irvine	CA	92612
Lissa	Wick	Santa Rosa	CA	95407
LL	Wickham	SanOnofre	CA	92672
Landon	Wiedenman	Mountain View	CA	94043
Jonathan	Wieder	Berkeley	CA	94702
Nancy	Wiens	San Rafael	CA	94901
John	Wiesner	Castro Valley	CA	94546
Kevin	Wighman	Sylmar	CA	91392
Richard	Wightman	Arcadia	CA	91006
Antoinette	Wilcox	Sunnyvale	CA	94085
Deborah	Wilder	San Anselmo	CA	94960
Beth	Wildermann	Boulder Creek	CA	95006
Carol	Wiley	Victorville	CA	92394
Charles	Wiley	North Hollywood	CA	91606
Candace	Wilhelm	Redwood City	CA	94065
Ramona	Wilkerson	Oakland	CA	94604
Charles Skip	Wilkins	Pacific Grove	CA	93950
Dorothy	Wilkinson	Hollywood	CA	90027
S	Wilkinson-Bacchi	Pilot Hill	CA	95664
Jennifer	Will	Morgan Hill	CA	95037
Y	Williams	Rancho Palos Verdes	CA	90275
Leslie	Williams	El Cajon	CA	92020
John	Williams	Pollock Pines	CA	95726
Carol	Williams	Etna	CA	96027
Judy	Williams	Caliente	CA	93518
Linda	Williams	Napa	CA	94558
Rhoda	Williams	Sebastopol	CA	95472
Patrick	Williams	Sunnyvale	CA	94086
Gerry	Williams	Thousand Oaks	CA	91360
Sara	Williams	Cherry Valley	CA	92223
Penny	Williams	Newman	CA	95360

Will	Fukui	Playa del Rey	CA	90293
Judy	Fukunaga	ARROYO GRANDE	CA	93421
Lorna	Fuller	Oceanside	CA	92054
Jen	Fuller	Sausalito	CA	94966
Tony	Fuller	Petaluma	CA	94954
Maureen	Fullerton	Scotts Valley	CA	95067
Sophie	Fung	Calabasas	CA	91302
Robert	Furst	Joshua Tree	CA	92252
Gilda	Fusilier	Sacramento	CA	95831
Janet	G Heinle	Santa Monica	CA	90403
Nick	Gaetano	Laguna Beach	CA	92651
Mal	Gaffney	Lompoc	CA	93436
Martha	Galaif	Pacific Palisades	CA	90272
Querido	Galdo	Oakland	CA	94601
Roni	Galgano	San Diego	CA	92104
Kellie	Gallagher	29 Palms	CA	92277
Christine	Gallagher	Palm Springs	CA	92264
Mark	Gallegos	Los Angeles	CA	90063
Joseph	Gallegos	Sacramento	CA	95318
Craig	Galloway	Van Nuys	CA	91406
Laryssa	Galvez	San Dimas	CA	91773
Juanita	Gama	Desert Hot Sp	CA	92241
Tawni	Gamaza	San Francisco	CA	94121
Gavin	Gamboa	Sherman Oaks	CA	91423
Amy	Ganahl	Corona	CA	92881
Alison	Gann	Topanga	CA	90290
Sharma	Gaponoff	Grass Valley	CA	95949
Armando	Garcia	Paramount	CA	90723
evette	garcia	hawaiian gardens	CA	90716
Jeffery	Garcia	Mendocino	CA	95460
Bridgette	Garcia	La Mesa	CA	91942
Esmeralda	Garcia	san rafael	CA	94901
Hector	Garcia	Los Angeles	CA	90005
Luis	Garcia	Anaheim	CA	92801
Marli	Garcia Cucharero	Sonoma	CA	95476
Jean	Garcia-Gomez	Torrance	CA	90504
Constance	Garcia-Singer	Los Angeles	CA	90027
Colleen	Garde	santa cruz	CA	95062
Gardenia	Gardener	nevada city	CA	95959
Debbie	Gardinier	Santa Ana	CA	92704
Keith	Gardner	Monterey	CA	93940
David	Gardner	Santa Monica	CA	90405
pat	garfield	Alameda	CA	94501
Guy	Gargiullo	Emeryville	CA	94608
Michael	Garitty	Nevada City	CA	95959
Barbara	Garner	San Rafael	CA	94901
Marina	Garras	San Francisco	CA	94117

Nicholas	Williams	LANCASTER	CA	93535
Don	Williamson	Spring Valley	CA	92539
Shawn	Williamson	Studio City	CA	91604
Barbara	Williamson	Costa Mesa	CA	92627
Barbara	Williamson	Albany	CA	94706
Tessa	Williamson	Canyon Country	CA	91387
Debbie	Williamson	Marysville	CA	95901
Jennifer	Willis	SAN FRANCISCO	CA	94117
Charles	Wilmoth	San Francisco	CA	94124
Derek	Wilson	Larkspur	CA	94939
Margaret	Wilson	Ventura	CA	93003
Eliane	Wilson	Torrance	CA	90501
Andrew	Wilson	San Diego	CA	92130
Richard	Wilson	Oceanside	CA	92054
Samantha	wilson	redwood city	CA	94061
Arlene	Wiltberger	San Carlos	CA	94070
William	Winburn	Rancho Palos Verdes	CA	90275
Theresa	Winchell	Julian	CA	92036
Ken	Windrum	Los Angeles	CA	90020
Brian	Wines	San Francisco	CA	94114
Mala	Wingerd	San Diego	CA	92119
Philip	Winkels	LAYTONVILLE	CA	95454
Michael	Winn	Laguna Niguel	CA	92677
Ann	Winship	Woodland	CA	95695
William	Winters	Emeryville	CA	94608
Anita	Wisch	Valencia	CA	91355
Christina	Wise	Culver City	CA	90230
F	Wisznia	Redlands	CA	92373
Amanda	Withrow	Los Angeles	CA	90065
Roslynn	Witte	Del Mar	CA	92014
Jessica	Wodinsky	Los Angeles	CA	90066
Craig	Woempner	San Diego	CA	92113
Marc	Woersching	Valley Village	CA	91617
Linda	Wolcott	LAGUNA HILLS	CA	92653
Laura Tomi	Wolf	Los Angeles	CA	90066
Rachel	Wolf	Santa Cruz	CA	95060
Jessica	Wolfe	Sebastopol	CA	95472
Charles	Wolfe	Sylmar	CA	91342
Michael	Wollman	San Luis Obispo	CA	93405
Manuel	Wong	Pacific Palisades	CA	90272
Peter	Wong	San Francisco	CA	94112
Karina	Wong	San Jose	CA	95148
Benjamin	Wong	Newark	CA	94560
Teresa	Wong	San Gabriel	CA	91775
Cynthia	Wood	San Francisco	CA	94117
Dianna	Wood	Tehachapi	CA	93561
Lauren	Wood	Los Angeles	CA	90046

Jamila	Garrecht	Petaluma	CA	94952
Laurie	Garrett	Fairfax	CA	94930
Megan	Garrett	Sacramento	CA	95835
James	Garrison	Camptonville	CA	95922
Laila	Garsys	Los Angeles	CA	90006
Donna	Garza	Tustin	CA	92782
Salvador	Garza	ojai	CA	93023
Jordan	Gascon	San Diego	CA	92103
Roy	Gates	Fresno	CA	93727
and	Gates	Fountain Valley	CA	92708
Jan	Gates	Napa	CA	94559
Sandra	Gather	Roseville	CA	95747
Carole	Gathman	novato	CA	94949
Gina	Gatto	Castro Valley	CA	94546
Ellen	Gauba	Torrance	CA	90504
B	Gauler	Riverside	CA	92506
Diego	Gavilanes	Los Angeles	CA	90024
Silvana	Gayer	Carlsbad	CA	92011
Steven	Gaylord	Barstow	CA	92311
Gertrude	Gebin	Daly City	CA	94015
Cynthia	Gecas	Oakland	CA	94611
Steffanie	Gee	Los Angeles	CA	90064
Lisa	Gee	La Crescenta	CA	91224
Jay	Gehrke	Highland	CA	92346
fred	geiger	santa cruz	CA	95060
Gemma	Geluz	Fairfield	CA	94533
Timothy	Gemmill	San Francisco	CA	94109
HClarkeGentry	Gentry	Oakland	CA	94609
Nick	George	San Francisco	CA	94115
CLS	George F. Klipfel II	Cathedral City	CA	92234
Anthony	Georgetti	Burbank	CA	91504
Alexis	Georgiou	Santa Clara	CA	95054
Mark	Geraghty	Santa Monica	CA	90405
Robin	Gerber	North Hollywood	CA	91602
Balfour	Gerber	San Francisco	CA	94132
Gordon	Gerbitz	Santa Barbara	CA	93120
Christine	Gernant	West Sacramento	CA	95691
Carol	Gerratana	Joshua Tree	CA	92252
David	Gerry	los Angeles	CA	90039
Maria	Gestuvo	san francisco	CA	94105
Nazlee	Ghannadi	Valencia	CA	91354
Sheila	Gholson	palo alto	CA	94306
Janine	Giaime	Valley Village	CA	91607
Janet	Giamanco	San Diego	CA	92105
Linda	Gibb	Rancho Cucamonga	CA	91739
Christina	Gibson	San Diego	CA	92130
Claudia	Gibson	Fairfax	CA	94930

Wendell	Wood	Crescent City	CA	95531
Cynthia	Wood	Bolinas	CA	94924
Jud	Woodard	sutter creek	CA	95685
Laura	Woodry	Azusa	CA	91702
Zion	Woods	san diego	CA	92116
Debbie	Woods	Rohnert Park	CA	94928
Lauren	Woods	santa cruz	CA	95060
Moriah	Woolworth	Cupertino	CA	95014
Chris	Worcester	Truckee	CA	96160
Wyatt	Workman	Glendale	CA	91201
Gail	Worth	Palos Verdes	CA	90274
Elisaveta	Wrangell	Perris	CA	92570
kathryn	wright	Los Angeles	CA	90041
Katherine	Wright	Aliso Viejo	CA	92656
Emma	Wright	San Diego	CA	92103
Blake	Wu	Lafayette	CA	94549
Dana	Wullenwaber	Redding	CA	96001
Thomas	Wylie	Big Bear City	CA	92314
Tom	Wyman	riverside	CA	92501
Tina	Wynn	San Diego	CA	92117
Marjorie	Xavier	hayward	CA	94542
Steve	Yaffee	Long Beach	CA	90815
Sandra	Yagi	San Francisco	CA	94114
David	Yamaguchi	Fresno	CA	93704
Jennifer	Yamamoto	Manhattan Beach	CA	90266
Lor	Yang	Hanford	CA	93230
Emily	Yang	Arcadia	CA	91007
Rev Gregory	Yaroslow	Redlands	CA	92373
Jacob	Yastrow	Arcata	CA	95521
William	Yeager	menlo park	CA	94025
Chet	Yee	Redwood City	CA	94061
Stephen	Yeh	Oakland	CA	94605
Stefanie	Yellis	Oakland	CA	94619
Julian	Yerena	Parlier	CA	93648
Grainne	Yiu	La Crescenta	CA	91214
Holly	Yokoyama	Rancho Cucamonga	CA	91737
Lynne	York	Vallejo	CA	94590
Bing	York	Mendocino	CA	95460
Carol	Yothers	Whittier	CA	90601
Anita	Youabian	Beverly Hills	CA	90212
Constance	Youens	Murrieta	CA	92562
Lowell	Young	Mariposa	CA	95338
Vincent	Young	Upland	CA	91786
Leslie	Young	Bloomington	CA	92316
Shelley	Young	Stockton	CA	95215
Noah	Youngelson	Los Angeles	CA	90066
Harry	Youtt	Redondo Beach	CA	90277

Leah	Gibson-Corcoran	Tujunga	CA	91042
Astrid	Giese-Zimmer	Berkeley	CA	94705
Phyllis	Gifford	Rio Linda	CA	95673
Teresa	Gifford	Mentone	CA	92359
Karyn	Gil	Sacramento	CA	95819
Camille	Gilbert	Santa Barbara	CA	93101
Pat	Gilbert	Carmichael	CA	95608
Pat	Gilchrist	Fairfield	CA	94534
Thomas	Giles	Laguna Beach	CA	92651
Irene	Gilgoff	Los Alamitos	CA	90720
Brian	Gill	Oakland	CA	94610
Thomas	Gillespie	La Mirada	CA	90638
Naomi	Gilmore	Sacramento	CA	95824
AG	Gilmore	Walnut	CA	91789
Arturo	Giraldez	Stockton	CA	95203
Jocelyn	Girard	San Bernardino	CA	92405
Darrylin	Girvin	Laguna Beach	CA	92651
Louise	Givens	Santa Rosa	CA	95409
Christine	Gladish	Sierra Madre	CA	91024
Jean	Gladstone	EUREKA	CA	95501
Heather	Glanz	La Mesa	CA	91942
Philip	Glaser	Laguna Niguel	CA	92677
Robert	Glasner	Tarzana	CA	91356
andrea	glass	San Francisco	CA	94131
Daniel	Glass	Los Angeles	CA	90039
Mark	Glasser	LA	CA	90066
Joe	Glaston	Desert Hot Springs	CA	92240
Stephanie	Glatt	Santa Barbara	CA	93108
Cori	Glazer	Topanga	CA	90290
Holly	Gleason	Los Angeles	CA	90039
C.	Glick	Laguna Woods	CA	92637
Pamela	Glintenkamp	Valley Village	CA	91607
Krista	Gobby	Corona	CA	92882
James	Godbe	Bishop	CA	93515
laura	godfrey	Corralitos	CA	95076
Matt	Godino	Mill Valley	CA	94941
Mika	Godzich	fall river mills	CA	96028
Paul	Goedinghaus	Chino	CA	91710
Jill	Goessling	Castaic	CA	91384
Randall	Goetzl	San Francisco	CA	94110
Frances	Goff	Valley Village	CA	91607
Alan	Goggins	Castro Valley	CA	94546
Ellen	Gold	Palo Alto	CA	94306
Nancy	Goldberg	Los Angeles	CA	90066
Daniel	Goldberg	Santa Cruz	CA	95060
Susan	Goldberg	Glendale	CA	91202
Patricia	Goldberg	San Francisco	CA	94122
J	Yudell	santa monica	CA	90409
shirley	yuen	san francisco	CA	94118
Raymond	Yule	Fullerton	CA	92835
Joy	Zadaca	Long Beach	CA	90807
Julie	Zak	Forestville	CA	95436
Deborah	Zak	Malibu	CA	90265
Eric	Zakin	San Mateo	CA	94403
Katrina	Zaleski	corona	CA	92882
M	Zamagni	Valley Springs	CA	95252
Andy	Zamenes	Redwood City	CA	94061
norma	zamit	San Anselmo	CA	94979
Victor	Zamora	Torrance	CA	90504
Brianna	Zamora	Redding	CA	96002
Amanda	Zangara	Sebastopol	CA	95472
Laura	Zanic	Fullerton	CA	92833
Sandra	Zaninovich	Los Angeles	CA	90024
Enrique	Zapata	artesia	CA	90702
Krishna	Zapkovic	Arcata	CA	95518
Gabriela	Zaragoza	Davis	CA	95618
Sandra	Zelasko	Valley Center	CA	92082
Johanne	Zell	Camarillo	CA	93012
Rudy	Zeller	berkeley	CA	94702
Jennifer	Zeller	Pacific Palisades	CA	90272
Jaric	Zemmer	san francisco	CA	94131
Elisabeth	Zenker	arcata	CA	95521
Sydney	Zentall	santa cruz	CA	95060
E.Gail	Zermeno	Palomar Park	CA	94062
I	Zevos	Los Angeles	CA	90029
Alysha	Zgrabik	Thousand Oaks	CA	91360
Jane	Zhao	Burlingame	CA	94010
Herbert	Ziegler	YUCAIPA	CA	92399
Dawn	Ziegler	San Diego	CA	92107
R.	Zierikzee	San Francisco	CA	94118
Louise	Zimmer	Paso Robles	CA	93446
Arlene	Zimmer	Rancho Palos Verdes	CA	90275
Julie	Zimmerman	Sherman Oaks	CA	91423
Anne	Zimmerman	San Francisco	CA	94134
Amy	Zink	Oakland	CA	94606
Jeff	Zittrain	Berkeley	CA	94702
Richard	Zoah-Henderson	Eureka	CA	95503
John	Zorger	Laguna Hills	CA	92653
Pilar	Zorrilla	West Hills	CA	91307
C	Zuber	Tujunga	CA	91043
Sandy	Zwick	Yorba Linda	CA	92886
Debra	Zywica	Dana Point	CA	92629
Josh	Amendola	Coeur D'Alene	ID	83816
Celeste	Arnold	Boise	ID	83713

Elizabeth	Golden	Topanga	CA	90290
Gene	Golden	Rancho Santa Margarita	CA	92688
ellen	golden	san mateo	CA	94401
Lisa	Golden	Santa Rosa	CA	95403
Georgia	Goldfarb	Malibu	CA	90265
Bobbi	Goldin	woodland hills	CA	91364
John	Golding	oakland	CA	94619
Ron	Goldman	Los Altos	CA	94024
Sergi	Goldman-Hull	Oakland	CA	94602
roz	goldstein	greenbrae	CA	94904
Susan	Goldstein	Danville	CA	94526
Joanne	Gomes	Madera	CA	93637
Angelica	Gomez	los angeles	CA	90044
Sandra	Gomez	San Pedro	CA	90732
Tara	Gonzales	Atascadero	CA	93422
Mike	Gonzales	LA VERNE	CA	91750
Tara	Gonzales	Huntington Beach	CA	92648
Alan	Gonzalez	Long Beach	CA	90808
Iara	Gonzalez	Port Hueneme	CA	93041
Yazmin	Gonzalez	Bellflower	CA	90706
Kristina	Gonzalez	San Diego	CA	91911
Manuel	Gonzalez, Jr	Upland	CA	91786
Mark	Goodfriend	Lafayette	CA	94549
Timothy	Goodman	Cerritos	CA	90703
Diana	Goodman	San Francisco	CA	94116
James	Goodwin	Hollywood	CA	90068
Susan	Goodwin	Valencia	CA	91355
Keith	Gordon	Los Angeles	CA	90024
Mildred	Gordon	Oceanside	CA	92054
WENDY	GORDON	Valley Village	CA	91607
Carol	Gordon	Los Angeles	CA	90027
Ray	Gordon	Sausalito	CA	94965
Lisa	Gordon	Malibu,	CA	90265
Billie	Gordon	Los Gatos	CA	95032
Linda	Gossard	San Juan Capistrano	CA	92675
Elaine	Gottesman	San Diego	CA	92124
Michelle	Gough	San Francisco	CA	94118
Thomas	Gourley	San Francisco	CA	94121
Nancy	Gowani	Winnetka	CA	91396
Edward	Gowens	San Diego	CA	92101
Nick	Grable	Agua dulce	CA	91390
Steve	Graff	Los Angeles	CA	90025
Gail	Graff	Thousand Oaks	CA	91361
Barbara	Graham	San Diego	CA	92110
R	Graham	San Francisco	CA	94121
Clayton	Graham	Bonita	CA	91902
Sara	Graham	Yucaipa	CA	92399

Sean	Bailey	Coeur d' Alene	ID	83814
Susan	Beard	Dover	ID	83825
Juliana	Benner	BOISE	ID	83702
Dian	Berger	Boise	ID	83716
Russ	Berger	Boise	ID	83716
Joan	Blurton	Mountain Home	ID	83647
Laurie	Brown	Boise	ID	83709
gary	Calhoun	Boise	ID	83704
Janet	Carter	Hailey	ID	83333
Linde	Casper	Middleton	ID	83644
patricia	castillo	Boise	ID	83703
Carmen	Chacon	Pocatello	ID	83202
Nicole	Chaniac	Taradeau	ID	83460
Janelle	Church	Garden Valley	ID	83622
Kristine	Ciesinski	Victor	ID	83455
Rachel	Clark	Moscow	ID	83843
Sally	Cloud	Sandpoint	ID	83864
Demetra	Conklin	Boise	ID	83713
Glenda	Cox	Sun Valley	ID	83353
Barb	Crumpacker	Coeur d'Alene	ID	83814
Leslee	Doner	Boise	ID	83709
Lynne	doria	hayden	ID	83835
Lorna	Emdy	Hailey	ID	83333
Marc	Fleisher	Moscow	ID	83843
Margaret	Flock	COEUR D ALENE	ID	83816
Brieanne	Fluewelling	Boise	ID	83709
Dave	Frederick	Boise	ID	83705
Virginia	George	Boise	ID	83713
Ellen & Tom	Glaccum	Stanley	ID	83278
Stephen	Hackney	Grangeville	ID	83530
Dameon	Hansen	Idaho Falls	ID	83402
craig	hanson	Priest River	ID	83856
Annette	Hanson	Boise	ID	83712
Sylvia	Heller	Kooskia	ID	83539
Stan	Hoobing	Boise	ID	83702
Ronald	Johnson	Post Falls	ID	83854
sara	johnson	Coeur d'Alene	ID	83815
Schuyler	Judd	Island Park	ID	83429
Adina	Kelley	Boise	ID	83706
Marcia	Kent	Hailey	ID	83333
Linda	Kish	Ketchum	ID	83340
Grove	Koger	Boise`	ID	83712
Nicole	Kohn	Sun Valley	ID	83353
Laurie	Kuntz	Boise	ID	83713
Aaron Jacob	Lampe	Boise	ID	83704
Roger & Sue	Lang	Island Park	ID	83429
sue	lesmond	boise	ID	83725

Rosemary	Graham-Gardner	Manhattan Beach	CA	90266
Briana	Graham-Ramos	Buena Park	CA	90620
Elizabeth	Grainger	Claremont	CA	91711
Fred	Granlund	N. Hollywood	CA	91601
Robert	Grant	San Francisco	CA	94121
Audrey	Grant	Aliso Viejo	CA	92656
Katharine	Grantham	Ojai	CA	93023
Lisa	Graser	Morgan Hill	CA	95037
Sharon	Graves	Westwood	CA	96137
Caryn	Graves	Berkeley	CA	94702
H	Gray	Hayward	CA	94544
Margery	Gray	San Francisco	CA	94116
Denise	Greaves	San Jose	CA	95132
Paula	Greco	Aliso Viejo	CA	92656
June	Green	Belmont	CA	94002
Scott	Green	Alhambra	CA	91801
Janet	Green	Temecula	CA	92592
Patty	Green	carmichael	CA	95608
Delone	Green	newport beach	CA	92663
Jamie	Green	Ventura	CA	93004
Don	Green	oakland	CA	94602
Jonathan	Green	Los Angeles	CA	90008
Savannah	Green	mendocino	CA	95460
July	Green	Santa Rosa	CA	95403
Bert	Greenberg	san jose	CA	95135
Kelly	Greene	San Diego	CA	92106
Juliet	Greenwald	san diego	CA	92106
Jared	Greer	Oakland	CA	94609
Pia	Gregan	Menlo Park	CA	94025
Arthur	Gregorian	Oakland	CA	94602
William	Gregory	Santa Clarita	CA	91390
Shirley	Gregory	Moraga	CA	94556
Mary	Gregory	studio city	CA	91607
Faye	Gregory	Colton	CA	92324
Probyn	Gregory	Tujunga	CA	91042
Arthur	Gribben	Van Nuys	CA	91406
Lana	Gridley	Santa Maria	CA	93454
Robert	Griffin	North Hollywood	CA	91601
Pam	Griffin	Camarillo	CA	93012
Amanda	Griffis	Woodland	CA	95695
Morgan	Griffith	Jamul	CA	91935
Russell	Grindle	Fairfield	CA	94533
Vaiva	Griskaite	sacramento	CA	95821
Lynne	Grob	San Jose	CA	95122
Michael	Groeger	Vista	CA	92083
Lance	Groody	Sebastopol	CA	95472
Malcolm	Groome	Topanga	CA	90290

Cass	Lockhart	Parma	ID	83660
Linda	Lord Johnson	Ketchum	ID	83340
Sheelagh	Lynn	Spirit Lake	ID	83869
Cheryl	Martin	Lewiston	ID	83501
Chelsea	Maxfield	Boise	ID	83702
Jim	May	Boise	ID	83706
Jim	McCue	Idaho Falls	ID	83402
Colleen	McNutt	Moscow	ID	83843
David	Monsees	Boise	ID	83702
Linda	Morgan	Caldwell	ID	83607
Kathy	Motsinger	Boise	ID	83704
katherine	noble	Hailey	ID	83333
Debra	Nyberg	Post Falls	ID	83854
Crista	O'Conner	Moscow	ID	83843
Mo	Oliver	Coeur d'Alene	ID	83814
Nikola	Olson	Boise	ID	83705
Aurora	Paz	Notus	ID	83656
Craig	Peariso	Boise	ID	83702
John	Pedersen	Nampa	ID	83686
Thomas	Pierce	Grangeville	ID	83530
Mary	Reali	Boise	ID	83709
Earline	Reid	Idaho Falls	ID	83404
A	Reid	Hope	ID	83836
Ronda	Reynolds	Idaho Falls	ID	83404
Tim	Rhodes	Boise	ID	83707
Kelly	Richmond	Boise	ID	83703
Thomas	Rogers	Eagle	ID	83616
Sandra	Romero	Boise	ID	83706
Daniela	Rossi	Aberdeen	ID	83210
Shelli	Schwasinger	Boise	ID	83709
Nancy	Shankweiler	Boise	ID	83705
Larry	Siglin	Coeur D Alene	ID	83815
ashlea	simpson	Post Falls	ID	83854
Jasmin	Skewis	Payette	ID	83661
Perky	Smith-Hagadone	Dover	ID	83825
Gina	Stoner	Boise	ID	83709
Earth	Thunder	Boise	ID	83703
Bonnie	Tighe	Coeur D Alene	ID	83814
donna	towne	meridian	ID	83646
Michael	Tuttle	Moscow	ID	83843
Misha	Veloz	Meridian	ID	83646
Kitty	Vincent	Blackfoot	ID	83221
E	Wait	Hayden	ID	83835
Tom	Wilson	Boise	ID	83715
William	Woodward	Meridian	ID	83646
Jean	Aadams	Sweet Home	OR	97386
Teos	Abadia	Portland	OR	97229

Henriette	Groot	Los Osos	CA	93402
Anne	Gross	Modesto	CA	95351
Kurt	Gross	San Diego	CA	92176
Cathy	grovenburg	San Jose	CA	95124
William	Grueneberg	Los Angeles	CA	90025
Anita	Gryska	Carmel	CA	93923
Herbert	Guadron	Inglewood	CA	90302
Sophie	Guarasci	Sausalito	CA	94965
Alisienda	Guastella	Valencia	CA	91354
Joyce	Gubelman	San Francisco	CA	94124
Craig	Guenther	Lakeport	CA	95453
Adriana	Guidi	Sherman Oaks	CA	91423
Valerie	Guinan	Cupertino	CA	95014
Tina	Gullickson	Reseda	CA	91335
Christine	Gump	castaic	CA	91384
Sylvia	Gunning	Thousand Oaks	CA	91320
J	Gurdin	San Francisco	CA	94122
Brian	Gustafson	Eureka	CA	95503
Rae	Gustafson	Mill Valley	CA	94941
Nancy	gutierrez	palm desert	CA	92260
David	Gutierrez	Los Angeles	CA	90031
Tracy	Guzeman	Los Altos	CA	94022
Mariel	Guzman	Los Angeles	CA	90026
RN	Gwyneth J. Smith	Escondido	CA	92026
Tia	Ha	San Jose	CA	95124
Lhaage	haage	oakland	CA	94618
Sue	Habegger	Grass Valley	CA	95949
Sally	Haberlin	Laguna Niguel	CA	92677
Lisa	Hackett	san Clemente	CA	92673
Laura	Hadeed	oakland	CA	94606
Ellen	Haden	Pacific Palisades	CA	90272
Marlayna	Hadley	Inyokern	CA	93527
Sarah	Hafer	Sacramento	CA	95864
Anne	Hagberg	salinas	CA	93906
MC	Hagerty	Carlsbad	CA	92013
Alan	Haggard	San Diego	CA	92105
George	Hague	Moreno Valley	CA	92555
Brenda	Haig	Long Beach	CA	90803
Denise	Halbe	Sonoma	CA	95476
Alyssa	Halcomb	san diego	CA	92127
john	hale	los angeles	CA	90041
KATHY	HALES	LANCASTER	CA	93536
Julie	Hales	Castro Valley	CA	94546
Mary	Haley	Elk Grove	CA	95758
Kimberly	Halizak	Los Angeles	CA	90068
Robert	Hall	San Francisco	CA	94117
Holly	Hall	Temecula	CA	92592

Otto	Abahazy	Aloha	OR	97007
Harriet	Adams	Eugene	OR	97404
Roy	Adsit	portland	OR	97228
Honora-Bright	Aere	Blodgett	OR	97326
Patrick	Aitchison	Beaverton	OR	97005
Susan	Alaine	Beaverton	OR	97007
Myriam	Alaux	Portland	OR	97209
Samuel	Aley	Coos Bay	OR	97420
Mandy	Allen	Salem	OR	97302
Edye	Allen	Portland	OR	97215
Luanne	Alomair	Beaverton	OR	97007
Skylaar	Amann	Portland	OR	97202
Hector	Amaro	Salem	OR	97305
Sheri	Ambrose	Lincoln City	OR	97367
Christy	Anderson	Portland	OR	97213
Joan	Andon	Portland	OR	97229
George	Angus	warrenton	OR	97146
Luisa	Appleman	Clackamas	OR	97015
Sheri	Archey	Canby	OR	97013
Barbara	Arlen	Corvallis	OR	97330
Susanna	Askins	Portland	OR	97230
Deanne	Ater	Portland	OR	97239
Julia	Austbo	Jacksonville	OR	97530
Andrew	Austin	Salem	OR	97302
Steve	Aydelott	Bend	OR	97701
Beverly	Bacak	Brookings	OR	97415
Cindy	Baertlein	Eugene	OR	97405
Sara	Baker	Portland	OR	97201
Amy	Baker	Ashland	OR	97520
Jada	Baker	Eagle Point	OR	97524
Catherine	Barnard	Portland	OR	97202
Elaine	Barnes	Harrisburg	OR	97446
Lois	Barrett	Portland	OR	97230
Janelle	Barton	Forest Grove	OR	97116
Keith	Barton	Albany	OR	97321
Madeleine	Bateman	Portland	OR	97230
elaine	Bauer	Astoria	OR	97103
Enrique	Bava	Portland	OR	97232
Edward	Bedor	Portland	OR	97225
George	Beres	eugene	OR	97405
Kyle	Bergmann	Corvallis	OR	97330
Steven	Berkson	Keizer	OR	97303
James	Bernard	Portland	OR	97266
Stacey	Berrum	Ashland	OR	97520
Danette	Bialous	Sisters	OR	97759
Fred	Bigeh	wilsonville	OR	97070
Patricia	Biggs	Portland	OR	97224

Kathleen	Hallal	Irvine	CA	92603
Thomas	Hallal	irvine	CA	92603
Chris	Halley	irvine	CA	92606
Barbara	Hallman	Brea	CA	92821
G	Hamel	Oceano	CA	93445
Frederick	Hamilton	Rancho Cucamonga	CA	91739
James	Hamilton	Palos Verdes Peninsula	CA	90274
Colleen	Hamilton	Orange	CA	92869
Pamela	Hamilton	sacramento	CA	95605
Victoria	Hamman	San Francisco	CA	94114
F	Hammer	San Francisco	CA	94123
Lisa	Hammermeister	Granada Hills	CA	91344
Marcella	Hammond	San Diego	CA	92104
Clarice	Hampel	Foster City	CA	94404
Susan	Hampton	El Cerrito	CA	94530
Lillian	Hanahan	Novato	CA	94947
K	Hani	hayward	CA	94544
Mark	Hanisee	Riverside	CA	92506
Steve	Hanlon	Los Angeles	CA	90049
Joselyn	Hanmer	San Leandro	CA	94578
Judith	Hanna	Sonora	CA	95370
Ron	Hansel	West Covina	CA	91790
Mary	Hanselmann	Monterey	CA	93940
Phillip	Hansen	San Diego	CA	96120
Audrey	Hanson	Berekely	CA	94705
Susan	Harby	Windsor	CA	95025
Richard	Harden	El Cajon	CA	92019
Timothy	Harden	Campbell	CA	95008
Maddelyn	Harden	San Francisco	CA	94121
Merrow	Hardy	Nevada City	CA	95959
Kathryn	Hardy	Petaluma	CA	94952
Patrick	Harestad	Trinidad	CA	95570
Lynne	Hargett	Lompoc	CA	93436
Mark	Hargraves	Guerneville	CA	95446
Kathryn	Hargreaves	Los Angeles	CA	90053
Bill	Harmon	Milpitas	CA	95035
Pollyana	Harmon	Torrance	CA	90501
Barbara	Harpe	Lomita	CA	90717
Barbara	Harper	Castroville	CA	95012
Diane	Harper	Long Beach	CA	90814
Jan	Harrell	El Cajon	CA	92020
Chris	Harrington	Woodland Hills	CA	91364
Robert	Harris	Menlo Park	CA	94025
Marsha	Harris	Pauma Valley	CA	92061
Terri	Harris	camarillo	CA	93010
Shirley	Harris	Willits	CA	95490
John	Harris	Pittsburg	CA	94565

Sky	Bird	Corvallis	OR	97339
Susan	Birge	SEAL ROCK	OR	97376
Nancy	Bishop	Portland	OR	97217
Tina	Bissett	Portland	OR	97202
Sylvia	Black	Portland	OR	97219
Dana	Bleckinger	Yachats	OR	97498
Tollie	Bohl	Hood River	OR	97031
Challen	Bomont	Grants Pass	OR	97526
Patty	Bonney	Portland	OR	97223
Mary	Botcheos	Welches	OR	97067
Katie	Boxeth	Portland	OR	97266
Joel	Brauer	Lake Oswego	OR	97034
Judy	Bridges	Portland,	OR	97215
Susan	Brown	Eugene	OR	97404
Sandy	Brown	Jacksonville	OR	97530
Cassandra	Browning	Salem	OR	97302
Christopher	Brunje	Creswell	OR	97426
Peter	Buller	Portland	OR	97209
Trish	Bunyard	Portland	OR	97266
Kurt	Burkhart	Portland	OR	97218
David	Burkhart	Salem	OR	97306
Rita	Burns	Pendleton	OR	97801
Connie	Butler	Portland	OR	97217
Phillip	Callaway	Philomath	OR	97370
Nora	Cameron	West linn	OR	97068
Elizabeth	Campbell	Portland	OR	97206
Dale	Cannon	Monmouth	OR	97361
Ellen	Cantwell	Portland	OR	97219
Monica	Card	Portland	OR	97236
Nancy	Carl	Carlton	OR	97111
David	Carnese	Portland	OR	97214
Tasha	Carpenter	Deer Island	OR	97054
Niall	Carroll	Astoria	OR	97103
Kathleen	Casson	Portland	OR	97202
Shannon	Catt	Beaverton	OR	97007
kelley	caudell	williams	OR	97544
Ron	Caudill	Ashland	OR	97520
Tammy	Causey	Jefferson	OR	97352
Nicole	Cerra	Portland	OR	97214
Michele	Chavez	TIGARD	OR	97224
Veroune	Chittim	Selma,	OR	97538
Rena	Chiu	Portland	OR	97229
M'Lou	Christ	Tigard	OR	97223
Steven	Christian	Hillsboro	OR	97123
Veronica	Christie	Corvallis	OR	97330
Bruno	Cilione	Salem	OR	97308
Julie	Clark	Portland	OR	97267

Lois	Harris	Claremont	CA	91711
Carolyn	Harris	Los Angeles	CA	90041
Eddis	Harrison	Richmond	CA	94805
Lynda	Harrison	Sacramento	CA	95825
Faith Elisabeth	Harrison	La Quinta	CA	92253
Patty	Harrison	novato	CA	94949
Jen	Harrison	San Francisco	CA	94131
Maraya	Hart	Salinas	CA	93901
Denice	Hart	Crescent City	CA	95531
Richard	Hart	West Hills	CA	91304
Mary	Harte	Berkeley	CA	94708
Paula	Hartgraves	Dublin	CA	94568
Anne	Harvey	San Diego	CA	92130
Richard	Harvey	Paso Robles	CA	93446
Matthew	Harvey	London	CA	90210
Joe	Harvey	Twain Harte	CA	95383
Mark	Harwood	Van Nuys	CA	91401
Gerald	Haslam	Penngrove	CA	94951
James	Hatchett	Reseda	CA	91335
Susan	Hathaway	Pico Rivera	CA	90660
Erik	Hattan	San Anselmo	CA	94960
Kelly	Hatteberg	Marina	CA	93933
Samantha	Hauptman	Canyon Country	CA	91387
Judy	Hausman	San Jose	CA	95148
Nancy	Havassy	Oakland	CA	94611
Gary	Haven	Agoura Hills	CA	91301
Salome	Hawkins	Anaheim	CA	92807
Paula	Hawkins	San Diego	CA	92104
Randy	Hawkins	Long Beach	CA	90803
Alys	Hay	Windsor	CA	95492
Tim	Hayes	El Cajon	CA	92020
Marietta	Hayes	encino	CA	91436
Denise	Hayes	VENTURA	CA	93001
Susan	Hayes	mill valley	CA	94941
Kimberly	Hayes	Oakland	CA	94605
Jennifer	Hayes	Modesto	CA	95350
Lee	Hays	Apple Valley	CA	92307
McGregor	Hayslip	San Rafael	CA	94901
Dennis	Hazen	San Jose	CA	95125
Lisa	Hazen	Saratoga	CA	95070
Jen	Hazen	San Jose	CA	95126
Yuriko	Hazlett	Oxnard	CA	93036
Kelly	He	San Jose	CA	95132
Susan	Head	Sausalito	CA	94965
Kris	Head	Garden Grove	CA	92843
Shannon	Healey	San Carlos	CA	94070
Chuck	Heard	Santa Monica	CA	90401

Blythe	Clark-McKitrick	Portland	OR	97201
Charles	Coffelt	Tigard	OR	97224
Stephen	Coffin	portland	OR	97219
Bonnie	Cohen	Portland	OR	97229
Ashley	Coke	Troutdale	OR	97060
Carrie	Cole	Portland	OR	97213
Felicia	Colvin	Seal Rock	OR	97376
Nancy	Condy	Salem	OR	97305
Colleen	Conifer	Portland	OR	97203
Mary	Conroy	Selma	OR	97538
Sean	Cook	Portland	OR	97236
Carol	Coons	redmond	OR	97756
Julie	Cooper	beaverton	OR	97005
Todd	Corbett	Umpqua	OR	97486
Peg	Cornell	Corvallis	OR	97330
Amanda	Corwin	Portland	OR	97239
Deborah	Craig	Eugene	OR	97402
Jackie	Critser	Beaverton	OR	97007
Jeanne	Crowley	Astoria	OR	97103
Debra	Culwell	Gresham	OR	97030
Alyson	Dal Ponte	Medford	OR	97501
Heather	Dale	Wilsonville	OR	97070
Terry	Dalsemer	Portland	OR	97205
randy	dandurand	eugene	OR	97401
Brad	Daniels	Oregon City	OR	97045
April	Dauenhauer	Estacada	OR	97023
Nancy	Davies	Lincoln City	OR	97367
James	Davis	Redmond	OR	97702
Mary	Davis	Portland	OR	97206
Steve	Davis	Lake Oswego	OR	97035
Karen	DeBraal	Springfield	OR	97477
Tony	DeFalco	Portland	OR	97218
Christine & William	DeMoll & James	Yachats	OR	97498
Lori	Dennis	Eugene	OR	97402
Karen	Deora	Portland	OR	97212
Diane	Diethelm	Eugene	OR	97403
Donald	Dimock	Monmouth	OR	97361
David & Leneda	Ditterick	Hillsboro	OR	97123
Belinda	Dodd	Eugene	OR	97404
Sara	Dolph	Portland	OR	97233
Laurie	Dougherty	Salem	OR	97301
Ann	Dow	Hood River	OR	97031
Jacquelyn	Downing	Scottsburg	OR	97473
Tasha	Drake	Jasper	OR	97438
Anne	Dryad	Portland	OR	97206
Nancy	Dudley	Sisters	OR	97759
Raymond	Dukes	Salem	OR	97317

Ellen	Hecht	Albany	CA	94706
Justin	Hedemark	San Francisco	CA	94133
Michael	Hedgecock	Midway City	CA	92655
Ken	Hedges	Lemon Grove	CA	91945
Lin	Heidt	San Diego	CA	92109
Barbara	Heiman	Los Angeles	CA	90066
dana	heimback	Fallbrook	CA	92028
Daryl	Heimsness	Willits	CA	95490
Christine	Hein	Huntington Beach	CA	92648
Bridgett	Heinly	San Diego	CA	92107
Penny	Heintz	Cedar Ridge	CA	95924
Susan	Heisler	Patton	CA	92369
Clifford	Helfrich	Pasadena	CA	91107
Barbara	Helgesen	Foster City	CA	94404
Sharron	Helmholz	Campbell	CA	95008
GA	Hemingway-Proia	Oakland	CA	94611
M	Hempel	Redlands	CA	92375
Michael	Henderson	Huntington Beach	CA	92649
Lynette	Henderson	Northridge	CA	91325
Martin	Henderson	Goleta	CA	93117
Devin	Henderson	Ben Lomond	CA	95005
J	Henderson	San Diego	CA	92129
Allyson	Henderson	Del Mar	CA	92014
Janet	Hendrick	Imperial Beach	CA	91932
James	Hendricks	SF	CA	94117
Margaret	Henke	Santa Ana	CA	92705
Marie	Henley	aptos	CA	95003
Dan	Henneberger	Los Angeles	CA	90066
Lisa	Henry	Mission Viejo	CA	92692
Jean	Hepner	Redwood City	CA	94062
Venedel	Herbito	Los Angeles	CA	90042
Janet	Herbruck	San Diego	CA	92110
Daniel	Herbst	San Mateo	CA	94401
Samuel	Hergenrather	Sebastopol	CA	95472
Joyce	Hering	Beverly Hills	CA	90212
Howard	Herl	Glendale	CA	91206
Bill	Herman	Oceanside	CA	92056
vivian	hernandez	South San Francisco	CA	94080
Steven	Hernandez	Los Angeles	CA	90001
James	Hernandez	Tustin	CA	92780
Asaneth	Hernandez	San Francisco	CA	94112
Beth	Herndobler	Altadena	CA	91001
Laura	Herndon	Burbank	CA	91505
Ana	Herold	Pacifica	CA	94044
Joan	Heron	Hemet	CA	92545
William	Herrera	Walnut Creek	CA	94595
Pat	Herrera-Duran	San Pedro	CA	90731

Aaron	Dukes	Hood River	OR	97031
Susan	Dunaway	Grants Pass	OR	97527
Richard	Dunn	Portland	OR	97211
Lucia	Durand	Corvallis	OR	97330
Carla	Earl	Redmond `	OR	97756
Darlene	Edelman	Klamath Falls	OR	97603
David	Edwards	Eugene	OR	97404
Jen	Ei	Beaverton	OR	97005
Michael	Elich	Ashland,	OR	97520
Jan	Elliott	Portland	OR	97219
Sandra	Elliott	Portland	OR	97225
Dianne	Ensign	Portland	OR	97219
Paula	Eppler	Happy Valley	OR	97086
Susan	Evans	Days Creek	OR	97429
Fauna	Fauth	Cloverdale	OR	97112
Angela	Fazzari	portland	OR	97213
Melanie	Feder	Philomath	OR	97370
Kellie	Federico	salem	OR	97306
Sherrylee	Felger	Port Orford	OR	97465
Angela	Fendley	Corvallis	OR	97333
Maggie	Fenske	Wilsonville	OR	97070
Lois	Feuerle	Portland	OR	97214
Jamie	Fillmore	Beaverton	OR	97006
robin	firth	Portland	OR	97239
Mel	Fish	WALDPORT	OR	97394
Laurie	Fisher	Tigard	OR	97224
Robert	Fladger	Port Orford	OR	97465
Beth	Flake	Hood River	OR	97031
Cinda	Flynn	Corvallis	OR	97330
Melinda	Folsom	Beaverton	OR	97006
Mariah	Forrest	Salem	OR	97302
Sheila	Forrette	Portland	OR	97213
Gretchen	Freda	Portland	OR	97202
Matt	Freedman	Eugene	OR	97405
Harry	Freiberg	Brookings	OR	97415
Chris	Frick	portland	OR	97212
Crystal	Frisk	Portland	OR	97229
Grant	Fujii	Portland	OR	97203
Christie	Gansen	Eugene	OR	97402
Eric	Geisler	Hillsboro	OR	97124
Mary	Gemmel	Orford	OR	97465
Michelle	Ghiggia	Fairview	OR	97024
Nathan	Gimbol	Corvallis	OR	97330
Joe	Glidden	Klamath Falls	OR	97603
Daniel	Goheen	yachats,	OR	97498
Teresa	Goldfarb	Portland	OR	97215
Emerald	Goldman	Portland	OR	97215

Aukjen	Herrick	Corralitos	CA	95076
Angela	Herschel	West Hills	CA	91307
Marlies	Herter	Atascadero	CA	93423
Tina	Herter	walnut creek	CA	94596
David	Hertzel	Poway	CA	92064
Cheri	Herzog	San Rafael	CA	94901
Carla	Hess	Redwood City	CA	94061
Marianne	Hesse	San Francisco	CA	94117
diane	hestich	colton	CA	92324
Michael	Hetz	Solana Beach	CA	92075
Rosanne	Heym	Chico	CA	95973
walker	hibben	newport beach	CA	92660
Jim	Hibbs	Cotati	CA	94931
Barbara	Hibino	Palo Alto	CA	94301
Mary	Hicklin	Lakeside	CA	92040
Cass	Hicks	Bolinas	CA	94924
Robert	Hicks	Long Beach	CA	90803
Leslie	Hicks	Los Angeles	CA	90035
Janet	Hicks	Lawndale	CA	90260
Richard	Hiersch	Berkeley	CA	94705
Carol	Hiestand	Joshua Tree	CA	92252
Susi	Higgins	Glendale	CA	91203
Eleanor	High	Ventura	CA	93003
Susan	High	Los Angeles	CA	90012
Andrea	HILARIO	Alhambra	CA	91803
Erik	Hilburn	San Francisco	CA	94109
Valerie	Hill	Long Beach	CA	90807
Sheri	Hill	Santa Maria	CA	93458
Frank	Hill	North Hollywood	CA	91601
carolee	Hill	Oceanside	CA	92058
Eloise	Hill	Alameda	CA	94501
William	Hill	Fairfax	CA	94930
Misako	Hill	Emeryville	CA	94608
danielle	hill	Saugus	CA	91350
Christopher	Hillman	Capitola	CA	95062
Anouche	Himidian	Winnetka	CA	91306
Richard	Hingel	San Francisco	CA	94102
Troy	Hinish	Castro Valley	CA	94546
S	Hinrichs	Gilroy	CA	95020
Wendy	Hinsberger	santa ana	CA	92705
Arleen	Hirano	los angeles	CA	90066
Cora	Hirashiki	los angeles	CA	90037
Renetta	Hirrel	Ramona	CA	92065
Deborah	Hirsch	Palm Springs	CA	92264
Jeanne	Hirshfield	Rancho Mirage	CA	92270
Ananya	Hixon	San Anselmo	CA	94960
Leslie	Hixson	Santa Ana	CA	92707

Gwen	Good	Hood River	OR	97031
kayce	gorham	Tigard	OR	97224
Michelle	Grace	Ashland	OR	97520
Arika	Grace-Kelly	Portland	OR	97203
Charlie	Graham	Hillsboro	OR	97124
Samantha	Graham	Oregon	OR	97202
Diane	Grannis	Portland	OR	97239
Pauline	Gravier	McMinnville	OR	97128
Catherine	Green	Lake Oswego	OR	97035
Stacy	Green	Portland	OR	97214
Andres	Grijalva	Beaverton	OR	97005
Guy	Grimsley	Brookings	OR	97415
Sarah	Haavind	Eugene	OR	97401
Gwen	Hadland	Hillsboro	OR	97123
Jim	Hajek	Port Orford	OR	97465
Claudia	Hall	Beaverton	OR	97007
James	Hall	Seaside	OR	97138
Michael	Halloran	Salem	OR	97305
Adama	Hamilton	Ashland	OR	97520
Joan	Hamilton	Eugene	OR	97405
bob	hammond	Sisters	OR	97759
Laura	Hanks	Portland	OR	97215
Bob	Hannigan	Corvallis	OR	97330
Phil	Hanson	Portland	OR	97202
Emily	Hanson	Portland	OR	97205
Richard	Hanson	Hillsboro	OR	97124
Susan	Harlan	Cheshire	OR	97419
C.	Harmon	Brightwood	OR	97011
geoffrey	harold	wilsonville	OR	97070
Julie	Harris	Aloha	OR	97007
Linda	Harris	Hillsboro	OR	97123
Randy	Harrison	Eugene	OR	97402
Brandon	Haslick	Hines	OR	97738
Melissa	Hathaway	Gresham	OR	97030
Gloria	Hatrick	South Salem	OR	97123
Jennifer	Hauge	Salem	OR	97302
Lester	Haverland	Albany	OR	97321
David	Hawley	Lake Oswego	OR	97034
Helen	Hays	Oregon City	OR	97045
Karen	heere	Yachats	OR	97498
Linda	Heiartz	Grants Pass	OR	97526
Heidi	Heidig	Ashland	OR	97520
Tanja	Hens	Bend	OR	97708
John	Herberg	Eugene	OR	97405
Michael	Herbert	Florence	OR	97439
Jessica	Heritier	Portland	OR	97212
Hector H	Hernandez	Portland	OR	97202

Aimee	Hodge	Los Gatos	CA	95033
Suzanne	Hodges	Sacramento	CA	95819
Steve	Hoelke	Claremont	CA	91711
Marsha	Hoff	Stockton	CA	95204
Cody	Hoff	Carlsbad	CA	92009
Chrissy	Hoffman	Berkeley	CA	94705
Barbara	Hoffman	Palm Springs	CA	92262
John	Hoffman	Whittier	CA	90602
Judith	Hogan	Santa Barbara	CA	93103
Joe	Hogan	Sebastopol	CA	95472
Michael	Hogan	La Jolla	CA	92037
Patricia	Holbert	Soquel	CA	95073
Karcy	Holbrook	Glendora	CA	91740
Cathy	Holden	Sacramento	CA	95865
Melinda	Holinger	Carlsbad	CA	92013
Brett	Holland	Los Angeles	CA	90026
Alison	holland	San Diego	CA	92103
Roger	Hollander	tarzana	CA	91356
David	Hollier	Crestline	CA	92325
Anthony	Hollow	Anaheim	CA	92804
Sally	Holloway	Capistrano Beach	CA	92624
Stephen	Holman	los angeles	CA	90042
John	Holmes	San Francisco	CA	94131
Melissa	Holmes	Fremont	CA	94555
Georje	Holper	Redway	CA	95560
John	Holtzclaw	San Francisco	CA	94133
Jed	Holtzman	San Francisco	CA	94117
Dennis	Holz	Encinitas	CA	92024
Celeste	Hong	L.A.	CA	90027
Malina	Hong	Long Beach	CA	90807
Val	Hongo-whiting	Laguna Niguel	CA	92677
Anne	Hoop	Long Beach	CA	90803
Jordan	Hooper	Discovery Bay	CA	94505
Adora	Hoose	San Jose	CA	95117
Clare	Hooson	Belmont	CA	94002
Michael	Hoover	Los Angeles	CA	90046
Kris	Hoover	Burbank	CA	91505
Faith	Hoover	Woodland Hills	CA	91303
Linda	horn	South San Francisco	CA	94080
Roger	Hornby	Los Angeles	CA	90066
Diana	Horowitz	woodland hills	CA	91367
Eric	Horwitz	Lake Forest	CA	92630
Lynne	Hoskins	Bakersfield	CA	93309
Vaughn	Hosmann	Bellflower	CA	90706
Barbara	Hosmer	Mission Viejo	CA	92691
Barry	Hottle	Roseville	CA	95747
Nancy	Hounshell	modesto	CA	95351

Judy	Heumann	Portland	OR	97212
Sheri	Hewitt	Creswell	OR	97426
Robert	Heydenreich	Portland	OR	97202
Kelly	Hibbert	Roseburg	OR	97470
Rebecca	Hickey	Portland	OR	97206
Todd	Hildebrandt	Elmira	OR	97437
Jessica	Hill	Beaverton	OR	97006
Christine	Hince	Ashland	OR	97520
Kiernan	Hodge	Ashland	OR	97520
Emily	Holland	Happy Valley	OR	97086
Ann	Hollyfield	Seal Rock	OR	97376
Patricia	Horter	Portland	OR	97231
Karen	Horton	Independence	OR	97351
Thaddeus	Hostetler	Portland	OR	97232
Nancy	Howard	Mulino	OR	97042
Celeste	Howard	Hillsboro	OR	97124
Nancy	Hunt	Portland	OR	97218
John	Hutchison	Salem	OR	97302
Shelley	Ingram	Beaverton	OR	97008
Greg	Jacob	Hillsboro	OR	97124
Ilona	James	Williams	OR	97544
Gwen	Jameson	Philomath	OR	97370
Lars	Jefferson	Albany	OR	97322
T	Jeffries	Bend	OR	97701
Nicole	Jergovic	Portland	OR	97201
maureen	Johann	O BRIEN	OR	97534
chris	johanson	Portland	OR	97211
Cheryl	Johnson	Portland	OR	97216
Daniel	Jones	Lebanon	OR	97355
Nicholas	Jones	Portland	OR	97205
Sandra	Joos	Portland	OR	97239
Mary	Joyce	Portland	OR	97215
Mike	Judd	Oregon City	OR	97045
Bradford	Kalita	Chiloquin	OR	97624
Betty	Kang	Eugene	OR	97401
Joseph	Kauth	ASHLAND	OR	97520
Joel	Kay	Milwaukie	OR	97222
Margaret	Keene	White City	OR	97503
Denise	Keeton	Metolius	OR	97741
Marie	Keith	Eugene	OR	97404
Diana	Kekule	lincoln city	OR	97367
dorinda	kelley	portland	OR	97220
Lauren	Kelley	Portland	OR	97206
Jack	Kendall	Grants Pass	OR	97527
Regina	Keosky	Redmond	OR	97756
Janet	Kerr	Medford	OR	97501
Andrew	Kerr	Portland	OR	97202

Roseanne	Hovey	San Diego	CA	92117
Sarah	Howard	Modesto	CA	95355
Erin	Howard	Oakland	CA	94607
Angela	Howe	San Clemente	CA	92672
Jason	Howsmon	Huntington Beach	CA	92649
Michelle	Huang	Monterey Park	CA	91755
Natalie	Hubbard	Folsom	CA	95630
James	Hubbard	Los Angeles	CA	90018
Mark	Hubbell	San Francisco	CA	94115
Carol	Huber	Seal Beach	CA	90740
Lesley	Hudak	Orinda	CA	94563
D	Hudson	LA	CA	90027
Katie	Huebner	Oxnard	CA	93035
Elaine	Huff	san francisco	CA	94118
Janis	Hug	Monte Rio	CA	95462
Michael	Hughes	San Diego	CA	92123
Barbara	Hughes	San Jose	CA	95125
Gabrielle	Hughes	rancho palos Verdes	CA	90275
Sherry	Hugi	San Francisco	CA	94117
Cathy	Hullman	San Diego	CA	92107
Siavash	Human	Santa Monica	CA	90403
S	Hume	Oceanside	CA	92057
George	Hummel	Rosemead	CA	91770
Cynthia	Humphrey	Redwood City	CA	94062
Gilia	Humrich	FORESTVILLE	CA	95436
NICOLE	HUNT	CHULA VISTA	CA	91911
Shannon	Hunter	San Jose	CA	95112
Jacki	Hunter	Hollywood	CA	90068
Rochelle	Hunter	santa ana	CA	92706
Carol	Huntsman	San Diego	CA	92111
Chris	Hurley	San Francisco	CA	94117
Jeffrey	Hurwitz	San Francisco	CA	94121
Tess	Husbands	San Diego	CA	92117
Kristi	Hutchison	Fresno	CA	93710
Graciela	Huth	Los Angeles	CA	90045
Frank	Huttinger	Pasadena	CA	91105
Craig	Hutton	Los Angles	CA	90041
Alan	Hyams	saiinas	CA	93905
Shelley	Hyatt	Pleasanton	CA	94566
Alexis	Hyde	Los Angeles	CA	90048
Jinx	Hydeman	Trabuco Canyon	CA	92679
Vonnie	Iams	Poway	CA	92064
Angelina	Ibarguen	Chula Vista	CA	91910
Hannah	Inez	Sherman Oaks	CA	91401
Maryan	Infield	Atascadero	CA	93422
Jaycie	Ingersoll	Beverly Hills	CA	90210
Taylor	Ingram	Torrance	CA	90501

Rebecca	Kimsey	Sublimity	OR	97385
Suzanne	Kindland	Cannon Beach	OR	97110
Dave	King	Portland	OR	97203
Judy	Kinsman	Florence	OR	97439
Carol	Kirkbride	Portland	OR	97229
Jennifer	Kirkpatrick	Terrebonne	OR	97760
Christine	Kleiman	Ashland	OR	97520
Ken	Klemke	Oregon city	OR	97045
Curtiss	Klimes	Corvallis	OR	97330
Joanne	Knowles	Portland	OR	97202
Will	Koenitzer	Corvallis	OR	97333
Julia	Koerth	Portland	OR	97216
Kristin	Kohl	Portland	OR	97212
M	Komisar	portland	OR	97206
John	Kozel	Portland	OR	97232
Elizabeth	Kramer	Brookings	OR	97415
Candace	Kreitlow	bandon	OR	97411
Helen	Kuttel Gorman	Beaverton	OR	97007
Amy	Lafferty	Bend	OR	97702
Rick	Lambert	Salem	OR	97306
Diane	Landon	Eugene	OR	97408
Cheri	Laos	Portland	OR	97202
Maitreya	Laridon	Portland	OR	97230
Patricia	Latham	Medford	OR	97501
Matt	Laubach	Eugene	OR	97405
Joseph	Lavine	Grants Pass	OR	97527
Jill	Lawrence	PORTLAND	OR	97223
abby	layton	Portland	OR	97219
Sharon	Lee	Bend	OR	97701
paul	leib	Lake Oswego	OR	97034
Paul	Leigh	Portland	OR	97223
Brad	Lerch	Eugene	OR	97046
Beth	Levin	Portland	OR	97213
Joan	Lewis	Bend	OR	97707
Elaine	liberty	obrien	OR	97534
Caren	Liebman	Eugene	OR	97401
Kathleen	Liermann	Portland	OR	97217
Sandra	Lindeboom	Portland	OR	97214
conny	lindley	Williams	OR	97544
Rebecca	Lippmann	Albany	OR	97322
Alan	Lithman	Ashland	OR	97520
Jim	Lockhart	Portland	OR	97206
Brooke	Logan	Portland	OR	97206
Charles	Looney	Scappoose	OR	97056
Eileen	Loritsch	eugene	OR	97402
Michael	Lovely	Bend	OR	97702
Sara	Lucas	Corvallis	OR	97333

Cindy	Ingram	Riverside	CA	92506
Miriam	Iosupovici	IMPERIAL BEACH	CA	91932
Josephine	Ireland	Carpinteria	CA	93013
Susan	Irving	redondo beach	CA	90277
Larry	Irwin	Pasadena	CA	91105
Aikea	Isom	Vallejo	CA	94591
Sheryl	Iversen	Murrieta	CA	92563
Sherri	Ivey	San Diego	CA	92107
Lisbeth	Jaasko	Whittier	CA	90604
Kathleen	Jacecko	Redondo Beach	CA	90278
Paloma	Jacinto	Duarte	CA	91010
Bruce	Jackson	Oxnard	CA	93035
Donna	Jackson	Hesperia	CA	92340
Maryanne	Jackson	El Cajon	CA	92020
Elizabeth	Jackson	Elk Grove	CA	95624
Jenice	Jackson	inglewood	CA	90302
Ron	Jacob	San Jose	CA	95117
Richard	Jacobel	Oakhurst	CA	93644
Ketzia	Jacoby	San Francisco	CA	94118
Karen	Jacques	Sacramento	CA	95816
hannes	jaenicke	Pacific Palisades	CA	90272
Sandra	Jaffe	Los Angeles	CA	90036
Patti	Jahsman	Cobb	CA	95426
C	James	Clovis	CA	93613
Shunko	Jamvold	san rafael	CA	94903
Shannon	Jan	TORRANCE	CA	90503
Kimberly	Jannarone	San Francisco	CA	94117
Ben	Jansen	Ben Lomond	CA	95005
Andres	Jaramillo	North Hollywood	CA	91606
Peter	Jardine	San Francisco	CA	94115
darki	jarkin	Midway City	CA	92655
Marsha	Jarvis	Pinole	CA	94564
CK	Jasiorkowski	Goleta	CA	93117
Marilyn	Jasper	Loomis	CA	95650
Samar	Javid	Irvine	CA	92614
Katie	Jay	Tarzana	CA	91335
James	Jefferis	Van Nuys	CA	91401
Lynne	Jeffries	Laguna Niguel	CA	92677
Lee	Jenkinson	Canyon country	CA	91351
Kathie	Jenni	Beaumont	CA	92223
Anita	Jennings	CLOVERDALE	CA	95425
Lisa	Jensen	Santa Cruz	CA	95062
Jo	Jensen	Moreno Valley	CA	92557
Alan	Jensen	Maslibu	CA	90265
Amanda	Jensen	Santa Barbara	CA	93111
Donna	Jensen	Playa Vista	CA	90094
Laura	Jensen	Modesto	CA	95354

Augusta	Lucas-Andreae	Ashland	OR	97520
Diane	Luck	Portland	OR	97212
Mary	Lyda	Cave Junction	OR	97523
Michael	Macaluso	Portland	OR	97214
Natalie	MacDonald	Tigard	OR	97223
Alberto	Macri	Hillsboro	OR	97124
Ellen	Maddex	Eugene	OR	97403
Michelle	Maher	Astoria	OR	97103
Joy	Mamoyac	Corvallis	OR	97330
Peter	Manka	Portland	OR	97219
Lin	Marie	Eugene	OR	97405
Judith	Maron-Friend	Portland	OR	97220
Heather	Marsh	Lake Oswego	OR	97035
Nancy	Marshall	Portland	OR	97213
Dolly	Marshall	Eugene	OR	97401
Michael	Martin	Portland	OR	97203
Kevin	Martin	Portland	OR	97217
Carolina	Martinez	Portland	OR	97232
F	Mason	Portland	OR	97221
Sharon	Matticola	Halsey	OR	97348
Robin	Maule	Portland	OR	97217
Richard	McCombs	Otter Rock	OR	97369
Kelly	McConnell	Tigard	OR	97223
Colin	McCoy	Tigard	OR	97223
Gary	McCuen	Salem	OR	97302
Linda	Mcfarlane	Eugene	OR	97405
Michele	McFerran	lake oswego	OR	97034
M	McGillivary	Eugene	OR	97408
Donlon	Mcgovern	Portland	OR	97211
Wendy	McKee	Corvallis	OR	97330
Scott	McKenzie	Portland	OR	97219
Barbara	McLean	Portland	OR	97201
Kirk	McLoren	Paola	OR	97386
Erich	McMaughton	Milwaukie	OR	97222
Jeannine	Mead	Salem	OR	97302
Frank	Mele	Silverton	OR	97381
Jerry	Melton	Corvallis	OR	97330
Julia	Mendez	Beaverton	OR	97007
max	mensing	yachats	OR	97498
Christopher	Michaels	Eugene	OR	97402
Janis	Miesen	Portland	OR	97211
Ketty	Miller	Portland	OR	97230
Koko	Miller	Portland	OR	97217
Irene	Mills	Portland	OR	97210
Patricia	Misner	Cannon Beach	OR	97110
Bonnie	Mitchell	Portland	OR	97231
Anne	Mitchell	Portland	OR	97206

Tim	Jensen	los angeles	CA	90041
Tim	Jensen	Redondo Beach	CA	90277
Melanie	Jensen	Redding	CA	96002
James	Jewell	San Francisco	CA	94107
Penelope	Jewkes	Los Angeles	CA	90036
Rosemary	Jewkes	Laguna woods	CA	92637
Lawrence	Jimenez	Los angeles	CA	90068
Kathy	Jimenez	El Cajon	CA	92020
Pati	Jio	Castro Valley	CA	94546
Adam	Joe	Castro Valley	CA	94546
Kit	Joel	Santa Barbara	CA	93103
JEFF	JOHANSEN	Fresno	CA	93728
Brian	Johansen	San Diego	CA	92126
Oda	John	San francisco	CA	94115
Shawn	Johnson	san clemente	CA	92672
Sharon	Johnson	North Highlands	CA	95660
Becky	Johnson	El Dorado HIlls	CA	95762
Chad	Johnson	Long Beach	CA	90813
James	Johnson	Simi Valley	CA	93065
Guy	Johnson	Newport Beach	CA	92663
Christine	Johnson	Fresno	CA	93727
Celeste	Johnson	sun valley	CA	91352
Barbara	Johnson	newbury park	CA	91320
Brooke	Johnson	Los Angeles	CA	90036
Eden	Johnson	Santa Barbara	CA	93140
Sherry	Johnson	Capistrano Beach	CA	92624
Mara	Johnson	Lafayette	CA	94549
Mark	Johnson	Irvine	CA	92618
Catherine	Johnston	El Cerrito	CA	94530
Cathy	Johnston	Los Angeles	CA	90028
Karen	Jolliffe	San Francisco	CA	94122
Charles	Jonaitis	Los Angeles	CA	90046
Jeffrey	Jones	Los Angeles	CA	90049
Roslyn	Jones	Riverside	CA	92506
Thomas	Jones	berkeley	CA	94708
Edmund	Jones	San Jose	CA	95129
Chris	Jones	Alameda	CA	94501
Karen	Jones	Venice	CA	90291
Julita	Jones	Laguna BEach	CA	92651
David	Jones	San Francisco	CA	94114
Linda	Jones	Bakersfield	CA	93387
Donna	Jones	Sunland	CA	91040
GARY	JONES	SAN MARINO	CA	91108
Megan	Jones	Acton	CA	93510
Rita	Jones	Ventura	CA	93003
Angela	Jones	novato	CA	94947
Mike	Jones	West Hills	CA	91307

Gregory	Monahan	Lake Oswego	OR	97034
Sherry	Monie	Damascus	OR	97089
Molly	Monroe	Corvallis	OR	97333
Siobhn	Moody	salem	OR	97304
Jeanne	Moonier	Phoenix	OR	97535
Winston	Moore	North Powder	OR	97867
Daniel	Morrow	Ashland	OR	97520
Roy	Moss	Medford	OR	97504
Katie	Mountjoy	Portland	OR	97206
Laurel	Mouzakis	Tigard	OR	97224
Erin	Muck	ASHLAND	OR	97520
Lewis	Murdock	Winston	OR	97496
Peter	Murray	Redmond	OR	97756
Sigrid	Myrdal	Portland	OR	97211
Diana	Nagy	Welches	OR	97067
GRACE	NEFF	ALBANY	OR	97322
Tom	Neff	West Linn	OR	97068
John	Neilson	Portland	OR	97236
Marianne	Nelson	Portland	OR	97202
Randall	Nerwick	Milwaukie	OR	97222
carol	newman	Astoria	OR	97103
David	Nez	Portland	OR	97203
Beatrice	Nissel	Eugene	OR	97405
Gina	Norman	Portland	OR	97213
Tenzin	Norris	Eugene	OR	97401
BJ	Novitski	Eugene	OR	97402
Margaret	Nyburg	Beaverton	OR	97005
William	OBrien	Beaverton	OR	97005
Nancy	O'Fraley	Eugene	OR	97404
Hugh	O'Haire	Eugene	OR	97405
Karen	O'Halloran-Miller	Hillsboro	OR	97124
Laura	Ohanian	Eugene	OR	97402
Frodo	Okulam	Portland	OR	97213
Beryl	Oliver	Springfield	OR	97477
Sandra	Oliver-Poore	Salem	OR	97301
Maureen	O'Neal	Portland	OR	97223
Paul	Ordway	Springfield	OR	97478
Thomas	Osborn	Stanfield	OR	97875
Valerie	Oxley	portland	OR	97219
Della	Pangborn	Beaverton	OR	97007
Joseph	Paraszewski	Eugene	OR	97404
Rheychol	Paris	Yachats	OR	97498
Anita	Parish	Sweet Home	OR	97386
Richard	Pasichnyk	Eugene	OR	97402
Christina	Pasillas	Klamath Falls	OR	97603
Hugh	Peach	Beaverton	OR	97006
Gavin	Peacock	West Linn	OR	97068

Allison	Jones	San Francisco	CA	94109
David	Jones	Chatsworth	CA	91311
Michael	Joo	Gardena	CA	90247
Lee	Jordan	Los Angeles	CA	90056
julie	Jordan	Culver City	CA	90232
Lance	Jordan	san diego	CA	92110
alena	jorgensen	Temple City	CA	91780
Cherilyn	Jose	Union City	CA	94587
Richard	Joste	Mountain View	CA	94040
Lil	Judd	Sylmar	CA	91342
Scott	Jung	south pasadena	CA	91030
Jedidiah	Juniper	Richmond	CA	94805
Joan	Jurancich	Sacramento	CA	95864
Caroline	Jurovic	Los Angeles	CA	90026
Valerie	Justus-Rusconi	Watsonville	CA	95076
Paivi	Juvonen	Tustin	CA	92782
Richard	Kacmar	San Diego	CA	92105
Anne	Kaeser	San Jose	CA	86916
Pauline	Kahney	San Francisco	CA	94102
Nicole	Kaimori	Cupertino	CA	95014
Jessie	Kainz	Healdsburg	CA	95448
Kathleen	Kaiser	Chico	CA	95928
A	Kakar	san francisco	CA	94122
Antal	Kalik	REDONDO BEACH	CA	90278
Maral	Kalinian	LAGUNA HILLS	CA	92653
todd	kalionzes	signal hill	CA	90755
Catherine	Kamas	Westminster	CA	92683
Tara	Kamath	Santa Monica	CA	90404
Nathan	Kamer	Idyllwild	CA	92549
Cora	Kamerman	Los Angeles	CA	90049
Scott	Kaminski	San Leandro	CA	94578
Lacey	Kammerer	Milpitas	CA	95035
Jan	Kampa	Soquel	CA	95073
Talbot	Kanae	Los Angeles	CA	90066
Colleen	Kandus	Temecula	CA	92591
Cynthia	Kane	San Juan Capistrano	CA	92675
Caroline	Kane	Valley Village	CA	91607
Debbie	Kane	Tujunga	CA	91042
Paivi	Kangas	El Dorado Hills	CA	95762
Sharon	Kantanen	santa barbara	CA	93103
KRISTINA	KAPCIUK	LOS ANGELES	CA	90048
Audrey	Kapitan	Santa Rosa	CA	95409
Adam	Kaplan	laguna beach	CA	92651
Kay	Kaplan	irvine	CA	92603
Keith	Kapuy	Santa Barbara	CA	93110
Pieter	Kark	San Mateo	CA	94401
Kellie	Karkanen	Walnut Creek	CA	94595

Gary	Pedersen	Depoe Bay	OR	97341
Rachel	Pedriani	Portland	OR	97213
Anne	Pernick	Portland	OR	97206
Virginia	Perry	Otis	OR	97368
Neena	Petersen	Portland	OR	97210
John	Peterson	McMinnville	OR	97128
Cindy	Peterson	Eugene	OR	97405
Ashley	Phillis	Hillsboro	OR	97123
Pam	Pierpont	Dallas	OR	97338
Evelyn	Pietrowski-Ciullo	Salem	OR	97301
janna	piper	portland	OR	97293
Jeff	Pokorny	Bend	OR	97701
Ed	Pool	Myrtle Point	OR	97458
Alex	Prentiss	King City	OR	97224
Ansula	Press	Portland	OR	97211
Michael	Price	Portland	OR	97210
Elaine	Priday	Powell Butte	OR	97753
Steven	Prince	Eugene	OR	97405
Mindy	Proski	Gladstone	OR	97027
Richard	Pross	Lake Oswego	OR	97034
Sally	Purbrick-Illek	Salem	OR	97302
Margaret	Quentin	Portland	OR	97213
Phoebe	Quillian	Talent	OR	97540
Laura	Randall	Portland	OR	97209
K	Rasmussen	Junction City	OR	97448
Steve	Rauworth	Portland	OR	97214
Michele	Ray	North Plains	OR	97133
Jennifer	Reed	Ashland	OR	97520
Elizabeth	Reed	Lake Oswego	OR	97035
Jason	Reed	Coos Bay	OR	97420
Sherwood	Reese	Eugene	OR	97403
CHERIE	REEVES	Central Point	OR	97502
Debra	Rehn	Portland	OR	97202
Linda	Reilly	Saint Helens	OR	97051
Claire	Reiswig	Waldport	OR	97394
Katja	Relford	Gerbrunn	OR	97218
Pam	Rensch	St Helens	OR	97051
Jessica	Richards	Eugene	OR	97402
Jennifer	Richardson	Salem	OR	97306
Paul	Richey	Portland	OR	97221
Jenniene	Ritacca	redmond	OR	97756
Stephen	Ritter	Talent	OR	97540
Cheri	Riznyk	portland	OR	97217
Steven	Roach	Grants Pass	OR	97527
Mark	Roberts	Beaverton	OR	97005
Kathleen	Robinson	Springfield	OR	97477
Charli	Robinson	Lebanon	OR	97355

Chuck	Karp	Palm Desert	CA	92261
Sally	Karste	san anselmo	CA	94960
Andree	Kasche	Woodacre	CA	94973
Bronte	Kass	Los Gatos	CA	95030
Mary	Kathrin	Chico	CA	95928
Jerome	Katon	los angeles	CA	90056
Jerry	Katz	Santa Monica	CA	90404
David	Katz	los angeles	CA	90025
Andrea	Kaufman	Guerneville	CA	95446
Michael	Kavanaugh	San Francisco	CA	94115
Josh	Kaye-Carr	Ventura	CA	93001
Robert	Keats	Santa Barbara	CA	93109
Branislav	Kecman	Altadena	CA	91001
Artur	Kedzierski	Yorba Linda	CA	92887
Johanna	Kee	Greenbrae	CA	94904
Marie	Keefe	Burbank	CA	91506
Bruce	Keegan	San Francisco	CA	94127
Kathy	Keenan	Aptos	CA	95003
Lori	Kegler	San Pedro	CA	90731
Katharine	Kehr	sebastopol	CA	95472
Cheri	Keisner	Piercy	CA	95587
Sandra	Keist	Napa	CA	94558
Kathleen	Kelehan	Los Angeles	CA	90041
Clare	Kelemen	Carlsbad	CA	92010
Krista	Keller	San Francisco	CA	94123
Sydne	Keller	Westlake village	CA	91361
Dean	Kelley	Los Angeles	CA	90045
Keith	Kellogg	santa cruz	CA	95060
Chuck	Kelly	Long Beach	CA	90803
Lisa Ann	Kelly	Santa Barbara	CA	93101
S	Kelly	San Rafael	CA	94903
Barbara	Kelly	Moraga	CA	94556
Colleen	Kelly	Redwood City	CA	94062
Alice	Kelly	Felton	CA	95018
Briana	Kelly	Santa Barbara	CA	93101
Parker	Kelly	San Diego	CA	92101
Kate	Kelly	San Francisco	CA	94107
bev	kelly, ph.d.	long beach	CA	90803
Rick	Kemenesi	West Covina	CA	91791
David	Kemnitzer	Oakland	CA	94611
Eden	Kennan	Van Nuys	CA	91405
Kevin	Kennedy	Camarillo	CA	93012
Clare	Kennedy	San Luis Obispo	CA	93465
Kenneth	Kenneth	Willow Creek	CA	95573
Janet	Kennington	Los Angeles	CA	90077
Suzanne	Kent	Santa Cruz	CA	95060
Douglas	Kenyon	San Diego	CA	92111

Mike	Robinson	eugene	OR	97405
Janice	Rogers-Levy	Portland	OR	97229
Lori	Rohn	Pendleton	OR	97801
Lily	Rose-Laughlin	PORTLAND	OR	97214
Kay	Ross	Portland	OR	97223
Robert	Ross	OR	OR	97301
Michael	Roteik	Portland	OR	97229
David	Roth	Beaverton	OR	97006
Emily	Rowley	Silverton	OR	97381
Martin	Rugger	Portland	OR	97214
Rosalie	Sable	Medford	OR	97501
Alex	Samarin	Culver	OR	97734
Linda	Sampson	Eugene	OR	97405
Georgeanne	Samuelson	Oakridge	OR	97463
Juanita	Sanderson	waldport	OR	97394
Joana	Sarmiento	Grants pass	OR	97526
Debra	Saude	Sweet Home	OR	97386
Ellen	Saunders	Manning	OR	97125
Diana	Saxon	Salem	OR	97301
Bruce	Schacht	Portland	OR	97221
Steven	Schafer	Portland	OR	97075
Robert and Dolore	Scheelen	Medford	OR	97504
Casey	Schnaible	Medford	OR	97504
Sandra	Schomberg	Corvallis	OR	97330
Linda	Schwartz	Cannon Beach	OR	97110
Emily	Scott	Portland	OR	97212
Joyce	Selb	Bend	OR	97701
Peter	Sergienko	Portland	OR	97210
Dana	Sewall	Gresham	OR	97030
Ken	Sexton	Salem	OR	97301
Donna	Sharp	Veneta	OR	97487
Sheila	Shearer	Hood River	OR	97031
Steve	Sheehy	Klamath Falls	OR	97603
Ian	Shelley	Portland	OR	97225
Betty	Shelley	Portland	OR	97219
debra	shepherd	milwaukie	OR	97267
Janice	Sherer	Hood River	OR	97031
Susan	Sheythe	Albany	OR	97321
Katherine	Shields	Portland	OR	97229
Sherrie	SHiv	Portland	OR	97229
K	Shiv	Hillsboro	OR	97124
Susanne	Shotola-Hardt	Wilsonville	OR	97070
Penny	Signalness	Corvallis	OR	97330
James	Sigrist	Gaston	OR	97119
Roslyn	Simon	Portland	OR	97212
Katherine	Skirvin	Pendleton	OR	97801
Joanna	Skirvin	Pendleton	OR	97801

Devon	Kerbow	Norco	CA	92860
Charlene	Kerchevall	Oceanside	CA	92054
Nick	Kerkhoff	Santa Cruz	CA	95060
Alicia	Kern	Palos Verdes Peninsula	CA	90274
Zeneta	Kertis	Ojai	CA	93023
Anthony	Kessler	Emeryville	CA	94608
Kristen	Kessler	Valencia	CA	91355
Brian	Kessler	sherman oaks	CA	91423
Robert	Kevess	Oakland	CA	94609
Soseh	Kevorkian	LA	CA	90026
Pam	Khadder	Los Altos	CA	94022
Lala	Khanian	West Hollywood	CA	90046
Marco	Khanlian	Hermosa Beach	CA	90254
Rubi	Khilnani	San Mateo	CA	94402
Sheila	Khilnani	San Mateo	CA	94404
Renee	Kilmer	Aptos	CA	95003
Tina	Kim	APO	CA	96218
James	Kimball	Elkhorn	CA	95012
Toni	Kimball	Santa Ana	CA	92706
Jan	Kimbrough	Valley Village	CA	91607
Judy	King	El Dorado Hills	CA	95762
Jean	King	Livermore	CA	94550
Barbara	King	Los Angeles	CA	90029
marcia	King	los Angeles,	CA	90049
Dione	King	San francisco	CA	94114
Stephen	King	San Francisco	CA	94110
Ryan	King	Tulare	CA	93274
Kim	King	Nevada City	CA	95959
Daniela	Kingwill	Sebastopol	CA	95472
John	Kinney	Laguna Niguel	CA	92677
Judy	Kinter	Chico	CA	95928
Connie	Kirkham	Concord	CA	94521
Kaye	Kirkwood	Santa Clarita	CA	91390
ana	kirola	San Francisco	CA	94109
Saran	Kirschbaum	Los Angeles	CA	90035
Laura	Kirton	Belmont	CA	94002
Tara	Kitty	Los Angeles	CA	90210
JoAnn	Kiva	Pasadena	CA	91107
Avi	Klammer & Reese	Oakland	CA	94612
Kevin	Klapp	Corona del Mar	CA	92625
Michael	Klaric	Los Angeles	CA	90066
Tracey	Kleber	Los Angeles	CA	90049
V	Klein	Benicia	CA	94510
Leslie	Klein	los angeles	CA	90036
Jill	Klein	Oceanside	CA	92056
Melissa	Kleinbart	san Francisco	CA	94118
Diana	kliche	long beach	CA	90804

Debra	Slater	Portland	OR	97219
Kristin	Smith	Portland	OR	97210
Darly	Smith	Bend	OR	97701
Laurie	Smith	Hood River	OR	97031
scott	smith	salem	OR	97304
Debra	Smith	Tigard	OR	97223
Terry	Smythe	portland	OR	97239
Elaina	Snow	Oregon City	OR	97045
Leslie	Sodaro	Forest Grove	OR	97116
Curt	Sommer	West Linn	OR	97068
Kathryn	Sonenshine	Ashland	OR	97520
Shelley	Sovola	Brookings	OR	97415
Loreen	Spangler	Roseburg	OR	97470
Craig	Speck	Eugene	OR	97402
Sheila	Spencer	Gresham	OR	97080
Robert	Spies	Portland	OR	97211
Chris	Spinks	Portland	OR	97217
Christine	Spinola	Scotts Mills	OR	97375
A	Stanger	Lake Oswego	OR	97034
S	Stark	Eugene	OR	97408
Janiece	Staton	Beaverton	OR	97006
Pamela	Statz	Portland	OR	97202
Nicole	Staudinger	Portland	OR	97214
Stephanie	Stephan	beaverton	OR	97007
Lauren	Steward	Medford	OR	97504
Thomas	Stilwell	Eddyville	OR	97343
Polly	Stonier	Phoenix	OR	97535
Star	Studonivic	Portland	OR	97206
Leslie	Sullivan	Portland	OR	97206
Timothy	Surprenant	Portland	OR	97215
Jeanette	Swanson	Corvallis	OR	97333
Daisy	Sweetland	Gresham	OR	97030
Ann	Tattersall	Eugene	OR	97402
Nannette	Taylor	Damascus	OR	97089
Coleen	Tew	Beaverton	OR	97005
eva	thiemann	Jacksonville	OR	97530
Saundra	Thixton	Philomath	OR	97370
Alyssa	Thomas	Bend	OR	97701
Lauren	Thompson	Portland	OR	97211
Nigel	Thornell	Roseburg	OR	97470
Hillary	Tiefer	Lake Oswego	OR	97035
Donna	Timmerman	Sisters	OR	97759
Gretchen	Timmons	Troutdale	OR	97060
Virginia	Tobin	Oregon City	OR	97045
A.	Todd	Eugene	OR	97404
Chris	Tolman	Beaverton	OR	97007
Barbi	Touron	Portland	OR	97201

Lorraine	Kline	Mira Loma	CA	91752
Frank	Klug	Campbell	CA	95008
Barbara	knapp	Valencia	CA	91355
Kendra	knight	Burlingame	CA	94010
Linda	Knight	Kenwood	CA	95452
Lindsay	Knights	Santa Cruz	CA	95061
Helene	Knobel	Irvine	CA	92618
Holly	Knoll	San Francisco	CA	94123
Elena	Knox	Pioneer	CA	95666
Claudia	Knudson	Santa Barbara	CA	93103
Amber	Knudson	Ben lomond	CA	95005
Jaina	Ko	Irvine	CA	92612
Caroline	Ko	Livermore	CA	94550
Anne	Kobayashi	San Diego	CA	92122
Cindy	Koch	Long Beach	CA	90807
Donald	Koch	Landers	CA	92285
Renee	Kochevar	San Jose	CA	95132
Jill	Koenigsdorf	Sonoma	CA	95476
Karl	Koessel	Blue Lake	CA	95525
Laura	Kohn	Hillsborough	CA	94010
Ellen	Koivisto	San Francisco	CA	94122
Gregory	Kolar	Santa Cruz	CA	95060
Joyce	Kolasa	springville	CA	93265
Maia	Kolbeck	San Francisco	CA	94118
P	Kolchins	Calabasas	CA	91302
Anja	Kollbach	Menlo Park	CA	94025
Kimberly	Kolpin	Huntington Beach	CA	92649
Melvin	Kong	Costa Mesa	CA	92627
Kasey	Konkel	Laguna Beach	CA	92651
rebecca	koo	san jose	CA	95129
John	Kopinetz	Los Angeles	CA	90039
Lori	Korioth	Long Beach	CA	90807
Miriam	Korpi	San Francisco	CA	94122
Caron	Kort	Los Angeles	CA	90005
Derek	Kortepeter	Pasadena	CA	91106
Michelle	Kory	Valencia	CA	91354
Alexios	Kotsilinis	Irvine	CA	92620
Terry	Kourda	Chula Vista	CA	91913
Roger	Kovach	Bolinas	CA	94924
Natalie	Kovacs	Irvine	CA	92620
Gail	Koza	Half Moon Bay	CA	94019
Martha	Krainin	Stevenson Rancg	CA	91381
Julie	Kramer	San Francisco	CA	94114
Kelly	Kramer	GARDEN GROVE	CA	92840
Lisa	Krausz	Tiburon	CA	94920
Ivan	Kreger	Berkeley	CA	94710
Ethan	Krenzer	Los Angeles	CA	90034

Tamara	Townsend	Brookings	OR	97415
Becky	Turner	La Grande	OR	97850
Teresa	Tyler	Sandy	OR	97055
Theresa	Tyler	Brookings	OR	97415
Linda	Ulvaeus	Eugene	OR	97405
Jean	varda	Portland	OR	97215
Karen	Varney	Talent	OR	97540
Marty	Verberkmoes	Roseburg	OR	97470
joan	viers	Hubbard	OR	97032
Albert	Voegeli	Portland	OR	97266
Mary	Vorachek	Salem	OR	97301
Carol	Wagner	Happy Valley	OR	97086
Scott	Wagner	Klamath Falls	OR	97601
Lois	Wagner	Happy Valley	OR	97086
Sue	Waite	Roseburg	OR	97470
Karen	Walasek	Portland	OR	97217
Sandra	Wallwork	Drain	OR	97435
Grady	Warren	Rockaway Beach	OR	97136
Susan	Wechsler	Corvallis	OR	97330
Naomi	Weidner	Albany	OR	97321
Nancy	Weil	Portland	OR	97201
Virginia	Weller	salem	OR	97302
Janette	Wells	Bend	OR	97702
Sher	wells	Lake oswego	OR	97035
Rachel	Wells	Portland	OR	97219
Stephen	Wessels	Corvallis	OR	97330
Allen	Wheeland	Portland	OR	97217
nora	wheeler	Beaverton	OR	97008
Ken	Wheeler	Beaverton	OR	97006
Hazel	Wheeler	Portland	OR	97213
William	Whitaker	La Grande	OR	97850
Vesper	White	Corvallis	OR	97333
Margie	White	Redmond	OR	97756
Amy	Whitworth	Portland	OR	97214
Gary	Wickham	Port Orford	OR	97465
Kim	Wilbur	roseburg	OR	97470
Jason	Williams	Portland	OR	97202
Sherry	Wilmsen	Lincoln City	OR	97367
Jane	Wilson	Oregon City	OR	97045
Stephen	Wilson	Gleneden Beach	OR	97388
David	Wilson	Myrtle Point	OR	97458
Lisa	Windflower	Philomath	OR	97370
Genevieve	Windsor	Talent	OR	97540
Mary	Wiser	Portland	OR	97213
Lily	Witham	Portland	OR	97233
Tanya	Witman	Newport	OR	97365
Harry	Wohlsein	Milwaukie	OR	97267

Marian	Kressly	Huntington Beach	CA	92649
Annica	Kreuter	Joshua Tree	CA	92252
Robert	Krikourian	El Dorado Hills	CA	95762
Ann	Kroeber	Richmond	CA	94804
Patricia	Krommer	Los Angeles	CA	90018
Ray	Kronquist	San Jose	CA	95133
Jessica	Kroontje	Modesto	CA	95352
Arthur	Krowitz	North Hollywood	CA	91605
Cynthia	Kruger	El Granada	CA	94018
Henry	Kruger	Eureka	CA	95501
K	Krupinski	LA	CA	90042
Kevin	Krywko	San Marcos	CA	92069
Janet	Kubler	Valencia	CA	91355
Kathleen	Kuczynski	Lake Forest	CA	92630
Dan	Kuklo	Berkeley	CA	94705
Joanna	Kung	Moraga	CA	94556
Vicki	Kunkel	Bakersfield	CA	93312
Earl	Kuon	Oceanside	CA	92054
Aimee	Kurachi	Chatsworth	CA	91311
Mary	Kusnic	Los Angeles	CA	90067
Ron	Kutch	san jose	CA	95118
Sheri	Kuticka	Concord	CA	94518
Rotheric	Kynith	Upland	CA	91786
John	Kyrk	San Francisco	CA	94109
Jennifer	LaBar	San Marcos	CA	92069
Leslie	Labrin	san fernando	CA	91340
Kathryn	Lacey	ORANGE	CA	92869
Phyllis	Lackey	Carlsbad	CA	92009
ivan	lacore	Cayucos	CA	93430
sharon	lacy	sebastopol	CA	95472
Patricia	LaDue	Ojai	CA	93023
Molly	Lafley	Huntington Beach	CA	92646
Gascogne	Lagut	Santa Cruz	CA	95060
Molly	Lai	South San Francisco	CA	94080
a	lai	san francisco	CA	94116
Alezz	Laielen	San Rafael	CA	94901
Alex	Laine	Oak View	CA	93022
Jared	Laiti	Sacramento	CA	95835
Jennifer	Lakner	San Jose	CA	95116
Jana	LaLanne	Mountain View	CA	94040
Kelly	Lally	San Francisco	CA	94117
Nghia	Lam	Sherman Oaks	CA	91403
Ken	LaMance	San Francisco	CA	94103
Robert	Lamar	Santa Cruz	CA	95060
Barbara	Lamb	Oakland	CA	94610
John	Lamb	Sierra Madre	CA	91024
Alexandra	Lamb	Eureka	CA	95501

Chris	Wolfe	Portland	OR	97209
Erica	Wright	Portland	OR	97225
patrice	wyatt	Hillsboro	OR	97124
Jean	Wyman	Portland	OR	97213
karen	young	eugene	OR	97401
Pedro	Zapata	hillsboro	OR	97124
marguery lee	zucker	Eugene	OR	97403
Janne	Abullarade	Seattle	WA	98109
Michael	Acker	Vancouver	WA	98685
Carol	Affleck	Seattle	WA	98136
Lisa	Agard	Mount Vernon	WA	98274
Colleen	Albert	Kent	WA	98042
Gary	Albright	Snohomish	WA	98296
Giovanna	Alfieri	Seattle	WA	98125
Barbara	Allen	Clarkston	WA	99403
Teresa	Allen	Deming	WA	98244
Dave	Allison	Shelton	WA	98584
Rhodila	Allred	Belfair	WA	98528
Sydney	Allrud	Seattle	WA	98103
Susan	Alter	Shoreline	WA	98133
Glen	Anderson	Lacey	WA	98503
Lynnette	Anderson	Seattle	WA	98119
Kate	Anderson	Deer Park	WA	99006
Becky	Anderson	Bellingham	WA	98229
Arlene	Anderson	Pullman	WA	99163
Kathleen	Anderson	Bothell	WA	98012
Jennifer	Anderson-Medau	Seattle	WA	98108
Lois	Anne	Seattle	WA	98107
Gregory	Anschell	Redmond	WA	98052
Allen	Aplass	Walla Walla	WA	99362
Christine	Armond	Shelton	WA	98584
Deanna	Armstrong	SEATTLE	WA	98116
David	Arntson	Bothell	WA	98012
Connie	Arveson	Bonney Lake	WA	98391
Noah	Ashenhurst	Shelton	WA	98584
Sigrid	Asmus	Seattle	WA	98199
April	Atwood	Seattle	WA	98117
Stella	Austin	Edmonds	WA	98026
Randall	Ayers	Vancouver	WA	98683
Brenda	Bachman	Seattle	WA	98116
Karen Hedwig	Backman	Federal Way	WA	98003
Chrissy	Bailey	Olympia	WA	98513
Stephen	Bailey	Deming	WA	98244
Tawni	Bailey	Tacoma	WA	98402
Ravinder	Bajwa	Redmond	WA	98052
LouAnn	Ballew	Redmond	WA	98052
Brian	Baltin	Seattle	WA	98102

Sally	Lambert	Sutter Creek	CA	95685
Larry	lambert	Desert Hot Springs	CA	92241
Linda	Lambert	Ojai	CA	93023
Kelley	Lamke	Santa Rosa	CA	95403
Jim and Cindy	Lamon	Vista	CA	92081
Linda	Lamon	Ventura	CA	93001
Kurtis	Lampe	Sacramento	CA	95817
Martha	Land	Concord	CA	94518
Dana	Landis	Valley Village	CA	91607
Marisa	Landsberg	Manhattan Beach	CA	90266
Ron	Landskroner	oakland	CA	94611
Judy	Lane	Novato	CA	94949
Johanna	Lang	Fremont	CA	94555
Angel and Ted	Lang	la tuna canyon	CA	91352
Mary	Lanis	Mission Viejo	CA	92691
Michelle	Lanting	Sebastopol	CA	95472
Catherine	Lanzl	Encinitas	CA	92024
Juan	Laos	Lafayette	CA	94549
Nicole	Lapeyrade	Placerville	CA	95667
Gary	Lapid	San Bruno	CA	94066
Roshanee`	Lappe	Redondo Beach	CA	90278
Robert	Lappo	Tujunga	CA	91042
Larry	Lapuyade	San Anselmo	CA	94979
Timothy	Larkin	San Francisco	CA	94109
Steve	Larkin	Santa Rosa	CA	95404
Laura	LaRocca	Toluca Lake	CA	91602
R	Larrison	Riverside	CA	92506
Nadine	Larsen	Laguna Beach	CA	92651
Brent	Larsen	San Diego	CA	92116
Craig	Larsen	San Diego	CA	92104
Elaine	Larson	Petaluma	CA	94954
Fran	Larson	Pacifica	CA	94044
Wendy	Larson	Turlock	CA	95380
R. Dene	Larson Jr.	San Francisco	CA	94117
karen	lassen	berkeley	CA	94707
Scott	Laster	Burbank	CA	91504
George	Latta	Visalia	CA	93277
char	laughon	montara	CA	94037
Vance	Lausmann	Cathedral City	CA	92234
Gabriel	Lautaro	Oakland	CA	94610
thomas	lavigne	Fremont	CA	94538
Linda	Law	Carmel Valley	CA	93924
Patricia	Law	San Diego	CA	92102
Mike	Law	San Diego	CA	92150
n	lawless	venice	CA	90294
Timothy	Lawnicki	Long Beach	CA	90806
Kathleen	Lawrence	Cathedral City	CA	92234

Robert	Bamford	Seattle	WA	98112
Lynne	Bannerman	Seattle	WA	98103
Nick	Barcott	Lynnwood	WA	98087
Michelle	Barrus	Sprague	WA	99032
Chris	batten	Kirkland	WA	98033
Allen	Bauer	Shoreline	WA	98155
John	Bayer	Washougal	WA	98671
Anne	Beaverson	Seattle	WA	98102
Albert	Bechtel	Seattle	WA	98105
joanne	beeson	Blaine	WA	98230
Suzan	Bekiroglu	Seattle	WA	98199
Joan	Beldin	Port Townsend	WA	98368
Stephanie	Bell	Everett	WA	98203
Marc	Benedict	Rochester	WA	98579
Ed	Bennett	Vancouver	WA	98660
Nicole	Bennion	Seattle	WA	98119
David	Benoff	Bellingham	WA	98229
Alyxx	Berg	Seattle	WA	98106
Dave	Bergeron	seattle	WA	98199
Cheryl	Biale	Olympia	WA	98512
Suzanne	Billings	Puyallup	WA	98375
Michelle	Billmaier	Woodinville	WA	98077
Stacy	Birch	Underwood	WA	98651
Faith	Bishop	Seattle	WA	98109
Ellen	Blackstone	Seattle	WA	98115
Patrick	Blakely	Auburn	WA	98092
Megan	Bloom	Bellingham	WA	98225
Robert	Blumenthal	Seattle	WA	98115
Michael	Bluske	Seattle	WA	98136
Ken	Bobrow	walla walla	WA	99362
Barbara	Bonfield	Tacoma	WA	98407
Taiya	Boni	Bremerton	WA	98312
Tika	Bordelon	Seattle	WA	98101
Lucinda	Boudreau	Shelton	WA	98584
William	Bowen	Tacoma	WA	98405
Jc	Bower	Sumner	WA	98390
Robin	Boyton	Mercer Island	WA	98040
Michelle	Bradbury	Spokane	WA	99202
Lael	Bradhaw	camano island	WA	98282
Tod	Braunwart	Vancouver	WA	98661
Peter	Brazitis	Hansville	WA	98340
Linda	Brewster	Port Townsend	WA	98368
Beth	Bricker	Tacoma	WA	98449
Julia	Briggs	Snohomish	WA	98290
Melissa	Britton	Kenmore	WA	98028
nancy	bronner	Rainier	WA	98576
Terrence	Brown	Seattle	WA	98115

Jennifer	Lawson	Corte Madera	CA	94925
Philip	le roux	Aliso Viejo	CA	92653
Elizabeth	Leaf	San Francisco	CA	94115
Lynn	Learch	Watsonville	CA	95076
Charles	Leavell	Anaheim	CA	92806
Candy	LeBlanc	Placerville	CA	95667
Mary	Leck	Palm Desert	CA	92260
Leslie	LeClere	Valley Village	CA	91607
Dennis	Ledden	Fiddletown	CA	95629
Elizabeth	Ledezma	Los Angeles	CA	90042
Cecile	Ledru	culver city	CA	90232
Robert	Lee	Rolling Hills	CA	90274
Peter	Lee	Pomona	CA	91766
Sandy	Lee	San francisco	CA	94107
Jeanine	Lee	Santa Clara	CA	95051
Virginia	Lee	Half Moon Bay	CA	94019
Claudia	Lee	Pasadena	CA	91104
Cynthia	Lee	winchester	CA	92596
Francis	Lee	San Bruno	CA	94066
King	Lee	Beverly Hills	CA	90210
Cynthia	Leeder	San Jose	CA	95124
Vicki	Leeds	Pt. Reyes Station	CA	94956
Barbara	Lehman	Santa Clarita	CA	91350
Rick	Leicher	OAKLAND	CA	94607
Michael	Leiendecker	norco	CA	92860
Laura	Leifer	Santa Ynez	CA	93460
Lynda	Leigh	Santa Cruz	CA	95062
Susan	Leihy	Santa Rosa	CA	95409
Dale	Leininger	San Francisco	CA	94124
Miriam	Leiseroff	San Jose	CA	95125
David	Leitch	venice	CA	90291
Miranda	Leiva	Sherman Oaks	CA	91423
Helen	Lembeck	Chula Vista	CA	91910
Denise	Lenardson	Sunland	CA	91040
Nicholas	Lenchner	santa rosa	CA	95403
Anita	Lenz	San Diego	CA	92127
Chemaine	Leon	millbrae	CA	94030
Julie	Leonardo	Irvine	CA	92618
Mike	Lepore	Claremont	CA	91711
Bob	Leppo	Santa Maria	CA	93454
Lynne	Lerner	Van Nuys	CA	91406
Jim	Leske	Glendale	CA	91203
Mark	Letizia	San Diego	CA	92123
Bogdana	Leto	Los Angeles	CA	90068
Florence	Leto	San Francisco	CA	94114
Barbara	Letosm	Escondido	CA	92025
Gabor	Lettner	Redwood City	CA	94061

Robert	Brown	Tacoma	WA	98466
ADDIE	BROWN	SPOKANE	WA	99207
Tina	Brown	Anacortes	WA	98221
John	Browne	Burton	WA	98013
Catherine	Brumbaugh	seattle	WA	98102
Michael	Brush	Seattle	WA	98118
Teresa	Bryan	Pass Christian	WA	98626
Carlin	Buchanan	Renton	WA	98059
Sara	Burgess	Seattle	WA	98112
R	Burkhead	Everett	WA	98208
Tim	Burns	Federal Way	WA	98023
Karen	Byrd	Everett	WA	98208
Debra	Calkins	Freeland	WA	98249
Beth	Call	Walla Walla	WA	99362
Jennifer	Calvert	Spokane Valley	WA	99206
Paul	Cameron	Camas	WA	98607
Janet	Campbell	Shoreline	WA	98155
Shirley	Campbell	seattle	WA	98103
Bob	Capener	Port Townsend	WA	98368
Tabitha	Carlson	Richland	WA	99352
Cheri	Carlson	Arlington	WA	98223
thompson	carol	auburn	WA	98002
Dennis	Carpenter	tacoma	WA	98444
Kathy	Carr	Kenmore	WA	98028
Kathryn	Carter	Shoreline	WA	98155
Peter	Cassinelli	Vancouver	WA	98662
Aimee	Cervenka	Winter Park	WA	99224
K	Chapman	Spokane	WA	99223
Kevin	Chiu	Kirkland	WA	98033
John	Christensen	Blaine	WA	98320
J	Chu	Wilson Creek	WA	98860
Allison	Ciancibelli	Twisp	WA	98856
Maxine	clark	Bremerton	WA	98310
Katharine	Clark	KENMORE	WA	98028
Jenny	Clark	Bothell	WA	98021
Gretchen	Clay	Bellingham	WA	98225
Amanda	Coder	Redmond	WA	98052
Patricia	Coffey	Langley	WA	98260
Felice	Cohen	nahcotta	WA	98637
Judith	Cohen	seattle	WA	98112
Annapoorne	Colangelo	Clinton	WA	98236
Jackie	Cole	Woodinville	WA	98072
Sandra	Cole	Vancouver	WA	98684
Edward	Colley	Ellensburg	WA	98926
Randall	Collins	Seattle	WA	98119
Katherine	Collinson	Bellingham	WA	98226
Lynn	Colson	Bellingham	WA	98229

Jason	Leung	LA	CA	90028
Rex	Levi	Agoura Hills	CA	91301
Allison	Levin	Sausalito	CA	94965
Karl	Levin	Canoga Park	CA	91304
Daniel	Levin	San Francisco	CA	94133
simona	levin	West Hollywood	CA	90069
Phyllis	Levin	Capitola	CA	95010
Julie	Levine	TOPANGA	CA	90290
Sandra	Levine	San Rafael	CA	94903
Marilyn	Levine	Mountain View	CA	94040
Sandy	Levine	Pasadena	CA	91104
Ira	Levine	Los Angeles	CA	90057
Sharon	Levine	Simi Valley	CA	93063
Peggy	Leviton	McKinleyville	CA	95519
Judy	Levitt	los angeles	CA	90039
Lacey	Levitt	Rancho Cucamonga	CA	91730
Nicole	levy	San Francisco	CA	94110
Cynthia	Levy	Pico Rivera	CA	90660
Katherine	Lewis	Sunnyvale	CA	94086
JENNIFER	LEWIS	Pasadena	CA	91106
Cynthia	Lewis	templeton	CA	93465
Debra	Lewis	Hayward	CA	94541
Michelle	Lewis	Long Beach	CA	90802
Patrick	Lewis	Emeryville	CA	94608
Lisa	Lewis	Santa Cruz	CA	95062
Lily	Li	San Bruno	CA	94066
Pamela	Libonati	Napa	CA	94559
Michael	Liby	Rancho Mirage	CA	92270
John	Liddy	lake forest	CA	92630
Andrea	Lieberman	Los Angeles	CA	90066
Amy	Liebman	Napa	CA	94558
Eve	Lievonen	Laguna Niguel	CA	92677
Ms.	Lilith	Ventura	CA	93003
Joseph	Lilli	Pacific Palisades	CA	90272
Olivia	Lim	Davis	CA	95616
Larry	Lima	Campbell	CA	95008
Chris	Lima	Ventura	CA	93003
David	Lin	Sacramento	CA	95816
Stephanie	Linam	Benicia	CA	94510
KJ	Linarez	Carmichael	CA	95608
Carol	Lind	Yorba Linda	CA	92886
Lauren	Linda	Laguna Woods	CA	92637
Bill	Lindner	Greenbrae	CA	94904
Erin	Lindquist	Carlsbad	CA	92008
Katie	Lindsay	daly city	CA	94015
Suzan	Lins	San Diego	CA	92104
Michael	Lipinski	San Mateo	CA	94401

Amy	Compestine	Spokane Valley	WA	99206
Mike	Conlan	Redmond	WA	98052
Patrick	Conn	Kent	WA	98031
Loretta	Conner	Puyallup	WA	98374
Tom	Connor	Olympia	WA	98502
James & Jan	Cooke	Kennewick	WA	99337
Ann and David	Cordero	Longview	WA	98632
Judy	Cornwall	Woodinviile	WA	98072
Shelley	Cort	Friday Harbor	WA	98250
David	Cosby	WALLA WALLA	WA	99362
Eva	Cosgrove	Seattle	WA	98103
Claire	Coupez	Edmonds	WA	98020
Christian	Courte	bellingham	WA	98226
Diana	Covington	Tacoma	WA	98465
Lanie	Cox	Spokane	WA	99224
Laura	Craig	Lakewood	WA	98499
KIMBERLY	CRANE	Snohomish	WA	98290
Phillip	Crawford	Stevenson,	WA	98648
Oliver	Crew	OLYMPIA	WA	98501
C	Crockett	seattle	WA	98194
Carolyn	Crombie	Seattle	WA	98119
Norman	Crouter	Seattle	WA	98107
Michelle	Crow	Mukilteo	WA	98275
Marty	Crowley	Greenbank	WA	98253
Wanda	Cucinotta	Lummi Island	WA	98262
Laurette	Culbert	Seattle	WA	98107
marjorie	curci	beaver	WA	98305
Colleen	Curtis	Bellingham	WA	98229
Richard	Curtis	Ethel	WA	98542
christian	czingula	bellingham	WA	98225
Shelley	Dahlgren	Issaquah	WA	98029
Felicia	Dale	Tulalip	WA	98271
David	Dalton	Puyallup	WA	98374
David	Daniels-Lee	Ocean Shores	WA	98569
Kevin	Darcy	Bellingham	WA	98225
Mary	Daub	Spokane	WA	99203
Alan	DAvanzo	Burien	WA	98166
Sharon	Davey	Sumner,	WA	98390
Janet	Davidoff	Maple Valley	WA	98038
Nora	Davidson	Bremerton	WA	98311
Sharren	Davis	Vancouver	WA	98684
Virginia	Davis	Woodinville	WA	98072
Erika	Davis	Lopez Island	WA	98261
Michael	Davis	Seattle	WA	98107
Cynthia	Davis	Longview	WA	98632
William	Davison	Everett	WA	98204
Emily	Day	Langley	WA	98260

Lawrence	Lipkind	San Francisco	CA	94133
Pearl	Lipner	Berkeley	CA	94705
Timothy	Lippert	Martinez	CA	94553
Elaine	Livesey-Fassel	Los Angeles	CA	90064
Marilyn	Livote	Buena Park	CA	90621
Loren	Lizarraga	monterey park	CA	91755
Gilly	Lloyd	San Francisco	CA	94112
Geralyn	LLoyd	Yorba Linda	CA	92886
Giovanni	Lo Gelfo	Monterey	CA	93940
Dana	Loats	La	CA	90065
Colleen	Lobel	San Diego	CA	92126
Jan	Lochner	Sebastopol	CA	95472
Renee	Locks	Mill Valley	CA	94941
Steve	Loe	Yucaipa	CA	92399
Adrian	Loeb	Los Angeles	CA	90034
Kit	Lofroos	Petaluma	CA	94952
Isabella	Lomax	Riverside	CA	92508
Petrina	Long	Los Angeles	CA	90049
carol	long	Santa Cruz`	CA	95060
Ned	Long	Los Osos	CA	93402
Charles	Long	la jolla	CA	92037
Kristina	Long	Escondido	CA	92027
Dona	Longacre	RSM	CA	92688
Robert	Longer	Elk Grove	CA	95757
Wally	Longshore	Riverside	CA	92501
jon	longsworth	Aptos	CA	95001
Cindy	Loomis	Santa Monica	CA	90403
Lindsey	Loperena	santa cruz	CA	95060
Elaine	Lopez	Santa Ana	CA	92707
Ralph	Lopez	Los Angeles	CA	90012
Crystal	Lopez	Rancho Cucamonga	CA	91739
Donna	Loren	Banning	CA	92220
Sonia	Lotfabadi	Glendale	CA	91208
Jude	Lotz	burbank	CA	91505
Catherine	loudis	San Anselmo	CA	94960
Laleh	Lourie	La Canada	CA	91011
Fernanda	Loustaunau	san diego	CA	92154
Heidi	Louvier	Anaheim	CA	92802
scott	love	los angeles	CA	90024
JANIS	Loveday	GRASS VALLEY	CA	95949
Kate	Love-Kanow	Salinas	CA	93901
Ralph	Lovelace	Clearlake	CA	95422
Darlene	Lovell	Bakersfield	CA	93301
Brice	Lovell	san francisco	CA	94109
Margot	Lowe	Oceanside	CA	92056
Mark	Lowentrout	Santa Clarita	CA	91387
James	Lowman	San Bernardino	CA	92410

Margaret	Day	Tacoma	WA	98408
Marco	de la Rosa	Kirkland	WA	98034
Brandie	Deal	Bothell	WA	98021
Ines	DeCastro	Issaquah	WA	98029
Rebecca	DeGeorge	Seattle	WA	98144
A	Dench	Mercer Island	WA	98040
Susan	Denike	LACEY	WA	98503
Janice	Denk	Snohomish	WA	98290
Xanthe	Denning	mercer island	WA	98040
Penny	Derleth	Deer Park	WA	99006
Michelle	Devlaeminck	Vancouver	WA	98664
Felicity	Devlin	Tacoma	WA	98406
Timothy	DeWitt	Spokane	WA	99224
Laura	Dicus	Poulsbo	WA	98370
Donna	Diduch	Seattle	WA	98178
Claudia	Dilgard	Everett	WA	98203
Cynthia	Dixson	Sedro Woolley	WA	98284
Del	Domke	Bellevue	WA	98008
Derek	Donatelli	Redmond	WA	98052
Edmund	Doran	Vancouver	WA	98665
Thomas	Dorosz	Tacoma	WA	98422
Eleanor	Dowson	Mill Creek	WA	98012
James	Doyle	Aberdeen	WA	98520
Shelli	Drummer	Olympia	WA	98502
Eliza	Duncan	Tacoma	WA	98404
Genevieve	Dwight	Seattle	WA	98177
Danny	Dwinell	Shoreline	WA	98155
Tracy	Eales	Seattle	WA	98117
Ted	Ebert	Coupeville	WA	98239
John	Eddy	Tacoma	WA	98406
Carolyn	Eden	Bainbridge Island	WA	98110
Sean	Edmison	Redmond	WA	98052
Willie	Edwards	Tacoma	WA	98408
Deborah	Efron	Bellevue	WA	98004
Claire	Egtvedt	Mukilteo	WA	98275
Stephen	Eichelberger	Tacoma	WA	98406
Chris	Eisenberg	North Bend	WA	98045
Sara	Eldridge	Seattle	WA	98115
Sharon	Eliason	everett	WA	98203
Anne	Elkins	Anacortes	WA	98221
sheryl	ellis	Tacoma	WA	98466
Carrie	Ellis	Des Moines	WA	98198
Ella	Elman	Redmond	WA	98053
Carol	Else	Lakewood	WA	98498
Richard	Emerson	Auburn	WA	98001
Maria	Emerson	Fircrest	WA	98466
Rexanne	Endicott	Everett	WA	98203

marsha	Lowry	El Sobrante	CA	94803
K	Lowry	Sacramento	CA	90211
Pamela A.	Lowry	Berkeley	CA	94704
Elissa	Lozano	Corona	CA	92882
James	Lozano	Berkeley	CA	94703
Russ	Luba	Santa Cruz	CA	95062
D.	Lubbers	Santa Monica	CA	90405
Stephen	Lubin	Sun Valley	CA	91352
Iris	Lubitz	Mountain View	CA	94040
Samantha	Lubrani	Torrance	CA	90505
Harold	Lucas	Anaheim	CA	92807
Paul	Luckman	OAKLAND	CA	94611
Marlene	Ludlow	Mount Shasta	CA	96067
Kristen	Luetkemeier	Independence	CA	93526
Frances	Luevano	Woodland	CA	95776
Kathryn	Lum	San Jose	CA	95132
Marg	Lum	Santa Clara	CA	95050
Linda	Luminella	sacramento	CA	95820
Jimmie	Lunsford	San Diego	CA	92176
jamie	lurtz	anaheim	CA	92805
Nathana	Lurvey	Culver CIty	CA	90230
sarah	luth	san diego	CA	92116
Rick	Luttmann	Rohnert Park	CA	94928
Phong	Ly	San Jose	CA	94089
Wendy	Lynch	Los Angeles	CA	90049
Rosann	Lynch	Monterey	CA	93940
Kitty	Lynch	Garberville	CA	95542
Susan	Lynch	Pacific Palisades	CA	90272
Dave	Lynch	Danville	CA	94526
Georgia	Lynn	Bakersfield	CA	93308
Barbara	Lyon	Goleta	CA	93116
Nancy	Lyon	Santa Monica	CA	90404
Jeremy	Lyons	West Hollywood	CA	90046
Pamela	Lyons	Paradise	CA	95969
Gerald	Lysne	Encinitas	CA	92024
John	MacAdams	Canoga Park	CA	91306
Kathryn	Macbride	Orinda	CA	94563
James	MacDonald	San Francisco	CA	94115
Galen	MacDougall	Santa Barbara	CA	93105
Steven	MacGregor	Agoura Hills	CA	91301
Julie	Machado	Hayward	CA	94541
David	MacHale	Orange	CA	92865
Sherry	Macias	Sacramento	CA	95825
Melinda	MacInnis	Venice	CA	90291
Donald	Mackay	South Pasadena	CA	91031
Michelle	MacKenzie	San Carlos	CA	94070
Claudia	Mackey	Stockton	CA	95207

Heidi	Erdmann	Tacoma	WA	98444
Ingrid	Erickson	Bellingham	WA	98226
Hilarie	Ericson	Seattle	WA	98115
Gina	Erskine	Gig harbor	WA	98329
Cherie	Erwin	Langley	WA	98260
John	Eschen	grand coulee	WA	99133
Esmeralda	Espinaco	Redmond	WA	98052
jerome	Esterly	seattle	WA	98112
Alyssa	Estes	Olympia	WA	98505
Chad	Evans	Seattle	WA	98103
Bronwen	Evans	vancouver	WA	98101
Karen	Everitt-Emery	Marysville	WA	98270
Gill	Fahrenwald	Olympia	WA	98507
Glenn	Fain	Seattle	WA	98144
Jennifer	Fairchild	Seattle	WA	98118
April	faires	Puyallup	WA	98374
George	Fairfax	Oak Harbor	WA	98277
Dean	Fanara	Elk	WA	99009
Susan	Farrar	Issaquah	WA	98029
Steven	Fenwick	Olympia	WA	98502
arlene	Ferguson	ferndale	WA	98248
Sharon	Fetter	Puyallup	WA	98371
Judy	Finch	Palouse	WA	99161
Debbie	Flork	Graham	WA	98338
Ryan	Flynn	Lakewood	WA	98499
Carol	Follett	Bellingham	WA	98228
Eric	Fosburgh	Seattle	WA	98112
Ronnie	Foster	Nine Mile Falls	WA	99026
Mary	Fournier	Seattle	WA	98177
Shannon	Fouts	Tacoma	WA	99208
Chris	Fox	Woodinville	WA	98077
Rebecca	Frank	Malaga	WA	98828
Larry	Franks	Issaquah	WA	98027
Paul	Franzmann	Walla Walla	WA	99362
Carol	Freese	Kennewick	WA	99336
Nina	French	Seattle	WA	98178
Richard	Frichette	Sequim	WA	98382
Robert	Fulmer	Seattle	WA	98108
Robert	Gabriel	Olympia	WA	98506
Cj	Gainer	Seattle	WA	98103
JL	Gale	Point Roberts	WA	98281
Sandra	Gallagher	Lynnwood	WA	98037
Michelle	Galo	tacoma	WA	98403
Patricia	Ganieany	Battle Ground	WA	98604
Elinor	Gannon	Seattle	WA	98121
Susan	Garcia	Bellevue	WA	98008
Lori	Garza	Mercer Island	WA	98040

Joan	Mackie-Ochoa	Oxnard	CA	93030
Chris	MacKrell	Long Beach	CA	90804
Sara	MacKusick	Berkeley	CA	94703
Ian	MacLeod	Albany	CA	94706
Markus	MacPherson	boulder creek	CA	95006
Bonnie	MacRaith	Arcata	CA	95521
Susanne	Madden	Playa del Rey	CA	90293
Chelsea	Madison	Oakland	CA	94619
Martha	Madison	Torrance	CA	90504
Carol	Maehr	monterey	CA	93940
Susan	Magana	tracy	CA	95377
Al	Magary	San Francisco	CA	94122
Lilithe	Magdalene	Middletown	CA	95461
Mike	Maghakian	hercules	CA	94547
Gail	Maher	San Diego	CA	92101
Tamara	Maher	San Clemente	CA	92672
Maureen	Mahon	Los Angeles	CA	90035
Krista	Mahoney	Sacramento	CA	95820
Maia	Maia	Goleta	CA	93117
Ann	Maijala	Ontario	CA	91762
David	Mailman	Corona Del Mar	CA	92625
Michelle	Maing	Los Angeles	CA	90024
matt	majersky	Truckee	CA	96160
Janet	Maker	Los Angeles	CA	90024
Theresa	Malin	Huntington Beach	CA	92647
Ben	Malka	Hillsborough	CA	94010
Marsha	Malone	Chino	CA	91710
Constance	Malone	San Francisco	CA	94132
Robert	Mammon	Richmond	CA	94803
Alphonso	Mance	Alameda	CA	94501
Dave	Mandel	Berkeley	CA	94708
Steven	Mandel	Marina Del Rey	CA	90292
Jutka	Mandoki	San Francisco	CA	94110
Jeffery	Mandrake	San Diego	CA	92116
Marjorie	Manley	Sherman Oaks	CA	91403
Courtney	Mann	Van Nuys	CA	91401
Kita	Mann	Santa Monica	CA	90405
Charlotte	Manning	Venice	CA	90291
Arthur	Manoogian	SAN CLEMENTE	CA	92672
Jean	Mansour	Los Angeles	CA	90066
James	Mapes	Napa	CA	94559
Lorretta	Marcel	San Francisco	CA	94134
Veronica	Marco	Solana Beach	CA	92075
Howard	Marcovitch	Santa Clarita	CA	91350
Bill	Marcus	Simi Valley	CA	93065
Martin	Marcus	San Diego	CA	92120
Renelle	Mare	Novato	CA	94945

Sherman	Gavette	Camas	WA	98607
Jim	Gay	seattle	WA	98125
Sandra	Gehri-Bergman	Lynnwood	WA	98036
Dan	Gerhard	Mount Vernon	WA	98274
Jim	Ghormley	Vancouver	WA	98684
Christine	Giannini	Puyallup	WA	98375
Helen	Gilchrist	Olympia	WA	98512
Kiwibob	Glanzman	Seattle	WA	98115
Deanna	Glass	Everett	WA	98204
Hal	Glidden	Bellingham	WA	98225
Joy	Gohl	White Salmon	WA	98672
Debra	Golden	Kirkland	WA	98033
Daryl	Goldfarb	Seattle	WA	98115
Nancy	Goodwin	Longview	WA	98632
Donna	Gorman	Vancouver	WA	98682
Alice	Goss	Clinton	WA	98236
Chris	Gossard	Seattle	WA	98117
Martha	Graef	Puyallup	WA	98371
Carson	Graham	Carnation	WA	98014
Edgars	Graudins	Everett	WA	98208
Pamela	Gray	Port Townsend	WA	98368
Patrick	Gray	Spokane	WA	99203
Lee	Greaves	Spokane	WA	99206
Stephen	Green	Mount Vernon	WA	98274
Loula	Gregg	Renton	WA	98057
Shannon	Gregor	Mill Creek	WA	98082
Brian	Gregory	Bremerton	WA	98337
Barbara	Gross	Seattle	WA	98115
Mark	Gross	Seattle	WA	98116
Mary	Guard	Friday Harbor	WA	98250
Lori	Gudmundson	Bellingham	WA	98227
Peter	Guerrero	Port Townsend	WA	98368
Evan	Guest	Spokane	WA	99205
Brian	Gunn	Auburn	WA	98002
David	Guthrie	Walla Walla	WA	99362
Brie	Gyncild	Seattle	WA	98122
Julie	Hacker	Kirkland	WA	98034
Donald	Haggbloom	seattle	WA	98116
Lindell	Haggin	Spokane	WA	99208
Carolyn	Hall	Renton	WA	98058
Michele	Ham	Ocean Shores	WA	98569
Suzanne	Hamer	Woodinville	WA	98072
Susan	Hampel	Sequim	WA	98382
Diane	Hardee	Monroe	WA	98272
Hugh	Harkins	Bellingham	WA	98225
Wendy	Harper	Everett	WA	98204
Robin	Harper	Oak Harbor	WA	98277

Linda	Margiot	Dana Point	CA	92624
Michael	Margulis	Valencia	CA	91354
Daniella	Mariane	San Jose	CA	95134
Sylvia	Marie	sebastopol	CA	95473
Lily	Marie	Rough And Ready	CA	95975
Lisa	Marie	Ventura	CA	93001
David	Marinsik	Santa rosa	CA	95401
Virginia	Mariposa	Santa Barbara	CA	93110
Stephen	Markel	Los Angeles	CA	90066
Stephen	Markowski	San Diego	CA	92116
JB	Marks	Tehachapi	CA	93561
Andrea	Marks	Santa Barbara	CA	93105
Mary	Markus	Garden Grove	CA	92840
Patricia	Marlatt	Los Angeles	CA	90068
Barbara	Marlatt	Dana Point	CA	92629
Nick	Marling	elk grove	CA	95624
Mariano	Marquez	San Francisco	CA	94124
Joseph	Marrino	San Rafael	CA	94903
Gloria	Marshall	Claremont	CA	91711
Ian	Marshall	South Pasadena	CA	91030
Thomas	Marshall	Simi Valley	CA	93065
Frances	Martin	Carmel	CA	93921
Dave	Martin	Boonville	CA	95415
Patty	Martin	Bethel Island	CA	94511
Robert	Martin	El cajon	CA	92021
Kyle	Martin	Huntington Beach	CA	92648
Kathleen	Martin	Shingle Springs	CA	95682
Jeanne	Martin	Pescadero	CA	94060
Dawn	Martin	Anaheim	CA	92807
Memory	Martin	Bakersfield	CA	93309
Ben	Martin	Mountain View	CA	94040
Nancy	Martin	Palo Alto	CA	94303
Sue	Martin	San Diego	CA	92102
Stacy	Martin	Oakland	CA	94601
Allison	Martin	Alameda	CA	94501
Staci	Martin	Carlsbad	CA	92009
Susannah	Martin	Oakland	CA	94608
Ray	Martinez	Covina	CA	91723
Ruth	Martinez	Avalon	CA	90704
Sasha	Martinez	Upland	CA	91786
casey	martinez	San Francisco	CA	94122
Frank	Marwood	San Diego	CA	92101
Christina	Marx	Marina del Rey	CA	90292
John	marzich	Arroyo Grande	CA	93420
Ashley	Marzocca	Fresno	CA	93720
Marie	Maschal	Santa Barbara	CA	93105
Barbara	Mason	Campbell	CA	95008

Tom	Harper	Port Angeles	WA	98362
Jeff	hart	shoreline	WA	98177
Charles	Hartik	Tonasket	WA	98855
Spring	Hartke	Tacoma	WA	98444
Florence	Harty	White Salmon	WA	98672
Rijah	hasan	Bothell	WA	98012
margaret	hashmi	BELLINGHAM	WA	98226
Todd	Hauser	Ocean Park	WA	98640
Lorena	Havens	Acme	WA	98220
Heather	Haverfield	Langley	WA	98260
Robert	Hawes	Steilacoom	WA	98388
Nancy	Hayden	Spokane	WA	99217
Scott	Hayes	Seattle	WA	98177
William W	Haywood	Centralia	WA	98531
Andrea	Hegland	Shelton	WA	98584
Jennifer	Hendrickson	Bothell	WA	98021
Michele	Henley	Everett	WA	98203
Carole	Henry	Seabeck	WA	98380
Marilee	Henry	Kirkland	WA	98034
Julie	Hentrich	Carlton	WA	98814
Anne	Hepfer	Seattle	WA	98112
Mai	Hermann	Mercer Island	WA	98040
Andria	Herron	BREMERTON	WA	98310
Steve	Hersch	Kenmore	WA	98028
Elizabeth	Hickman	Auburn	WA	98092
Jennifer	Hickman	Renton	WA	98056
Richard	Hieronymus	friday Harbor	WA	98250
Andrea	Higgins	Bothell	WA	98021
Nita	Hildenbrand	Kirkland	WA	98034
Robert	Hilgenberg	Everett	WA	98203
Michael and Barbara	Hill	Elbe	WA	98330
Patricia	Hilleary	Spokane Valley	WA	99216
Karen	Hiller	Kelso	WA	98626
Sharon	Hills	Kirkland	WA	98034
Nancy	Hines	Seattle	WA	98125
Angel	Hiott	Lakebay	WA	98349
Vicky	Hoaland	ferndale	WA	98248
Frances A	Hogan, MD	Vashon	WA	98070
Brian	Hollander	Olympia	WA	98512
Julie	Holtzman	Snohomish	WA	98290
merle	hooley	bellevue	WA	98007
Ruth	Hooper	Seattle	WA	98118
Mark	Hopkins	Friday Harbor	WA	98250
Mark	Hoshi	SEATTLE	WA	98116
Francoise	Hovivian	Seattle	WA	98144
Virginia	Huang	Woodland	WA	98674
D	Hubenthal	Spokane	WA	99205

Alison	Massa	Novato	CA	94947
Eileen	Massey	Oakland	CA	94608
Barbara	Mastej	Venice	CA	90291
Patricia	Masuda	Fountain Valley	CA	92708
Maria	Matan	Grass Valley	CA	95945
Lynn	Matarelli	Wilton	CA	95693
Karine	Matevossian	Los Angeles	CA	91606
Lm	Mathews	Burbank	CA	91504
Susan	Mathison	Los Angeles	CA	90039
Tim	Matson	El Dorado Hills	CA	95762
Gregg	Matson	Elk Grove	CA	95624
Melanie	Matson	San Mateo	CA	94404
Steve	Matson	Hermosa Beach	CA	90254
Dorian	Mattar	Los Angeles	CA	90017
Gina	Matteucci	Sacramento	CA	95822
Rachel	Matthews	Oakland	CA	94610
Linda	Mattingly	Avalon	CA	90704
Laura	Matyi	Carlsbad	CA	92009
Marika	Matyus	Redwood City	CA	94063
Tamara	Matz	Los Angeles	CA	90016
Robert	Mault	Mill Valley	CA	94941
Tim	Maurer	Anaheim	CA	92808
Michelle	Mauricette	Long Beach	CA	90807
Casee	Maxfield	los angeles	CA	90028
Ronald	Maxson	L.A.	CA	90016
Dana	May	Garden Grove	CA	92840
Jessica	May	Santa Rosa	CA	95409
William	Maya	Oakland	CA	94603
Tabitha	Maya	Bakersfield	CA	93305
Robert	Maya	Placentia	CA	92870
Marita	Mayer	san anselmo	CA	94960
PATRICIA	MAYNARD	Los Angeles	CA	90024
Paul	Maysonave	SONOMA	CA	95476
Mary	McAuliffe	Los Angeles	CA	90028
Nora	McBee	Concord	CA	94520
Tara	Mcbrayer	West Hollywood	CA	90046
Karma	McCain	Studio city	CA	91602
Linda	McCalister	Vacaville	CA	95687
Linda	McCall	Costa Mesa	CA	92627
Richard	McCann	Santa Maria	CA	93454
Maggie	McCarthy	Greenbrae	CA	94904
Mary	McCarthy	Van Nuys	CA	91406
Erin	McCarty	Solana Beach	CA	92075
Phil	McClain	Huntington Beach	CA	92649
Bob	McCleary	Roseville	CA	95747
Olivia	McClelland	Guerneville	CA	95446
Sudii	McCollum	Glendale	CA	91206

Laura	Huddlestone	Seattle	WA	98106
Carolyn	Hudson	Wenatchee	WA	98801
D	Hudson	Bellevue	WA	98007
Carole	Huelsberg	Port Townsend	WA	98368
Cheryl	Hughes	Indianola	WA	98342
Laurel	Hughes	Edmonds	WA	98026
Susiwa	Hulbert	Longview	WA	98632
Connie	Hull	Seattle	WA	98133
Shaun	Hulse	Silverdale	WA	98383
Janice	Humeniuk	Seattle	WA	98106
Chasity	Hungerford	Kirkland	WA	98034
Ann	Hunt	Mukilteo	WA	98275
Debra	Hunt	Kalama	WA	98625
Krista	Hunter	Ferndale	WA	98248
Sally	Hurst	Seattle	WA	98144
Mana	Iluna	Bellevue	WA	98007
Lura	Irish	Lakebay	WA	98349
Miriam	Israel	Seattle	WA	98117
T	Izeppi	Seattle	WA	98116
David	Jackson	Mukilteo	WA	98275
Martha	Jackson	Seattle	WA	98177
Diane	Jacob	Olympia	WA	98502
Wendy	James	Bellingham	WA	98229
Vanessa	Jamison	Arlington	WA	98223
Silvia	Jansson	Redmond	WA	98052
Gayle	Janzen	Seattle	WA	98133
Jean	Jensen	Graham	WA	98338
Kristin	Jensen	Seattle	WA	98121
Robert	Jensen	Lacey	WA	98513
Ron	Jewchyn	Montesano	WA	98563
AJ and John	Jittipsopa-Zinner	Mossyrock	WA	98564
Prestom	Johnson	Federal Way	WA	98003
Lorraine	Johnson	Seattle	WA	98118
Richard	Johnson	Bellingham	WA	98227
Curtis	Johnson	Federal Way	WA	98023
Beverly	Johnston	Puyallup	WA	98373
Clayton	Jones	Shoreline	WA	98155
Dorothy	Jordan	Lynden	WA	98264
Cj	Joyce	Vancouver	WA	98661
Alexis	Kane	Seattle	WA	98112
Rev. J. S.	Kasper	Quilcene	WA	98376
Mary	Kay	Poulsbo	WA	98370
Susan	Kay	Vashon	WA	98070
Devin	Kearns	Shoreline	WA	98133
JoAnne	Kelly	Seattle	WA	98115
Barry	Kelman	Kirkland	WA	98034
Lisa	Kelsey	Olympia	WA	98512

Barney	McComas	Berkeley	CA	94709
Robert	McCombs	Arcata	CA	95518
Sari	McConnell	Los Angeles	CA	90026
Douglas	McCormick	Trabuco Canyon	CA	92679
Mark	Mccormick	Scotts Valley	CA	95066
Brigid	McCormick	San Francisco	CA	94133
Susan	McCORRY	Santa Monica	CA	90405
Lisa	McCown	Alta Loma	CA	91701
Catherine	McCoy	Murrieta	CA	92563
Tami	McCready	simi valley	CA	93063
Connie	McCullen	San Diego	CA	92131
Denali	McCullough	San Jose	CA	95111
Jo	McCutchan	Nevada City	CA	95959
Skot	McDaniel	Novato	CA	94947
Paul	McDermott	Los Angeles	CA	90065
Mary	McDevitt	Redwod City	CA	94062
Jeff	McDonald	La	CA	90027
Stacey	McDonald	Thousand Oaks	CA	91361
Claude	McDonald	San Jose	CA	95120
Betty Jo	McDonald	Camrillo	CA	93010
Pamela	Mcdonald	Laguna Beach	CA	92651
Rebecca	McDonough	Menlo Park	CA	94025
Holly	McDonough	Anaheim	CA	92807
Margo	McDowell	Petaluma	CA	94952
Holly	McDuffie	Los Angeles	CA	91606
Maureen	McFadden	Santa Barbara	CA	93111
Alysanne	McGaffey	Pacifica	CA	94044
Catherine	McGavin	Buellton	CA	93427
Maureen	McGee	Pacific Palisades	CA	90272
Cecilia	McGhee	Bodega Bay	CA	94923
Eva	McGilvery	Del Mar	CA	92014
Kim	Mcgoldrick	San Diego	CA	92104
Kerri	McGoldrick	Castro valley	CA	94546
Patrick	McGorty	Pacifica	CA	94044
Jaime	McGrath	Aliso Viejo	CA	92656
Michael	McGrath	Granada Hills	CA	91344
Jane	McGraw	San Bernardino	CA	92404
Chris	McGregor	Toronto	CA	90210
Rene	McIntyre	San Francisco	CA	94102
Misty	McIntyre	Alameda	CA	94501
Michelle	McKay	Los Angeles	CA	90066
Krista	McKee	San Jose	CA	95148
John	McKee	Reseda	CA	91335
Gerald	McKelvey	Manteca	CA	95336
trish	mckenzie	Oceanside	CA	92054
Gator	McKinley	Valley Village	CA	91607
Robert	Mckinney	Mariposa	CA	95338

Susan	Kerwin	Goldendale	WA	98620
Kathy	Kestell	Spokane	WA	99208
Christopher	Key	Bellingham	WA	98225
Mark	Kidd	South Bend	WA	98586
Susan	Kilgore	Lummi Island	WA	98262
Ji-Young	Kim	Bothell	WA	98012
Marilyn	Kimmerling	Tacoma	WA	98407
Carolyn	Kinch	coupeville	WA	98239
michele	king	port orchard	WA	98367
Crystal	KING	Bellingham	WA	98226
Susan	Kiplinger	Vancouver	WA	98683
Michele	Kirk	port orchard	WA	98367
Mary-Ann	Kirsling	pasco	WA	99302
Jamie	Kitson	Everett	WA	98201
Maria	Kjaerulff	Gig Harbor	WA	98335
Christine	Klunder	Bellingham	WA	98225
Dana	Knutson	Seattle	WA	98116
Ari	Kohn	Seattle	WA	98145
Troy	Kokenge	North Bend	WA	98045
Kathleen	Konarzewski	Everett	WA	98204
Shirley	Konizeski	Snohomish	WA	98290
Kerry	Kovarik	Seattle	WA	98133
Maren	Kreun	Puyallup	WA	98371
Kaitlin	Krhounek	Seattle	WA	98122
Frank	Kroger	Seattle	WA	98122
Michelle	Kuehn	Kent	WA	98042
Susan	Kunin	Spokane	WA	99206
Stephen	Kunin	Spokane Valley	WA	99206
Rachel	La Fond	Redmond	WA	98052
JoAnn	LaBorde	Covington	WA	98042
David	Ladely	Snohomish	WA	98296
Bill	Laestadius	mercre island	WA	98040
Michael	Lampi	bellevue	WA	98008
Alli	Larkin	Des Moines	WA	98198
Marianne	Larkins-Strawn	Vancouver	WA	98684
Consuelo	Larrabee	Seattle	WA	98109
Margaret	Larrick	Burien	WA	98166
heidi	larsen	Olympia	WA	98502
Pamela	Larsen	Camano Island	WA	98282
R	Larson	Mount Vernon	WA	98274
Alida	Latham	Seattle	WA	98102
Barbara	Laudan	Lynden	WA	98264
Karin	Laurel	Woodinville	WA	98077
Charlene	Lauzon	Lynnwood	WA	98036
Gene	Lawson	Lynnwood	WA	98036
Margo	Lechner	Lake Stevens	WA	98064
alethea	leddy	Forks	WA	98331

Laura	McKinney	Los Angeles	CA	90036
M. Dan	McKirnan	San Diego	CA	92109
Rita	McKissick	Fremont	CA	94538
Shoshanah	McKnight	Santa Cruz	CA	95060
Susan	McLaughlin	Foothill Ranch	CA	92610
Michael	McLaughlin	Eureka	CA	95502
Janet	McLaughlin	Rancho Santa Fe	CA	92067
NICK	MCLAUGHLIN	LOS ANGELES	CA	90045
Sandra	McLeod	Glendale	CA	91226
Pamela	McMahan	Oceanside	CA	92057
Michael	McMahan	Huntington Beach	CA	92649
Carol	McMahon	Placerville	CA	95667
Natalie	McMahon	Woodside	CA	94062
Susan	McMullen	Lemon Grove	CA	91945
kevin	mcnamara	Rio Vista	CA	94571
Nicola	McNaughton	Escondido	CA	92027
Paul	McNeely	Pasadena	CA	91104
Robert	McNutt	Martinez	CA	94553
Cynthia	McPeak	Point Arena	CA	95468
Cathy	McPeek	Palm Springs	CA	92264
Kelley	McQueen	Yucaipa	CA	92399
Donna	McQuirter	Fairfield	CA	94533
Stacey	McRae	Winchester	CA	92596
Carol	McRae	Fairfax	CA	94930
Laurie	Mcrae	Monrovia	CA	91016
Carole	McRae	Redwood City	CA	94061
Linda	McVarish	Laytonville	CA	95454
Kelly	McVey	Anaheim	CA	92806
William	Mead	Burbank	CA	91505
Pattie	Meade	SAN CLEMENTE	CA	92672
Robert	Meadows	Burbank	CA	91505
Mary	Meads	Oakland	CA	94611
Hayley	Meagan	Ukiah	CA	95482
Sherry	Meddick	Silverado	CA	92676
Linda	Medeiros	Cloverdale	CA	95425
Robert	Medici	Hollywood	CA	90028
Betty	Medley	Santee	CA	92071
Roger	Meehan	San Francisco	CA	94117
Mary	Mees-Tishman	Alameda	CA	94501
Siddharth	Mehrotra	Camarillo	CA	93010
Wendy	Meidt	Running Springs	CA	92315
Robert	Meier	los angeles	CA	90042
Charles	Meier	Burlingame	CA	94010
Myron	Meisel	Los Angeles	CA	90064
Irma	Mejia	Valley Village	CA	91607
Marianna	Mejia	Soquel	CA	95073
Sandra	Melchor	Richmond	CA	94804

Kimberly	Leeper	Seattle	WA	98116
Lora	Lehner	Port Orchard	WA	98366
Karen	Leifker	Nine Mile Falls	WA	99026
Phillip	Leija	Spokane	WA	99216
Phillip	Leija	Spokane Valley	WA	99216
Hugh	Lentz	Olympia	WA	98501
Patricia	Lenzen	Vancouver	WA	98684
Julio	Leon	Redmond	WA	98052
Tom	Leurquin	Bainbridge Island	WA	98110
Gregory	LeVan	Seattle	WA	98126
Sharon	LeVine	Seattle	WA	98119
Alisha	Leviten	shoreline	WA	98155
Brenda	Lewis	Chelan	WA	98816
janine	lewis	Spokane	WA	99208
Nancy	Lill	Spokane	WA	99201
M	Lind	Vancouver	WA	98666
Eric	Lind	Seatac	WA	98168
Robert	Lindberg	Vancouver	WA	98685
Grant	Lindberg	Vancouver	WA	98685
Cathleen	Lindsay	Seattle	WA	98125
Paula	Lindsay	Seattle	WA	98136
Robin	Lindsey	Seattle	WA	98116
Virgene	Link	Anacortes	WA	98221
Alan	Lish	Marysville	WA	98271
Jeannine	Lish	Marysville	WA	98271
Nancy	Little	Ocean Shores	WA	98569
Nancy	Little	aberdeen	WA	98520
Delphi	Locey	Seattle	WA	98109
Kandace	Loewen	Seattle	WA	98103
Saab	Lofton	Seattle	WA	98104
Gregry	Loomis	Seattle	WA	98117
Elizabeth	Lopez	Seattle	WA	98107
Lara	Lorenz-Kastner	Seattle	WA	98117
Edward	Louchard	Port Townsend	WA	98368
Kristin	Love	Seattle	WA	98126
Josanne	Lovick	pt . Roberts	WA	98281
Sammy	Low	Ferndale	WA	98248
Grant	Low	Prosser	WA	99350
Kathleen	Lowney	Issaquah	WA	98029
Minh	Lu	Bellevue	WA	98008
Dana	Luchini	Chattaroy	WA	99003
Mark	Lucianna	stanwood	WA	98292
Lyn	Lukich	Spkane	WA	99218
Taffy	Lund	Olympia	WA	98501
Jeremy	Luscher	Seattle	WA	98108
Jayson	Luu	Seattle	WA	98178
K	Lyle	Gig harbor	WA	98335

Ron	Melin	Torrance	CA	90503
Hillary	Melin	Culver City	CA	90232
Linda	Mellen	Newport Beach	CA	92661
Harry	Mello	San Francisco	CA	94116
Michele	Melonas	Ojai	CA	93023
Emily	Melson	Valencia	CA	91355
John	Menart	Glendora	CA	91740
Leslie	Mendez	El Cerrito	CA	94530
Molly	Mendez	Oakley	CA	94561
Crystal	menendez	Portland	CA	90291
Marisa	Menicucci	Sunnyvale	CA	94086
Ana	Menjivar	Santa Monica	CA	90404
Suzanne	Menne	Camarillo	CA	93010
Melissa	Mercer	San Diego	CA	92124
Suzanne	Meredith	Rio Vista	CA	94571
Thelma	Mericle	Sherman Oaks	CA	91411
Margaret	Merino	San Diego	CA	92105
Jane	Merkel	Eureka	CA	95503
Patricia	Merrill	San Pedro	CA	90732
Heather	Merrill	Sacramento	CA	95864
Lindsay	merrynan	Petrolia	CA	95558
Jonathon	Merz	San Francisco	CA	94109
Carl	Mesick	El Dorado	CA	95623
David	Messenger	laguna beach	CA	92651
Barbara	Messer	Ventura	CA	93004
kathryn	metcalf	Sacramento	CA	95816
Nikita	Metelica	Mountain View	CA	94040
Kathy	Meteraud-ortiz	Poway	CA	92064
Margaret	Mew	Lafayette	CA	94549
Hannah	Mewhirter	Fresno	CA	93730
Paul	Meyer	El Sobrante	CA	94803
Twyla	Meyer	Pomona	CA	91767
Steve	Meyer	Rialto	CA	92377
Cindy	Meyers	La Selva Beach	CA	95076
Rosemary	Meyers	Rancho	CA	91730
Donna	Meyers	Long Beach	CA	90814
M	Meyers	Upland	CA	91786
Cheri	Mezzapelle	Walnut Creek	CA	94595
Debora	Michel	Laguna Hills	CA	92653
Kris	Michiels	Richmond	CA	94804
James	Mickle	Sacramento	CA	95811
Bernice	Miessner	Fresno	CA	93711
Bogdan	Mihailescu	Laguna Niguel	CA	92677
Andreea	Mihailescu	Laguna Niguel	CA	92677
Linda	Miilu	Chico	CA	95928
Nicole	mikals	Newbury Park	CA	91320
Gamal	Mikhail	Santa Monica	CA	90404

Michael	Lyman	COLVILLE	WA	99114
Teresa	Lyman	Covington	WA	98042
Monique	Maas	anacortes	WA	98221
Joe	Mabel	Seattle	WA	98115
Ron	MacArthur	Port Orchard	WA	98366
Michael	MacDougall	Nine Mile Falls	WA	99026
Dianna	MacLeod	Langley	WA	98260
Diann	MacRae	Bothell	WA	98021
Janet	Macri	Federal Way	WA	98023
Annie	Madsen	Seattle	WA	98166
Maria	Magana	Burlington	WA	98233
Mauricio	Malagon	Seattle	WA	98121
Kathleen	Malley	Tacoma	WA	98408
Greg	Malmberg	Wenatchee	WA	98801
Michaelene	Manion	Port Orchard	WA	98366
Nicole	Marble	seattle	WA	98115
Danielle	Marceaux	Lakewood	WA	98499
Barbara	Marcoe	Olympia	WA	98503
Lloyd	Marshall	Seattle	WA	98107
Melodie	Martin	seattle	WA	98102
David	Martin	edmonds	WA	98026
Gerry	Martin	University Place	WA	98466
Andrew	Martin	Issaquah	WA	98027
Jeff	Martin	Seattle	WA	98117
Marisa	martinez	silverdale	WA	98383
Julianne	Martinson	Everett, Wa	WA	98201
Dominique	Mason	Kirkland	WA	98043
Carol	mastan	yelm	WA	98597
Vicky	Matsui	Seattle	WA	98122
Linda	Mattox	Spokane	WA	99205
Chris	May	Renton	WA	98058
Frank	Maziarski	Shorelne	WA	98133
Carol Lynn	Mc Ardle	Oak Harbor	WA	98277
Denise	McAllister	Renton	WA	98058
Cheryl	McAtee	Vancouver	WA	98682
Roberta	McBride	Edmonds	WA	98026
Ai	McCarthy	Redmond	WA	98052
Jeffery	McConaughy	Bellingham	WA	98225
Allen	McCoy	Seattle	WA	98107
Bernadette	McCrea	Seattle	WA	98177
Meghan	McCutcheon	White Salmon	WA	98672
Colleen	McDonald	Edmonds	WA	98026
Sharon	McEneny	Vancouver	WA	98682
Terence	McGee	Bothell	WA	98011
Megan	Mcinnis	Issaquah	WA	98027
Becky	McKibben	Kent	WA	98031
Ellen	McKinley	Olympia	WA	98501

Charles	Milkewicz	Richmond	CA	94801
Howard	Miller	Ventura	CA	93003
Sandi	Miller	Orange	CA	92867
Nancy	Miller	Santa Maria	CA	93455
Laurie	Miller	Hemet	CA	92545
Victoria	Miller	Encino	CA	91436
Michelle	miller	San Diego	CA	92130
Mary	Miller	millbrae	CA	94030
Mallory	Miller	Oceanside	CA	92056
Keith	Miller	West Hollywood	CA	90069
Heidi	Miller	North Hills	CA	91343
Michael	Miller	Los Angeles	CA	90048
Lee	Miller	Stockton	CA	95215
Harriet	Miller	redding	CA	96049
Janet	Miller	Sherman Oaks	CA	91423
Carole	Miller	North Hollywood	CA	91606
David	Miller	San Diego	CA	92111
Kelly	Miller	San Diego	CA	92128
Candice	Miller	Altadena	CA	91001
Elizabeth	Milliken	St. Helena	CA	94574
Harriet	Millman	West Hills	CA	91307
Randy	Mills	Culver City	CA	90230
Faye	Mills	San Juan Bautista	CA	95045
Robert	Mills	Van Nuys	CA	91402
Kent	Minault	Sherman Oaks	CA	91423
Naomi	Mindelzun	palo alto	CA	94303
Ann	Miners	Oakdale	CA	95361
Daniel	Mingledorff	Palm Springs	CA	92262
Sheri	Minix	Descanso	CA	91916
Bonnie	Minkin	Venice	CA	90291
Ingeborg	Minton	Clovis	CA	93619
Elsa	Miramontes	Commerce	CA	90040
Eliot	Miranda	San Francisco	CA	94112
Rocio	Miranda	Oakland	CA	94619
Sophie	Miranda	Sacramento	CA	95821
Douglas	Mirell	Los Angeles	CA	90064
isabella	misso	Mission Viejo	CA	92692
Jill	Mistretta	KENTFIELD	CA	94904
Ina	Mitchell	Van Nuys	CA	91406
Michelle	Mitchell	Claremont	CA	91711
Sandra	Mitchell	West Hollywood	CA	90048
Elizabeth	Mitchell	Los Angeles	CA	90034
William	Mitchell	Oakland	CA	94619
Jolina	Mitchell	Marina Del Rey	CA	90292
Donna	Mitchell	La Mesa	CA	91942
Petrine	Mitchum	Santa Ynez	CA	93460
Kazuko	Mitose	San Diego	CA	92124

Christine	McLean	Gig Harbor	WA	98335
Michael	McLeod	Federal Way	WA	98023
Daniel	McLeod	Deer Park	WA	99006
Susan	McRae	Olympia	WA	98506
Krista	melby	Spanaway	WA	98387
Patricia	Mellon	Bremerton	WA	98311
Ramona	MENISH	Bellingham	WA	98229
Leila	Merosands	Lacey	WA	98503
Douglass	Merrell	Seattle	WA	98118
Laurie	Meyer	Port Townsend	WA	98368
Brenda	Michaels	Issaquah	WA	98027
Raelyn	Michaelson	Seatac	WA	98168
Carmen	Michelson	Seattle	WA	98125
Jeffrey	Miller	friday harbor	WA	98250
Carole	Miller	Vancouver	WA	98665
Ken	Mills	Renton	WA	98059
Karen	Mitchell	Vancouver	WA	98685
Cheryl	Mitchell	Spokane	WA	99205
Julia	Mohn	Port Hadlock	WA	98339
Richard	Moller	Lynnwood	WA	98087
Carol	Molmen	Olalla	WA	98359
Melissa	Monaghan	Allyn	WA	98524
Sue	Moon	Seattle	WA	98144
Kerry	Moore	Toledo	WA	98591
Linda	Moore	Yelm	WA	98597
Tom & Patricia	Moreland	Port Townsend	WA	98368
Stuart	Mork	Seattle	WA	98117
Juani	MuÃ±oz	WAHINTON	WA	99330
James	Mulcare	Clarkston	WA	99403
Ted	Muralt	Clallam Bay	WA	98326
Michael	Murphy	Seattle	WA	98115
Clayton	Murray	Seattle	WA	98133
Susanne	Murray	Spokane	WA	99223
John	Murrow	Kent	WA	98089
Judith	Nappe	North Bonneville	WA	98639
Brent	Naylor	Raymond	WA	98577
Randall	Neal	Seattle	WA	98122
Janet	Needler	Bellingham	WA	98225
Jennifer	Nelson	Seattle	WA	98133
Richard	Nelson	Seattle	WA	98116
S.	Nelson	Seattle	WA	98115
Dorothy	Newkirk	Pullman	WA	99163
Dung	Nguyen	Seattle	WA	98144
Duane	Niatum	seattle	WA	98107
John	Niendorf	Friday Harbor	WA	98250
Laurie	Nightingale	Auburn	WA	98001
Marguerite	Noblitt	Medina	WA	98039

William	Mittig	Mariposa	CA	95338
Asa	Mittman	Chico	CA	95926
Joann	Mizutani	Sacramento	CA	95816
Carol	Mock	Fremont	CA	94536
Deimile	Mockus	Los Angeles	CA	90004
Michael	Moeller	Temecula	CA	92591
Angela	Mogin	San Mateo	CA	94402
Patricia	Moguel	Los Angeles	CA	90066
maya	moiseyev	Oakland	CA	94602
Susan	Mokelke	Portola Valley	CA	94028
RaeAnn	Moldenhauer	Cupertino	CA	95014
Bianca	Molgora	San Francisco	CA	94110
Julie	Molthop	Los Angeles	CA	90017
Katherine	Monahan	Oakland	CA	94611
Carol	Mone	Trinidad	CA	95570
Carolyn	Mone	Woodside	CA	94062
Janet	Monfredini	San Francisco	CA	94127
Anneliese	Monnes	Monterey	CA	93940
James	Monroe	Concord	CA	94521
Jeanette	Monroe	Aliso Viejo	CA	92656
Cathy	Monroe	Redwood Valley	CA	95470
Dana	Monroe	San Diego	CA	92104
lydia	montag	ventura	CA	93001
Alida	Montanez-Salas	Long Beach	CA	90815
Brandi	Montano	San Francisco	CA	94109
Diego	Montecino	Davis	CA	95616
Deborah	Montero	orangevale	CA	95662
Elaine	Mont-Eton	San Rafael	CA	94901
Christine	Montgomery	Beverly Hills	CA	90210
Lisa	Monti	San Francisco	CA	94118
Mark	Moody	San Rafael	CA	94901
Ian and Janeane	Moody	Sausalito	CA	94965
Susan	Moor	Los Angeles	CA	90035
G	Moore	Soquel	CA	95073
Howard	Moore	San Diego	CA	92115
Jessica	Moore	Laguna Niguel	CA	92677
Sharlee	Moore	Los Angeles	CA	90013
Daniel	Moore	Berkeley	CA	94705
Malc	Moore	Portola	CA	96122
Timothy	Moore	Bakersfield	CA	93301
Kristine	Moore	San Francisco	CA	94127
Kevin	Moore	San Francisco	CA	94103
Alan	Moore	Sunnyvale	CA	94087
Jeremiah	Moore	Ventura	CA	93006
Marilyn	Moore	Long Beach	CA	90815
Mary	Moose	san francisco	CA	94133
Cynthia	Moragrega	Rancho Santa Fe	CA	92067

Heidi	Norman	Renton	WA	98059
Samantha	Novak	Seattle	WA	98102
Michael	Oaks	Seattle	WA	98144
Terry	O'Connor	Seattle	WA	98103
Julie	O'Donnell	Seattle	WA	98177
Lynn	Offutt	Everett	WA	98208
Shawn	O'Grady	Arlington	WA	98223
Tammie	O'Keefe	Lakewood	WA	98498
Erica	Olsen	Seattle	WA	98103
Sharon	Olson	Spokane	WA	99205
Mary Ann	Olson	Woodinville	WA	98072
Patricia	Olson	Bremerton	WA	98311
Janelle	Olvey	BELLINGHAM	WA	98226
Gudrun	Onkels	Seattle	WA	98107
Mark	Ortmeyer	Snohomish	WA	98290
Marsha	Osborn	Tacoma	WA	98408
Teresa	Osborn	Shoreline	WA	98133
Tyler	Otto	Maple Valley	WA	98038
K	Otto	Seattle	WA	98116
Tracy	Ouellette	Bow	WA	98232
Lynne	Oulman	Bellingham	WA	98225
Annie	Palmer	Washougal	WA	98671
Gina	Pantier	Federal Way	WA	98003
Carol	Papworth	Everett	WA	98204
Melinda	Parke	Seattle	WA	98103
L	Parker	Everett	WA	98204
William	Parkinson	Lake Stevens	WA	98258
Maureen	Parroitt	Oroville	WA	98844
Shani	Parrott	Woodinville	WA	98072
Sharon	Parshall	Fall City	WA	98024
Adina	Parsley	Ferndale	WA	98248
Hiroko	Patterson	Silverdale	WA	98383
Rae	Pearson	Seattle	WA	98105
Christine	Pearson	Auburn	WA	98092
David	Peha	Renton	WA	98058
Betsy	Pendergast	Port Townsend	WA	98368
Carolyn	Pendle	Olympia	WA	98516
Toni	Penton	Snohomish	WA	98296
Lela	Perkins	Everett	WA	98208
Patricia	PERRON	SEATT:E	WA	9117
Thom	Peters	Snohomish	WA	98290
Kristina	Peterson	Edmonds	WA	98026
Sandy	Petrarca	Seattle	WA	98103
Cynthia	Petrich	Anacortes	WA	98221
Kurt	Petrich	Anacortes	WA	98221
BRianna	Pfeninger	Tacoma	WA	98404
Katie	Pilarski	Seattle	WA	98105

Ximena	Morales	Torrance	CA	90505
Laurie	Morales	Pollock Pines	CA	95726
Rosy	Morales	rancho palos verdes	CA	90275
Diane	Moreno	San Francisco	CA	94105
Charla	Morgan	Woodland Hills	CA	91364
Mark	Morgan	Camarillo	CA	93010
Jody	Morgan	Santa Cruz	CA	95062
Linda	Morgan	San Pablo	CA	94806
Michelle	Morgan	Coronado	CA	92118
Mary	Morgan	Santee	CA	92071
Franz Johann	Morgenbesser	San Diego	CA	92126
Heidi	Morrell	Los Angeles	CA	90004
Sharon	Morris	Hayward	CA	94541
Ray	Morris	Bakersfield	CA	93308
Alexis	Morris	San Francisco	CA	94122
Susan	Morris	Long Beach	CA	90803
Joel	Morrison	CitrUnited States Heights	CA	95610
Thomas	Morrison	Northridge	CA	91325
Susanne	Mortenesen	Newport Beach	CA	92660
Margaret	Mortimore	Glendale	CA	91208
Henry	Moser	laguna woods	CA	92637
Virginiae	Moser	Emeryville	CA	94608
Brad	Moss	Sebastopol	CA	95472
Kerylin	Mott	Fremont	CA	94539
Marcina	Motter	Encinitas	CA	92024
Phyllis	Mottola	Bishop	CA	93514
Ann	Moynahan	CHULA VISTA	CA	91913
Pavel	Mracek	Los Angeles	CA	90025
Tony	Mrsich	Redwood City	CA	94061
Randall	Mueck	San Francisco	CA	94122
Karsten	Mueller	Santa Cruz	CA	95060
Lindsay	Mugglestone	Berkeley	CA	94705
Tod	Muilenburg	Carlsbad	CA	92011
Timur	Mukminov	Mountain View	CA	94043
Jill	Mulato	Mission Viejo	CA	92691
Mark	Mulder	San Jose	CA	95125
Kevin	Mulholland	Palm Springs	CA	92262
Katie	Mulleague	Chico	CA	95926
Patty	Mullin	San Francisco	CA	94110
Robert	Mumm	Camptonville	CA	95922
Kenneth	Mundy	Los Angeles	CA	90068
Marina	Munoz	Van nuys	CA	91405
Lisa	Munoz-Flores	Northridge	CA	91326
Betty	Murillo	Livermore	CA	94551
Garth	Murphy	Encinitas	CA	92024
Paul	Murphy	Los Angeles	CA	90012
Maeve	Murphy	San Rafael	CA	94901

Kathryn	Plitt	Gig Harbor	WA	98332
Darrell	Plouffe	Everett	WA	98201
JoAnn	Polley	Poulsbo	WA	98370
Syanika	Porter-Malloy	Puyallup	WA	98375
Debbi	Pratt	seattle	WA	98199
J	Preston and family	morton	WA	98356
Mara	Price	Marysille	WA	98270
Kelley	Price	KIRKLAND	WA	98033
Judith	Prowell	Bellevue	WA	98008
Diane	Puckett	Bothell	WA	98012
Alethea	Putnam	Seattle	WA	98125
Patti	Rader	Federal Way	WA	98003
Miguel	Ramos	Bellingham	WA	98229
Pearl	Ranstrom	Vashon	WA	98070
Kerrye	Raven	Kelso	WA	98626
Cheryl	Rawson	Coupeville	WA	98239
Leroy	Read	Tacoma	WA	98444
Lisa	Read	Seattle	WA	98119
Ron	Reagan	spokane	WA	99205
james	rechetnick	everett	WA	98201
Nora	Regan	Port Townsend	WA	98368
Margaret	Remingyon	Richland	WA	99354
Jasmine	Reppen	La Conner	WA	98257
Beth	Reprince	Puyallup	WA	98371
Richard	Ress	Edmonds	WA	98020
Jeff	Reynolds	Bremerton	WA	98312
John	Ricca	Port Townsend	WA	98368
Lori	Rice	Port Townsend	WA	98368
Robert	Rice	Redmond	WA	98052
Charles	Riddle	Mercer Island	WA	98040
Helga	Riehlein	Carlsborg	WA	98324
K	Riley	Spokane	WA	99202
Kathryn	ROberg	Spokane	WA	99202
James	Roberts	Palouse	WA	99161
Tina	Robertson	Woodland	WA	98674
Phyllis	Robinson	Greenacres	WA	99016
SA	Robinson	Milton	WA	98354
Brian	Roesch	Seattle	WA	98118
Lorinda	Roland	Olga	WA	98279
Carol	Rolf	Colville	WA	99114
Lea	Rolla	Snohomish	WA	98296
Bob	Rolsky	SUQUAMISH	WA	98392
Daniel	Romer	Seattle	WA	98122
M	Ropke	Seattle	WA	98103
Barbara	Rosenkotter	Deer Harbor	WA	98243
Elizabeth	Rosenthal	Shoreline	WA	98133
CK	Ross	Renton	WA	98059

betty	Murphy	long beach	CA	90802
Ann-Marie	Murphy	San Francisco	CA	94122
Sybil	Murray	Fairfield	CA	94533
Vasu	Murti	Oakland	CA	94611
Jeffrey	Muss	sacramento	CA	95819
Karen	Mussette	Beverly Hills	CA	90210
Bob	Mutascio	Venice	CA	90291
Tom	Mutchler	Santa Maria	CA	93458
Ruth	Muzzin	Montara	CA	94037
Ann	Myers	Berkeley	CA	94705
Rob	Myers	Anaheim	CA	92804
Nathan	Myers	Davis	CA	95616
Aviva	Myers-Taylor	San Diego	CA	92107
Anita	Mykytyn	Danville	CA	94526
Klatherine	Myskowski	Martinez	CA	94553
Janet	Nace	Saratoga	CA	95070
Jane	Nachazel	Los Angeles	CA	90026
christina	nagao	culver city	CA	90230
Christine	Nagata	West Covina	CA	91791
Ken	Nahigian	Sacramento	CA	95827
Jaime	Nahman	Topanga	CA	90290
Jerry	Nailon	Sacramento	CA	95831
Daniel	Nakaji	San Diego	CA	92122
Charlotte	Nall	South Pasadena	CA	91030
Suzanne	Narducy	San Clemente	CA	92672
Kathy	Nash	Fountain Valley	CA	92708
Tom	Nash	Rohnert Park	CA	94928
Colleen	Nathan	San Anselmo	CA	94960
Robert	Naumann	El Cerrito	CA	94530
Alec	Naylor	Beverly Hills	CA	90211
Shannon	Nazari	Porter Ranch	CA	91326
Natasha	Nazario	Guerneville	CA	95446
Mohammad Khalil	Nazihi	Oakland	CA	94609
Carla	Neal	Madera	CA	93636
Sandra	Nealon	Laguna Beach	CA	92651
Candra	Neff	Sonora	CA	95370
Alexis Wray	Negele Miller	Santa Monica	CA	90404
Gabriella	Negrete	Fullerton	CA	92831
Catherine	Neifing	arroyo grande	CA	93420
Laurie	Neill	Smith River	CA	95567
Eric&Kay	Nelson	Vacaville	CA	95688
L	Nelson	Morgan Hill	CA	95038
Brad	Nelson	Oxnard	CA	93035
Norman	Nelson	Torrance	CA	90503
Paul	Nelson	Twain Harte	CA	95383
Cipra	Nemeth	Los Angeles	CA	90048
Gina	Ness	Petaluma	CA	94954

Ray	Rossman	Everett	WA	98203
Elena	Rumiantseva	Seattle	WA	98112
Jay	Russo	Stevenson	WA	98648
Diana	Rutherford	Des Moines	WA	98198
Zandra	Saez	Spokane	WA	99203
john	sailer	Port Townsend	WA	98368
Allen	Sandico	Seattle	WA	98102
Daniel	Sandvig	Monroe	WA	98272
Mickie	Sanwald	Wenatchee,	WA	98801
sharon	saunders	Tacoma	WA	98465
Allan	Saunders	Poulsbo	WA	98370
Miyako	Sawada	Oroville	WA	98844
M.D.	Sazonov-Robinson	Milton	WA	98354
Stacie	Scattergood	Bellevue	WA	98007
Suzzanne	Scauzillo	Seattle	WA	98119
Kevin	Schmidt	Bainbridge Island	WA	98110
Mark	Schoening	Brush Prairie	WA	98606
Jennifer	Schonberger	Vancouver	WA	98665
Janet	Schreiber	Moses Lake	WA	98837
Margaret	Schult	Freeland	WA	98249
Lane	Schulz	Seattle	WA	98109
Ronlyn	Schwartz	Langley	WA	98260
Phebe	Schwartz	Yakima	WA	98901
Rhona	Schwartz	Seattle	WA	98119
raeann	Scott	Sumas	WA	98295
Jack	Scott	Sequim	WA	98382
Denee	Scribner	Ellensburg	WA	98926
Mary	Sebek	Seattle	WA	98103
john	seeburger	lakewood	WA	98498
Spencer	Selander	Castle Rock	WA	98611
Theresa	Sellmann	Bremerton	WA	98312
Paula	Shafransky	Sedro Woolley	WA	98284
Michael	Sharpe	Seattle	WA	98117
Diane	Shaughnessy	Tacoma	WA	98406
CV	Shaw	Dallas	WA	98056
Kirsten	Shaw	Point Roberts	WA	98281
Pam	Shea	Seattle	WA	98107
Sally	Sheck	Seattle	WA	98119
Harley	Shelley	Aberdeen	WA	98520
Bruce	Shilling	Seattle,	WA	98103
S	Shimada	KENMORE	WA	98028
Danielle	Shook	bellingham	WA	98228
Heidi	Shuler	Vancouver	WA	98682
Michael	Shurgot	Seattle	WA	98115
Vanessa	Skantze	Seattle	WA	98134
Ron	Slosky	Seattle	WA	98119
Marla	Smith	Vashon	WA	98070

Lisa	Nettleton	Agoura Hills	CA	91301
Christa	Neuber	W.Hollywood	CA	90069
Elizabeth	Neubrand	San Diego	CA	92116
Manon	Newell	Manhattan Beach	CA	90266
Jette	Newell	Beverly Hills	CA	90210
Roberta	Newman	Mill Valley	CA	94941
Lindsey	Newman	Los Angeles	CA	90005
Suzanne	Newman	Orinda	CA	94563
Helen	Newman	Eureka	CA	95501
Roger	Newton	Chula Vista	CA	91910
Yorkey	Ng	Oakland	CA	94610
Nga	Nguyen	Alhambra	CA	91801
Binh	Nguyen	Los Angeles	CA	90014
Diane	Nguyen	San Jose	CA	95118
Khanh	Nguyen	san jose	CA	95124
Margaret	nguyen	san jose	CA	95124
Marlene	Nguyen	san jose	CA	95124
Linda	Nicholes	Anaheim	CA	92807
Debra	Nichols	Palmdale	CA	93551
Anna	Nichols	Torrance	CA	90501
Ginny	Nichols	Los Gatos	CA	95032
D	Nicholson	San Francisco	CA	94114
Dan	Nickerson	North Hollywood	CA	91601
Sharon	Nicodemus	Sacramento	CA	95821
simona	nicotra	catania	CA	95122
Jane	Niehaus-tull	Ventura	CA	93004
Donna	Niekerk	NORTHRIDGE	CA	91325
Todd	Nielsen	Sherman Oaks	CA	91401
Diana	Nieves	Santa Cruz	CA	95060
Sarah	Nikolovska	los angeles	CA	90036
Karen	Niles	REDONDO BEACH	CA	90278
Karen	Nilsen	Ben Lomond	CA	95005
Lena	Nilsson	Laguna Beach	CA	92651
Patricia	nisbet	San Diego	CA	92117
Wayne	Nishiura	San Jose	CA	95129
Lela	Nishizaki	Dixon	CA	95620
Lauren	Nitta-Dong	Pleasanton	CA	94588
Berna	Nitzberg	APTOS	CA	95003
Lisa	Nix	Manteca	CA	95336
Philip	Noel	San Luis Obispo	CA	93401
Emily	Nogawski	Los Angeles	CA	90049
Elizabeth	Nogotona	Santa Rosa	CA	95403
Tim	Nolan	Los Angeles	CA	90065
Fiona	Nolan	San Rafael	CA	94903
Jacki	Nomi	Carmichael	CA	95608
Gail	Noon	San Pedro	CA	90731
James	Noordyk	San Diego	CA	92109

Sandra	Smith	Seattle	WA	98122
Angela	Smith	Seattle	WA	98166
Meghan	Smith	Bainbridge Island	WA	98110
leslie	Smith	bellingham	WA	98226
Seth	Snapp	Bellingham	WA	98225
Richard	Snook	Vancouver	WA	98687
Bonnie	Sobolewski	Gig Harbor	WA	98335
Samantha	Solomon	Spokane	WA	99205
Travis	Sorensen	Seattle	WA	98102
Sylvia	South	Seattle	WA	98121
Andrea	Speed	Tacoma	WA	98445
Timothy	Speirs	Vancouver	WA	98660
Tina	Springer	Everett	WA	98201
Penny	St. John	Port Townsend	WA	98368
Alycia	Staats	seattle	WA	98115
RyAnn	Stafford	Ellensburg	WA	98926
Kim	Stanley	Bainbridge Island	WA	98110
Carol	Stanley	Redmond	WA	98052
Jack	Stansfield	Stanwood	WA	98292
Lozz	Starseed	Seattle	WA	98125
Terran	Steinberg	Shoreline	WA	98155
Carol	Stevens	Lynnwood	WA	98037
Mattie	Stevens	Henderson	WA	99208
Amber	Still	Bellingham	WA	98229
Patricia	Stimac	Seattle	WA	98103
Gloria	Sting	Burien	WA	98166
Ann	Stockdale	Gig Harbor	WA	98335
Elizabeth	Stokes	Kent	WA	98030
Bettina	Stokes	Bellevue	WA	98005
Todd	Stoltey	Seattle	WA	98101
KS Taylor	Stone	vancouver	WA	98665
Elena	Stroe	bellingham	WA	98225
Camille	Sturdivant-Daly	Medical Lake	WA	99022
Diane	Sullivan	Oak Harbor	WA	98277
Stella	Sun	Medina	WA	98039
Linda	Swan	Snohomish	WA	98291
Karen	Swan	Oak Harbor	WA	98277
Linda	Sweeney	Mountlake Terrace	WA	98043
Leslie	Sweeney	Bellingham	WA	98228
Shelley	Talbot	Ephrata	WA	98823
Tony	Talevich	Seattle	WA	98118
Polly	Tarpley	Poulsbo	WA	98730
Sharon	Tauber	Lopez Island	WA	98261
Nick	Taylor	Olympia	WA	98502
Ruth	Terrill	Spokane	WA	99201
Yara	Tethys	Bellingham	WA	98225
Kat	Thomas	Seattle	WA	98122

Gary	Norcross	Paradise	CA	95969
Iris	Noren	Elk Grove	CA	95624
Lindsay	noren	San Francisco	CA	94123
Matt	Norris	Half Moon Bay	CA	94019
Ann	Northrop	Santa Monica	CA	90403
Aaron	Norton	Costa Mesa	CA	92627
juleigh	norwood	Arcata	CA	95521
Debbie	Notkin	Oakland	CA	94609
Ursula	Noto	Burbank	CA	91504
William	Nourse	Beverly Hills	CA	90210
M	Novak	Santa Monica	CA	90405
Joseph	Nowak	Temecula	CA	92592
Maria	Nowicki	San Francisco	CA	94116
Britney	Nucci	Manhattan Beach	CA	90266
Robert	Nunes	Paso Robles	CA	93446
Maria	Nunes	Redwood City	CA	94065
Carlos	Nunez	Reseda	CA	91335
Sharon	Nutt	Sausalito	CA	94965
Connie	O'Connor	Fallbrook	CA	92028
Laura	Oakes	Lincoln	CA	95648
Dan	Obannon	watsonville	CA	95076
Tim	Oben	Dublin	CA	94568
Abraham	Oboruemuh	Riverside	CA	92515
Cecille	OBrien	San Jose	CA	95129
Floyd	O'Brien	Stockton	CA	95204
Kerry	O'Brien	Valencia	CA	91355
Kathy	O'Brien	Redway	CA	95560
Carolyn	O'Brien	Los Angeles	CA	90048
rick	o'bryan	los angeles	CA	90066
Cynthia	OByrne	Lompoc	CA	93436
Barbara	Oceanlight	Palo Alto	CA	94306
MaryRose	OConnor	Guerneville	CA	95446
James	oconnor	San Diego	CA	91942
SHARONNA	O'CONNOR	Sunnyvale	CA	94086
Christine	Oda	SF	CA	94115
Gregg	Oelker	Altadena	CA	91001
Linda	Oeth	Corona del Mar	CA	92625
Daniel	Ogas	San Diego	CA	92126
Edith	Ogella	Santa Barbara	CA	93111
Dave	Ogilvie	Santa Barbara	CA	93105
Sharon	OHara	Penn Valley	CA	95946
Ami	Okada	Palo Alto	CA	94301
Masako	Okazaki	San Diego	CA	92111
Peggy	Oki	Carpinteria	CA	93013
Audrey	Okubo	San Jose	CA	95129
Liesl	Okuda	Stevenson Ranch	CA	91381
Ruth	Olafsdottir	Santa Monica	CA	90403

Patricia	Thomas	yacolt	WA	98675
Lisa	Thomas	Issaquah	WA	98027
Gerald	Thompson	Mukilteo	WA	98275
Lindsay	Thompson	sedro woolley	WA	98284
Don	Thomsen	Spokane	WA	99202
Rob	Thomson	Redmond	WA	98053
Danny	Thorn	Kirkland	WA	98033
Debbie	Thorn	Kirkland	WA	98033
J	Thrush	Naches	WA	98937
Michen	Thuemer	Seattle	WA	98118
Alice	Tobias	Seatle	WA	98105
David	Tonkin	Port Townsend	WA	98368
Ruth	Tooley	Shelton	WA	98584
Darlene	Townsend	Spokane	WA	99202
Teri	Travis	Seattle	WA	98115
Constance	Trowbridge	Seattle	WA	98118
Sherine	Tully	Seattle	WA	98199
Michael	Turnauer	Vancouver	WA	98683
David and Geri	Turnoy	Eastsound	WA	98245
Neal	Umphred	Redmond	WA	98052
Victoria	Urias	Seattle	WA	98125
Steve	Uyenishi	Seattle	WA	98178
Gianna	Vaccaro	Washougal	WA	98671
Amy	Valdez	Seattle	WA	98103
Nanette	Valencia	Des Moines	WA	98198
Frank	Valenti	Leavenworth	WA	98826
Emily	Van Alyne	West Richland	WA	99353
Benjamin	Van Riper	Spokane	WA	99217
Peter	Van Zant	Seattle	WA	98105
Geraldine	Vanderbeke	Blaine	WA	98230
Mark	Velez	Seattle	WA	98178
Joyce	Veterane	Bainbridge Is	WA	98110
Terry	Volkirch	Issaquah	WA	98027
Bruce	von Borstel	Sequim	WA	98382
Michael	von Sacher-Masoch	Everett	WA	98206
Mare	Wahosi	Olalla	WA	98329
Garrett	Waiss	Bainbridge Island	WA	98110
Francine	Walbon	Marysville	WA	98270
edie	wall	Sequim	WA	98382
Zoe	Wallace	Seattle	WA	98105
Patricia	Warden	Renton	WA	98056
Colleen	Wasner	Olympia	WA	98501
Joan	Wattles	Seattle	WA	98116
Dean	Webb	Seattle	WA	98199
Greg	Weber	Arlington	WA	98223
Ardeth	Weed	Edmonds	WA	98020
Lucy	Weinberg	Seattle	WA	98125

FELIPE	OLARTE	Pasadena	CA	91110
Karina	Oleynikov	Van Nuys	CA	91406
Consuelo	Olivarez	Venice	CA	90291
Bill	Oliveau	Albion	CA	95410
Rachel	Oliver	Mariposa	CA	95338
Cindy	Oliver	Aptos	CA	95003
Nancy	Oliver	Los Angeles	CA	90039
rICHARD	OLIVER	CAPISTRANO BEACH	CA	92624
Simone	oliver	Santa Rosa	CA	95404
Suzanne	Olsen	Slo	CA	93401
Andrew	Olsen	Los Angeles	CA	90027
Steve	Olson	Aptos	CA	95003
Krister	Olsson	Los Angeles	CA	90013
Frances	Onesti	Lawndale	CA	90260
Gulshan	Oomerjee	Simi Valley	CA	93065
Dylan	Orbach	auburn	CA	95603
George	Orbelian	San Francisco	CA	94121
Gerald	Orcholski	Pasadena	CA	91104
Alina	Orendain	San Diego	CA	92154
Michelle	Orengo-McFarlane	San Francisco	CA	94107
Nicole	Orestano	healdsburg	CA	95448
Angel	Orona	Alhambra	CA	91803
Michelle	Oroz	Morgan hill	CA	95037
Robert	Ortiz	Novato	CA	94945
Henry	Ortiz	Whittier	CA	90605
April	Ortiz-Marquez	Burbank	CA	91506
Kathy	Osborn	La Mesa	CA	91942
Vicki	Osborn-Gagen	Redwood City	CA	94061
Wendy	Oser	Berkeley	CA	94702
Nina	OShea	San Francisco	CA	94132
TIMOTHY	O'SHEA	SAN FRANCISCO	CA	94115
David	Osinga	San Rafael	CA	94901
Stuart	Oskamp	Claremont	CA	91711
David	Osterhoudt	Rancho Santa Margarita	CA	92688
Mary	osterloh	Fairfax	CA	94930
Gavin	Ostrom	Roseville	CA	95678
Hillary	Ostrow	Encino	CA	91316
Andrew	Oswald	SAN DIEGO	CA	92104
Sodavy	Ou	Long Beach	CA	90804
Tina	Overland	encinitas	CA	92024
Dustin	Ovitz	Malibu	CA	90265
Marianne	Owens	San Rafael	CA	94901
Anna	Owens	Woodland	CA	95695
Cindy	Owens	Fair Oaks	CA	95628
Luna	oxenberg	Berkeley	CA	94704
Rhonda	Oxley	San Francisco	CA	94122
Stephen	Pacetti	San Jose	CA	95130

Diane	Weinstein	Issaquah	WA	98029
Elyette	Weinstein	Olympia	WA	98501
Marie	Weis	Fox Island	WA	98333
Jan	Weisel	Woodinville	WA	98072
Donna	Weissbeck	Sultan	WA	98294
Susan	Welenofsky	Marysville	WA	98270
Jordan	Westerholm	Seattle	WA	98115
Grace	Weston	Portland	WA	98118
Jennifer	Westra	Spokane	WA	99202
willard	westre	Bellevue	WA	98006
Preston	Wheaton	Olympia	WA	98501
Jennifer	Wheeler	Gold Bar	WA	98251
Edward	Whitcomb	Spokane	WA	99208
Liz	White	Seattle	WA	98133
Nancy	White	Spokane Valley	WA	99216
Shannon	Whitmore	Bellevue	WA	98004
Scott	Widdas	Silverdale	WA	98383
Jeffrey	Widmer	Seattle	WA	98144
Marni	Wiebe Keogh	Edmonds	WA	98026
Joe	Wiederhold	Bellingham	WA	98229
Alixandre	Wilkins	Gig Harbor	WA	98335
Mary	WillAllen	Friday Harbor	WA	98250
Kendra	Williams	Seattle	WA	98126
Walt	Williams	Edmonds	WA	98026
Emily	Willoughby	Tukwila	WA	98188
Susan	wilson	Kent	WA	98031
Pierre	Wilson	Olympia	WA	98506
Steve	Wilson	West Richland	WA	99353
David	Wilson	Woodinville	WA	98072
William	Winstanley	Wenatchee	WA	98801
Karin	Winter	Kenmore	WA	98028
Mark	Wirth	Seattle	WA	98102
Wendy	Wiseman	Bellingham	WA	98225
Jackie	Wolf	Lopez Island	WA	98261
Kathleen	Wolfe	Des Moines	WA	98198
Maia	wolff	Bainbridge island	WA	98110
Barbara	Wood	Seattle	WA	98133
Merryl	Woodard	Mill Creek	WA	98012
Douglas	Woodzy	Fox Island	WA	98333
Ken	Woolard	TACOMA	WA	98466
Patti	Wright	Bellingham	WA	98229
Dayna	Yalowicki	Bothell	WA	98021
K	Youmans	Roslyn	WA	98941
Connie	Young	SNOHOMISH	WA	98290
Wesly	Young	renton	WA	98056
Otto	Youngers	Tacoma	WA	98418
Hamid	Zavareei	Seattle	WA	98126

ann	pacey	napa	CA	94558
Michelle	Pacheco	La Puente	CA	91744

Jack	Zektzer	Seattle	WA	98126
Amy	Zelaya	Snohomish	WA	98290
Debbie	Zick	Greenbank	WA	98253
Craig	Zimmerman	Buckley	WA	98321
Fred	Zlotnick	Seattle	WA	98119

OCEANA | Protecting The World's Oceans
99 Pacific Street, Suite 155C
Monterey, CA 93940
831.643.9266
www.oceana.org

November 5, 2014

Ms. Dorothy Lowman, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220

Mr. William Stelle, Regional Administrator
NOAA Fisheries, West Coast Region
7600 Sand Point Way NE
Seattle, WA 98115

RE: Agenda Item E.2 – Sardine Harvest FRACTION: Support for Alt. 2a

Dear Ms. Lowman, Mr. Stelle, and Council Members:

We support the adoption of the CalCOFI 3-year average as the index for determining the sardine harvest FRACTION, based on the best available science indicating that this index is superior to the currently used SIO index. However, in adopting the CalCOFI index, the data does not support a more aggressive harvest; thus, we strongly oppose any of the proposed alternatives that increase the upper bound of the FRACTION range above the current 15% maximum. We support Alternative 2a, and oppose Alternatives 2b, 2c, and 2d as described in the Draft Environmental Assessment.[1]

Brown pelican nesting failures and starving sea lions are the most visible results of the collapsing sardine population. These are clear warning signs that sardine management is not meeting the stated goal of the CPS FMP of providing adequate forage for dependent species or the fundamental requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to prevent overfishing and achieve Optimum Yield (OY). While there may be debate about the extent to which fishing pressure has exacerbated what is likely a period of low natural sardine productivity, the facts demonstrate that increasing catch levels under these conditions is harmful to both the stock itself and the predators that feed on it:

- From 2007-2014, the fishery removed 715,000 mt from the northern sardine stock.[2]
- From 2007-2014, the northern sardine stock size fell by 1,050,000 mt.[3]
- From 2007-2013, the Council used a FRACTION of 15%, failing to lower the FRACTION during a period of low natural productivity as intended.

[1] Draft Environmental Assessment. Incorporating the use of a new temperature index into the calculation of the Pacific sardine harvest guideline formula. PFMC and NMFS. November 2014 Agenda Item E.2.a Attachment 1
[2] Hill et al. Assessment of the Pacific Sardine Resource in 2014 for USA Management in 2014-15, p. 5. April 2014. http://www.pcouncil.org/wp-content/uploads/H1b_2014_PacificSardine_StockAssmnt_ES_APR2014BB.pdf
[3] Id. at 7.

- From 2004-2013, Mexico and Canada together harvested double the landings assumed in the U.S. harvest control rule (26% of total coastwide landings of the Northern sardine stock).[4]
- California sea lions experienced an unusual mortality event due to the lack of available food (primarily sardines and anchovies) in 2013, and had higher than average pup mortality in 2014.[5]
- Brown pelicans have experienced five consecutive years of unusual nesting failures including, in 2014, the first range-wide nesting failure ever seen in 25 years of monitoring.[6]

Simply put, the declines of the Pacific sardine stock and dependent predators show that management is not achieving Optimum Yield. Sardine harvest levels are not set at levels that account appropriately for relevant social, economic, and ecological factors, such as the needs of predators and effects on other fisheries. Moreover, the failure to consider the effect of this action on dependent predators flies in the face of NEPA's "hard look" requirement."[7] **Neither the law nor science justify moving toward a more aggressive harvest approach for sardines.**

The CPSMT November 2014 Report[8] states (p.5) that:

> *The specific HG formula adopted under Amendment 8 was selected from among many potential HCR rules analyzed because it optimally met the following CPS FMP goals:*
>
> *1. Promote efficiency and profitability in the fishery, including stability of catch.*[9]
> *2. Achieve optimum yield.*
> *3. Provide adequate forage for predator species.*
> *4. Prevent overfishing.*

Given the new information now before the Council, selection of a harvest control rule that is more aggressive than the current rule is a policy change that necessitates an analysis of whether the resulting harvest rates are consistent with optimum yield, including providing adequate forage for dependent predators <u>given current conditions and the current status of the stock</u>.[10] The

---

[4] Id. at 5.
[5] NOAA Fisheries. 2013 California Sea Lion Unusual Mortality Event in California http://www.nmfs.noaa.gov/pr/health/mmume/californiasealions2013.htm
[6] Harvey, L. 2014. California Institute of Environmental Studies. California Brown Pelican reproductive decline on the Channel Islands colonies. Unpublished data; May 2014. Preliminary data presented by Dan Anderson (Mexico) and Laurie Harvey (Channel Islands) at phone meeting of the Pacific Brown Pelican Rangewide Technical Working Group. Convened by USFWS Region 8. Carlsbad, CA.
[7] *City of Carmel-by-the-Sea v. United States DOT*, 123 F.3d 1142, 1151 (9th Cir. 1997).
[8] CPSMT Report on Sardine Harvest Fraction. November 2014 Agenda Item E.2.b
[9] Under the MSA, National Standard One's command to prevent overfishing and achieve optimum yield (which includes providing adequate forage) takes priority over promoting efficiency and profitability. Only once fishery managers demonstrate that they have met the requirements of National Standard One may they consider these economic factors.
[10] 16 U.S.C. § 1853(a)(3). "Optimum yield" is equivalent to maximum sustainable yield from the fishery, "as reduced by any relevant economic, social, or **ecological** factor." 16 U.S.C. § 1802(33). Emphasis added.

Council must perform this evaluation using the best scientific information currently available; it may not simply rely on 16-year old analyses used to support Amendment 8. We do not necessarily agree that those analyses comprised an actual assessment and specification of Optimum Yield. Regardless, however, new data have emerged, the stock status has changed, and the status of dependent predators has declined, indicating that the approach to determining OY in Amendment 8 may no longer be sufficient to meet ecological needs, and thus must be reassessed and specified based on current information.

As noted, a great deal of new information has emerged and circumstances have changed. This new information includes the fact that the average provision of forage provided by the sardine stock to the California Current ecosystem is much less than previously thought. Under Option J chosen in Amendment 8, the mean adult sardine biomass (1+) is 1,952 thousand metric tons.[11] Based on the assumed natural mortality rates of sardines in the Amendment 8 analysis, the Hurtado & Punt 2014 analysis, and the most recent stock assessment of M = -0.4, approximately one third of the biomass dies annually, hence one third of the annual biomass is provided as "forage" to the California Current Ecosystem. Therefore, pursuant to Amendment 8, NMFS and the PFMC intended to provide an annual average of 650 thousand metric tons of sardines as forage to the ecosystem, as a means to meet the stated FMP goal of providing adequate forage to dependent predators. However, under the new model, Alternatives 2b, 2c, and 2d result in mean adult biomass of 1,182, 1,186, and 1,187 respectively, each providing approximately only 395 thousand metric tons of forage to dependent predators--40% less forage than the level determined to be "adequate forage" in Amendment 8.

However, neither the Draft EA nor other materials describe how the alternatives before the Council will provide adequate forage for dependent predators or otherwise account for relevant ecological, economic and social factors consistent with Optimum Yield. Given a 40% decrease in the forage provided to the ecosystem under some of the proposed alternatives relative to the Council's intent in Amendment 8 – and, more importantly, its duties under the MSA – such an analysis is necessary to demonstrate whether or not the fishery is achieving Optimum Yield.

Throughout this process, Oceana has proposed the Council analyze and consider an alternative that would increase the CUTOFF biomass to 640,000 mt, consistent with the recommendations of the Lenfest Forage Fish Task Force.[12] The current sardine CUTOFF is around 10% of unfished biomass and the Council has thus far refused to seriously consider any increases in CUTOFF, despite Oceana presenting analysis that such an increase would maintain high catch levels while increasing forage production and reducing stock risk.

Alternatives 2b, 2c, and 2d are more aggressive than 2a or the status quo.

---

[11] DRAFT EA, Table 1.

[12] Pikitch, E., Boersma, P.D., Boyd, I.L., Conover, D.O., Cury, P., Essington, T., Heppell, S.S., Houde, E.D., Mangel, M., Pauly, D., Plagányi, É., Sainsbury, K., and Steneck, R.S. 2012. Little Fish, Big Impact: Managing a Crucial Link in Ocean Food Webs. Lenfest Ocean Program. Washington, DC. 108 pp.

Absent any change in the FRACTION bounds, the change from SIO to CalCOFI will result in equal or higher catch rates the vast majority of the time. Based on temperatures over the last century, the analyses in CPS FMP Amendment 13 and the CPSMT's September 2014 presentation to the PFMC provide median and lower and upper quartiles of what the temperatures and corresponding FRACTION levels are under both indices (Table 1).

Table 1: FRACTION levels corresponding to lower quartile, median, and upper quartile temperatures in each respective temperature index corresponding to each of the five alternative FRACTION ranges presented in the Draft EA. Note these are FRACTION values in the Harvest Guideline, independent of the OFL/ABC control rule.

Alternative	FRACTION Bounds and Temp Index	Lower temp quartile	Median temp	Upper temp quartile
1 (no action)	5-15 SIO	5%	8%	15%
2a	5-15 CalCOFI	12%	15%	15%
2b	10-20 CalCOFI	12%	18%	20%
2c	0-20 CalCOFI	12%	18%	20%
2d	0-20 CalCOFI	12%	18%	20%

Most of the time, CalCOFI results in higher FRACTION values than SIO, and over half the time, the FRACTION will be above 15% under alternatives 2b, 2c, and 2d. Another key ramification is that the "low temperature" scenarios analyzed in the November 2014 CPSMT report (Table A-2) are extremely rare cases. The vast majority of the time (75% of all years), the CalCOFI index will result in a FRACTION over 12%. Therefore, the fact that SIO FRACTION has exceeded the CalCOFI FRACTION in the last few years is not indicative of the long-term, and likely reflects an anomaly resulting from the fact that SIO is an inaccurate predictor of sardine recruitment.

We are concerned that Alternatives 2b, 2c, and 2d would result in substantially greater harvest (33% higher) than under Alternative 2a or the no action alternative under most conditions, and would result in lower mean biomass than Alternative 2a. Based on the temperatures observed over the last several decades, there will be even fewer years where FRACTION levels set using CalCOFI will be at the lower end of the range than under SIO, yet most of the time they will be at the upper end of the range. In particular, Table A-2 of the CPSMT November 2014 Report indicates that Alternatives 2b-d result in harvest rates of 17,400 mt under the "warm temp" scenarios when biomass is "low" at 250,000 mt, while the status quo and 2a will produce an HG of 13,050 mt. Catching 33% more sardines most of the time is simply more aggressive and not warranted. In particular, when the stock is at low levels, a 33% difference in catch can make the difference between decline and recovery.

One justification given in the CPSMT report for their recommendation to move to a 10-20% FRACTION range is that "For sub-alternatives 2a-d, biological and economic performance

measures are similar, differing by less than 5% except for mean and median catch" (p.6). However, a closer examination of individual cases reveals that under most conditions, Alternatives 2b, 2c, and 2d result in substantially greater harvest guidelines than 2a, including situations where biomass is low. Furthermore, regardless of the magnitude of the change, ANY increase in fishing rate on sardines in light of the many concerns with the stock runs contrary to precautionary management.

The original impetus for replacing the SIO index with a more accurate indicator of sardine productivity was that the continued use of the SIO index was resulting in harvest rates that were too high given the low productivity and rapid decline of the sardine stock. However, the argument for increasing FRACTION to 10-20% is based on the rationale that sardines are now more productive than once thought, and that an increased FRACTION is needed to bound the median Emsy value produced under the CalCOFI index. This argument is flawed and misguided for two reasons: 1) sardines are at critically low levels and dependent predators are suffering food shortages right now in part because management has not been conservative enough, so if anything the control rule should be made <u>more</u> conservative in order to satisfy National Standard One, not less; 2) if the stock is indeed more productive and the median Emsy value is higher under the CalCOFI index, that will already result in greater harvest rates and fishing opportunities under the 5-15% FRACTION range than under SIO. In the long-term, Alternative 2a would allow greater harvest rates than under the status quo, while more accurately reflecting the productivity of the stock. Therefore, there is no scientific need to increase the FRACTION range, and maintaining the current range is the most consistent choice with the current policy.

Discrepancy between DISTRIBUTION and actual landings by Mexico and Canada

We continue to be concerned that the DISTRIBUTION parameter in the harvest control rule is not adequately accounting for landings of the Pacific sardine stock in Mexico and Canada. As noted by NMFS stock assessment scientists in a new peer-reviewed scientific publication (full publication attached):[13]

> *Using combined or stock differentiated landings and assessed biomasses, we found that the current harvest control rule (HCR) for Pacific Sardine has not consistently maintained a total F below the U.S. target value because the "distribution" parameter (used to account for the northern stock's proportion in the U.S. Exclusive Economic Zone [EEZ]), has not adequately accounted for northern stock landings in Mexico and Canada.*

The most recent April 2014 stock assessment[14] for the first time differentiated the west coast sardine population into two separate stocks, and only assessed the Northern stock. According to that assessment, Mexico and Canada have landed 26% of total coastwide landings of the

[13] D. A. Demer and J. P. Zwolinski. 2014. Optimizing fishing quotas to meet target fishing fractions of an internationally exploited stock of Pacific sardine (Sardinops sagax) *North American Journal of Fisheries Management* 34:1119–1130,

[14] Hill et al. 2014. Assessment of the Pacific Sardine Resource in 2014 for U.S.A. Management in 2014-15. April 2014 PFMC Meeting, Agenda Item H.1.b.

Northern stock from 2004-2013. This is double the 13% assumed in the U.S. DISTRIBUTION parameter. This new best available science necessitates a reconsideration of how these two stocks are managed and how this new understanding affects sardine distribution.

These concerns with the DISTRIBUTION parameter have several important ramifications for the decision before the Council on FRACTION. In particular, the fact that catch has been exceeding target coastwide levels means that the performance standards produced in simulation analyses are invalid. In other words, the simulation results are only accurate when the U.S. catches 87% and Mexico and Canada combined catch 13% of the total coastwide catch, such that the total catch adds up to 100%, which is a DISTRIBUTION of 1.0. The CPSMT report states: "For the purpose of analysis Hurtado-Ferro and Punt (2014) set DISTRIBUTION to 1.0, as was done originally in Amendment 8, and thus this parameter was not a factor in the scenarios." The performance standards, however, deviate significantly from those assuming a DISTRIBUTION equal to 1.0 when Mexico and Canada are not following the U.S. control rule (which we know to be the case). In fact, Hurtado-Ferro & Punt 2014 produced simulation results in their original March 2014 analysis that indicated that the simulation results are sensitive to Mexico and Canada not following the U.S. control rule (case S14 in Table 6). This is the only case in which the resource is rendered "extinct".

Mr. Hurtado-Ferro (pers. comm., Oct. 8, 2014) provided Oceana with a similar analysis of alternatives 2a and 2b under their Sensitivity Scenario (case S14 in Table 6, Hurtado & Punt 2014) where Mexico and Canada do not follow the U.S. control rule (TABLE 2). The results are vastly different from the results provided in the Draft EA. Specifically, rather than comparing depletion rates across the proposed alternatives in the 70-80% range, the depletion rates across alternatives are in the 40-50% range, which mean dramatically different outcomes for the ecosystem and the fishery. Notably, Alternative 2b results in a greater risk of stock collapse than 2a (17% vs. 14%). Without first addressing the fundamental problem of actual coastwide catch exceeding what is assumed in the US harvest control rule, increasing FRACTION above current levels will accentuate the risk already inherent due to the lack of coordinated management of this trans-boundary stock. We understand this international issue is challenging and complex, and we are currently pursuing strategies to advance tri-national sardine management. However, it would be irresponsible for the Council to selectively make one aspect of the harvest control rule incrementally more aggressive based on an argument that new science indicates the stock is more productive, while ignoring new science showing the harvest control rule is not nearly as conservative as intended.

Table 2: Analysis of the No Catch Alternative, Alternative 2a under assumption of Distribution = 1 (Scenario "HG J"), and Alternatives 2a and 2b when Mexico and Canada do not follow the U.S. control rule. Analysis provided by F. Hurtado Ferro on October 18, 2014 using Hurtado-Punt 2014 simulation model and performance measures as presented in March 2014 report. Depletion refers to the mean 1+ biomass as a percentage of mean unfished biomass. Key performance measures are highlighted.

Description	Unfished	Alternative 2a when Mexico and Canada follow the US Control Rule	Alternative 2a when Mexico and Canada do not follow US Control Rule	Alternative 2b when Mexico and Canada do not follow US Control Rule
Scenario	No Catch	HG J	MF	MF*
Code	21	6	S14	S14*
FRACTION (%)	0	5-15	5-15	10-20
CUTOFF	-	150	150	150
MAXCAT	-	200	200	200
Performance_Measure				
Mean_catch_all	0	105.8	57.1	59.8
SD_catch_all	0	72.5	60.5	64.1
Mean_catch_CO	0	110.9	73.6	79.4
SD_catch_CO	0	70.4	59.5	62.9
Mean_B1+	1572	1220	715.8	660.4
Mean Depletion	100%	78%	46%	42%
SD_B1+	907.6	888.1	725.0	701.3
Mean_SSB	1304.3	946.7	493.5	450.4
SD_SSB	805.5	757	534.1	513.9
%B1+>400	98.6	92.4	58.8	54.9
%No_catch	100	4.7	22.8	25.1
%Catch<50	100	31.2	58.8	58.5
Median_catch	0	97.4	32.9	31.7
Median_B1+	1401.8	991.8	509.1	456.7
Median_SSB	1139.7	742.1	344.9	306.0
Mean_pop_age	3.29	2.83	2.18	2.10
Mean_Catch_Age	NA	1.83	1.41	1.36
%HCR_min	NA	11.18	11.09	25.17
%HCR_max	NA	57.36	57.74	40.29
Mean_Yrs_HCRmin	NA	2.58	2.61	4.00
Mean_Yrs_HCRmax	NA	8.56	8.82	6.01
Mean_Yrs_NoCatch	NA	1.86	4.14	4.47
% Collapses	0	0	14	17

*** New model run not previously included in March 2014 Hurtado-Ferro & Punt Analysis.**

Analyzing "No Action" under a different analysis than the proposed alternatives violates the National Environmental Policy Act (NEPA) and is inconsistent with the recommendations of the Scientific and Statistical Committee (SSC)

NEPA requires analysis of a no-action alternative as a baseline for measuring the effects of the proposed action. See 40 C.F.R. § 1502.14 (requiring that the agency assess a no-action alternative). "The no action alternative may be thought of in terms of continuing with the present course of action until that action is changed. It establishes a baseline against which the proposed action and its alternatives may be measured. "*Biodiversity Conservation Alliance v. United States Forest Service*, No. 12-8071, 2014 U.S. App. LEXIS 17056, at *11 (10th Cir. Sept. 3, 2014).

The Draft EA presents a meaningless comparison between the "no action" alternative and other alternatives because it uses a different operating model for analyzing the No Action alternative than it uses to analyze the other proposed alternatives. The Draft EA uses the Original Amendment 8 operating model analysis to describe the No Action alternative and the Hurtado & Punt 2014 analysis to describe the action alternatives. These two models are fundamentally different, using different parameters, model structure, and productivity information about the sardine stock. As the CPSMT November 2014 report (p. 16) states: "The new operating model by Hurtado-Ferro and Punt (age-structured) is structurally different than the simulation model used in Amendment 8 (production model), and incorporates a revised recruitment time series that better represents sardine population dynamics over the past several decades." Simply put, the same exact policy alternative will result in drastically different analytic results depending on which of the two models are used. Therefore, it is impossible to distinguish whether the differences between the No Action alternative and the action alternatives result from the difference in the model versus a difference in the performance of the alternatives. Hence, it is impossible to make a meaningful comparison between any of the alternatives and the No Action alternative in the Draft EA. The result is that the Draft EA prevents the public or decision-makers from being able to measure the proposed action against the baseline. As indicated in the CPSMT November 2014 report (p.16): "Because the results for the No Action alternative derive from a different data set and operating model, direct comparison between Alternatives 1 and 2a-d is not appropriate."

In discussing the proper analysis of the No Action alternative, the SSC said in its September 2014 statement:[15]

> *In order to fully evaluate the impact of this change and the Alternatives presented, however, Table 1 in the EA should include a column for Alternative 1 (the No Action Alternative). To produce this column, a simulation needs to be conducted using the current harvest control rules (including OFL, acceptable biological catch [ABC] and HG rules), including the temperature data from Scripps Institute of Oceanography (for the*

[15] Supplemental SSC Report, Agenda Item C.1.b. September 2014. http://www.pcouncil.org/wp-content/uploads/C1b_Sup_SSC_Rpt_SEPT2014BB.pdf

> *HG) as well as that from CalCOFI (for the OFL, ABC, and to drive the biological simulation) for the same time period used as the basis for simulations of the other Alternatives. The SSC expects that the results of this analysis will be generally similar to Scenario New8 (=Variant 22) in the "Revised Analyses Related to Sardine Harvest Parameters" (Agenda Item I.1.b, Revised Analyses, March 2014).*

This provides two options for providing a quantitative "no action" baseline analysis under the same operating model used to evaluate the alternatives: either develop a new simulation as proposed by the SSC or use the existing simulation (New 8, Variant 22) that the SSC indicated would most closely approximate the No Action alternative. However, the Draft EA fails to include either option, instead providing a misleading comparison to the results of a completely different model, and preventing a comparison of the proposed actions relative to the no action baseline.

We raised this concern in our public comments to the CPSMT at its October 9, 2014 meeting. As a courtesy, we include the following table (Table 3) which includes relevant performance standards from the Draft EA Table 1 for the action alternatives (2a,2b,2c,2d) and the SSC's recommended nearest approximation. Note that the mean biomass under Alternative 2a is the closest to the No Action alternative, and Alternatives 2b, 2c, and 2d all result in a lower mean Biomass than under No Action.

Table 3: Key performance measures associated with each of the five alternatives in the Draft EA, replacing Alternative 1 analysis as recommended by SSC September 2014 statement.

	Alt 1 No Action*	**Alt 2a**	**Alt 2b**	**Alt 2c**	**Alt 2d**
FRACTION	15%	5-15%	10-20%	5-20%	0-20%
Mean Biomass (1+) (tmt)	1208	1220	1182	1186	1187
Depletion	77%	78%	75%	75%	76%
Mean catch (tmt)	107	106	112	111	111

**Alt 1: No Action data taken from Scenario code 22, Table 4, Hurtado-Ferro & Punt 2014 (March 2014), as per SSC September 2014 recommendation. Note that since this Scenario had a fixed rate of 15%, the actual mean biomass and depletion of the No Action alternative would be slightly higher.*

Conclusion

In summary, there is a wealth of new information showing that Pacific sardines have experienced a major decline since 2007. Key predators, indicators of forage abundance, are having

reproductive failures due to a lack of sardines and anchovies. U.S. fishing contributed to this decline by not reducing fishing rates during the decline as originally intended. Additionally, Mexico and Canada are harvesting at rates greater than those anticipated by the DISTRIBUTION parameter of the harvest control rule.

Based on this data, it is unclear how the CPS FMP is meeting its goal of providing adequate forage, particularly as the new model simulations indicate 40% less forage being provided to the ecosystem by the Pacific sardine stock than was assumed in Amendment 8. Moreover, because NMFS has not assessed Optimum Yield since 1998, despite this new data, a change in the stock status, and the decline of dependent predators, it is likely that the determination of OY in Amendment 8 is no longer sufficient to meet ecological needs. Consequently, NMFS must reassess and specify OY based on current information.

Given the changed status of Pacific sardines, and deficiencies in the current Draft EA, we ask that you limit the current action to focus solely on changing the temperature index from SIO to CalCOFI by adopting Alternative 2a. Alternative 2a will allow for higher sardine catches in the long-term, it is not more conservative than the status quo, yet it is the most similar alternative to the status quo. We ask that any changes to the FRACTION range be considered in the context of the full suite of harvest parameters (including CUTOFF and DISTRIBUTION) as these parameters are highly dependent on one another, and that the Council make such an overhaul to sardine management a top priority in 2015 given the dire status of sardines and the new scientific information available.

The Council has shown leadership in light of the various stock, ecosystem, and stakeholder concerns by convening the 2013 Sardine Parameters Workshop and by lowering the Annual Catch Targets substantially below the Harvest Guideline in the Jan-June 2014 and July 2014-June 2015 seasons. We ask the Council to continue that leadership for the benefit of the California Current Ecosystem and west coast fishing communities by selecting Alternative 2a.

We look forward to working with the Council to continue to improve and update Pacific sardine management.

Sincerely,

Geoffrey Shester, Ph.D.
California Campaign Director

Attachment: Demer, D.A. and Zwolinski, J.P. 2014. Optimizing Fishing Quotas to Meet Target Fishing Fractions of an Internationally Exploited Stock of Pacific Sardine. *North American Journal of Fisheries Management* 34:1119–1130.

This article was downloaded by: [NOAA NMFS La Jolla]
On: 04 November 2014, At: 08:01
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

North American Journal of Fisheries Management
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/ujfm20

Optimizing Fishing Quotas to Meet Target Fishing Fractions of an Internationally Exploited Stock of Pacific Sardine

David A. Demer[a] & Juan P. Zwolinski[b]

[a] National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Fisheries Resources Division, Southwest Fisheries Science Center, 8901 La Jolla Shores Drive, La Jolla, California 92037, USA

[b] Institute of Marine Sciences, University of California, Santa Cruz, Earth and Marine Sciences Building, Room A317, Santa Cruz, California 95064, USA

Published online: 04 Nov 2014.

To cite this article: David A. Demer & Juan P. Zwolinski (2014) Optimizing Fishing Quotas to Meet Target Fishing Fractions of an Internationally Exploited Stock of Pacific Sardine, North American Journal of Fisheries Management, 34:6, 1119-1130, DOI: 10.1080/02755947.2014.951802

To link to this article: http://dx.doi.org/10.1080/02755947.2014.951802

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at http://www.tandfonline.com/page/terms-and-conditions

North American Journal of Fisheries Management 34:1119–1130, 2014
© American Fisheries Society 2014
ISSN: 0275-5947 print / 1548-8675 online
DOI: 10.1080/02755947.2014.951802

ARTICLE

Optimizing Fishing Quotas to Meet Target Fishing Fractions of an Internationally Exploited Stock of Pacific Sardine

David A. Demer*
National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Fisheries Resources Division, Southwest Fisheries Science Center, 8901 La Jolla Shores Drive, La Jolla, California 92037, USA

Juan P. Zwolinski
Institute of Marine Sciences, University of California, Santa Cruz, Earth and Marine Sciences Building, Room A317, Santa Cruz, California 95064, USA

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

Abstract
Two stocks of Pacific Sardine *Sardinops sagax* migrate seasonally and synchronously along the west coasts of Mexico, the USA, and Canada. Landings from the two stocks are currently combined in U.S. assessments of the northern stock, but the stocks may be differentiated by their associated seawater habitats, which are predominantly characterized by different ranges of sea surface temperature. We compared the combined and temperature-differentiated landings of the two stocks in each country for the period 1993–2011, demonstrating how different attributions of the landings affected the estimated annual fishing fraction (*F*) for the northern stock. Using combined or stock-differentiated landings and assessed biomasses, we found that the current harvest control rule (HCR) for Pacific Sardine has not consistently maintained a total *F* below the U.S. target value because the "distribution" parameter (used to account for the northern stock's proportion in the U.S. Exclusive Economic Zone [EEZ]), has not adequately accounted for northern stock landings in Mexico and Canada. We propose a refinement to the HCR, giving explicit consideration to the summed landings in Mexico and Canada, to more optimally set the annual U.S. quota. The performance of our method was compared with (1) the values of *F* that would have been achieved during the federal management period (2000–2011) if the U.S. quotas had always been met and (2) the generally lower actual values of *F* that were calculated using the default HCR formulation (1993–2011). We demonstrate that application of our method would permit more U.S. fishing for Pacific Sardine when the northern stock is large and predominantly located in the U.S. EEZ and would curtail U.S. fishing when a large proportion of the stock is present and fished in the Mexican EEZ, Canadian EEZ, or both.

In the California Current, there are two migrating stocks of adult Pacific Sardine *Sardinops sagax* (Clark and Janssen 1945; Félix-Uraga et al. 2004; Smith 2005) that exhibit large fluctuations in abundance (e.g., MacCall 1979; Hill et al. 2012) and distribution (e.g., Lo et al. 2011a; Demer et al. 2012; García-Morales et al. 2012). The southern stock spans seasonally from southern Baja California, Mexico (~850 nautical miles south of Ensenada; 1 nautical mile = 1.852 km), to Point Conception, California (~100 nautical miles north of San Pedro); the northern stock extends from San Quintín, Mexico (~90 nautical miles south of Ensenada), northward to southern Alaska (northwest of Vancouver Island, British Columbia, Canada; e.g., Vrooman 1964; Hargreaves et al. 1994; Smith 2005).

The seasonal north–south migrations of the two Pacific Sardine stocks are approximately synchronous within their respective domains, resulting in somewhat segregated spatial distributions and different spawning and life history characteristics for these stocks (Murphy 1966; Félix-Uraga et al. 2005; Smith 2005). The latitudinal extent of the seasonal migration appears

*Corresponding author: david.demer@noaa.gov
Received December 12, 2013; accepted July 16, 2014

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

to depend on the stock size (Zwolinski and Demer 2012) and is constrained by the dynamics of the stock's potential oceanographic habitat.

Habitats of the Northern Stock

To predict the potential habitat and associated seasonal dynamics for the northern stock of Pacific Sardine, Zwolinski et al. (2011) developed a model parameterized with satellite-sensed sea surface temperature (SST), chlorophyll-*a* concentration, and gradient of sea surface height. The model showed that during spring, the potential habitat for Pacific Sardine is located offshore of central and southern California (Figure 1). During summer, the potential habitat is compressed along the coast, extending northward to Vancouver Island. During winter, the habitat distribution, coupled with the virtual absence of landings in the north, suggests that the Pacific Sardine are offshore as they return south.

Differentiated Landings

The Oregon, Washington, and Vancouver Island fisheries are seasonal, generally occurring between May and November depending on the migration, region, and allocation. During this period, the potential habitat of the northern stock develops along the northeastern Pacific coast from the south and progresses northward. In the north, the seasonal habitat and migration of Pacific Sardine, as well as regulations and weather, cause fishing for this species to begin and end first off Oregon, then off Washington, and lastly off Vancouver Island (Zwolinski et al. 2011). In contrast, to the south, fisheries off Ensenada, Mexico, and San Pedro, California, can span all months (Demer and Zwolinski 2014). Although the U.S. currently only assesses the northern stock and the models include all of the Pacific Sardine landings from Ensenada to Vancouver Island (Hill et al. 2010, 2011, 2012), accurate apportionment of the landings data from the northern and southern stocks is critical for successful assessment and management of both stocks (Smith 2005).

Refining the method proposed by Félix-Uraga et al. (2004, 2005), we (Demer and Zwolinski 2014) used indices of potential habitat and associated SST ranges to partition and attribute catch data from each fishing zone to each respective Pacific Sardine stock. We showed that fishery landings from central California and northward are consistently from habitat associated with the migrating northern stock, whereas the landings at Ensenada and San Pedro may represent either the southern stock or northern stock depending on the local presence of suitable potential habitat. The catches off southern California were from the northern stock during winter and spring and from the southern stock during summer, transitioning during the months of June–July and November–December.

Distribution of the Northern Stock

The U.S. fishing areas span both the spring spawning and summer feeding areas used by the northern stock during migration. Depending on the time of the year and the latitudinal extent of the stock-size-dependent migration, potentially little to all of the northern stock may be in or pass through U.S. waters. For example, during the 2006–2011 spring surveys, the large majority of the northern stock was located off the U.S. west coast. A small proportion of the stock may have been present in waters off Mexico during spring (Zwolinski et al. 2011), whereas fishery landings indicated that few to no northern stock fish were off Canada at that time (Zwolinski et al. 2011; Demer and Zwolinski 2014). In contrast, during the 2008 summer survey, Pacific Sardine migrated north (Demer et al. 2012), and few to no individuals from the northern stock were present off Mexico (Zwolinski et al. 2011; Demer and Zwolinski 2014). Thus, the proportion of the northern stock that occurs within any U.S. management area is not constant because this stock migrates and potentially extends seasonally into Mexican and Canadian waters. Furthermore, the proportions of Pacific Sardine catches associated with each country do not equate to the potential habitat present in the respective regions, or the proportions of the stock in the respective exclusive economic zones (EEZs).

U.S. Harvest Control Rule

The Pacific Fishery Management Council (PFMC) currently manages the northern stock of Pacific Sardine. The biomass of the southern stock is neither managed nor assessed, and its exploitation rate is unknown. Since January 2000, the PFMC has set the U.S. annual catch level for the northern stock by using a harvest control rule (HCR), optionally formulated as a harvest guideline (HG), an overfishing level (OFL), or an allowable biological catch (PFMC 2011). To date, only the default HG formulation has been used; HG is calculated as

$$\mathrm{HG} = (B - C) \cdot F \cdot D, \tag{1}$$

where B is the assessed biomass of age-1 and older (age-1 +) fish of the northern stock as estimated for July 1 of the previous year; C is the cutoff (currently 150,000 metric tons), defined as the lowest level of estimated biomass at which harvest is allowed (i.e., C is used as a buffer to protect the spawning stock); F is the target fishing fraction (0.05–0.15; currently 0.15), which is the target proportion of northern stock biomass above the C to be harvested by the fisheries; and D is the distribution parameter (currently 0.87), defined as the designated proportion of B in U.S. waters (PFMC 2011). By mathematical complement, $1 - D$ (currently 0.13) is the designated proportion of B outside of the U.S. EEZ.

The OFL equation is

$$\mathrm{OFL} = B \cdot F_{MSY} \cdot D, \tag{2}$$

where F_{MSY} (currently 0.18) is the target F that allows for the maximum sustainable yield (MSY; PFMC 2011). The allowable biological catch equals the OFL multiplied by a fraction to account for scientific uncertainty and accommodate risk policy

FIGURE 1. Pacific Sardine biomass densities (metric tons per square nautical mile; 1 nautical mile = 1.852 km), averaged over 2 km intervals, off the west coast of the USA, as estimated from acoustic–trawl surveys conducted during spring 2006, 2008, 2010, and 2011 and summer 2008 (Demer et al. 2012, 2013; Zwolinski et al. 2012). Confined by their dynamic potential habitat (dashed lines), the fish were located offshore of central and southern California during spring and were close to the coast in the northeast Pacific during summer. The fish did not span their entire potential habitat, but they did fill more of the potential habitat when their population was larger. More specifically, both the area occupied (= 41,567 km^2 × biomass + 18,341, where biomass is in metric tons; $R^2 = 0.9788$) and the proportion of their habitat occupied (= 0.0896 × biomass + 0.0593; $R^2 = 0.9998$) in high density (Lo et al. 2011b) increased as estimated biomass increased (Demer and Zwolinski 2014).

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

to protect against overfishing (i.e., when landings exceed the OFL or when the fishing rate exceeds F_{MSY}).

In each of the HCR formulations, it is currently assumed that 87% of the northern stock of Pacific Sardine is resident in the U.S. EEZ. This value was derived from an analysis of aerial spotter logbook data for the period 1963–1992 (PFMC 1998). During the period analyzed, the residual portion of the northern stock's biomass (i.e., 13%) was ascribed entirely to the Mexican EEZ because the northern stock had not yet resumed its seasonal migration into the Canadian EEZ (PFMC 2011). If the assumed D-value is now incorrectly large, the HCR may be less conservative than expected. Conversely, because U.S. assessment and management of Pacific Sardine assume that all of the landings at ports spanning from Ensenada to Vancouver Island are from the northern stock, and given that some of the U.S. landings are probably from the southern stock (Demer and Zwolinski 2014), the HCR may be more conservative than expected. Therefore, without explicitly accounting for the actions of the tri-national Pacific Sardine fishery and differentiation of the landings, the total F for the northern stock is probably different than the U.S. target. If so, the stock biomass and yield may be reduced due to too much fishing (PFMC 1998) or the stock may not be exploited to the intended extent.

The Pacific Sardine fishery in Mexico is not regulated by quotas but is technically restricted to fish with SL values greater than 150 mm (Morales 1993; Castañeda 2012). The Pacific Sardine fishery in Canada is restricted by a 15% harvest rate for a 3-year running average of the estimated proportion of the U.S.-assessed Pacific Sardine biomass that migrates into Canadian waters (Ware 1999). In 2010, for example, the U.S. assumed that 87% of the northern stock resided within its EEZ, Canada assumed that 27.2% of the northern stock migrated into its EEZ (DFO 2011), and Mexico made no assumption in this regard. Therefore, under the current HCR, it is quite possible that the tri-national landings of the northern stock can exceed the biomass corresponding to the U.S. target F.

Study Objectives

In the present analysis, our principal assumption was that the total tri-national landings (L) for the northern stock of Pacific Sardine should be less than or equal to the U.S. target F biomass, irrespective of the HCR formulation (e.g., $L \leq [B - C] \cdot F$ or $L \leq B \cdot F_{MSY}$). The value of L is the sum of annual landings at Ensenada, Mexico (L_{Mexico}); multiple U.S. ports (L_{USA}); and Vancouver Island, Canada (L_{Canada}). First, we explored whether the distribution parameter D has been sufficient to keep L_{USA} and $L_{Mexico} + L_{Canada}$ below the proportional values of F indicated (or implied) by the HG and OFL formulations (i.e., if and when $L_{USA} > [B - C] \cdot F \cdot D$ or $L_{USA} > B \cdot F_{MSY} \cdot D$; or $L_{Mexico} + L_{Canada} > [B - C] \cdot F\,[1 - D]$ or

$L_{Mexico} + L_{Canada} > B \cdot F_{MSY} \cdot [1 - D]$, respectively). If not, and if the target F-values were exceeded during 1993–2011, we aim to show that future U.S. quotas could be optimized (maximized under our principal assumption) using any of the HCR formulations by explicitly accounting for the "undifferentiated" (combined) northern and southern stock landings or the "differentiated" northern stock landings at Ensenada and Vancouver Island. We consider both the undifferentiated and differentiated landings because future consideration may be given to the proportions of Pacific Sardine landings at Ensenada and San Pedro that are attributed to the southern stock. Finally, we aim to show that application of our method could not only reduce discrepancies between the actual F and the target F but could also (1) optimally increase U.S. quotas when the northern stock is large and primarily located within the U.S. EEZ and (2) inherently reduce U.S. exploitation of the stock when large proportions of the landings are at Mexico, Canada, or both.

METHODS

Differentiation of fishery landings.—Because the annual landings of Pacific Sardine at Ensenada and San Pedro may include fish from the southern and northern stocks, a monthly SST index associated with the potential habitat for the northern stock was used to ascribe the landings from these ports to either the northern stock or southern stock (see Demer and Zwolinski 2014 for details). The undifferentiated or differentiated landings at Ensenada, U.S. ports, and Vancouver Island were summed to estimate the total tri-national landings.

Exploring the effectiveness of the distribution parameter.—The undifferentiated and differentiated landings were used to explore whether D in the HCR has effectively kept L_{USA} and $L_{Mexico} + L_{Canada}$ below the proportional target values of F. First, we note that since the PFMC implemented the HCR in 2000, Pacific Sardine landings at U.S. ports have not exceeded the annual quota (PFMC 2011; Hill et al. 2012). Therefore, after substituting $L_{USA} \leq \text{HG}$ for HG in equation (1) and rearranging, we have

$$L_{USA} \leq \text{HG} \leq (B - C) \cdot F \cdot D. \tag{3}$$

Similarly, after substituting $L_{USA} \leq \text{OFL}$ in equation (2) and rearranging, we obtain

$$L_{USA} \leq \text{OFL} \leq B \cdot F_{MSY} \cdot D. \tag{4}$$

The minimum value of D (D_{min}) is calculated by rearranging equation (3):

$$D_{min} \geq \frac{L_{USA}}{(B - C) \cdot F}. \tag{5}$$

If D_{min} exceeds D, then L_{USA} exceeds the proportional F indicated by the HCR. If D_{min} exceeds 1.0, then L_{USA} alone exceeds the target total F.

The maximum value of D (D_{max}) was calculated, via mathematical complement, by substituting $L_{Mexico} + L_{Canada}$ for L_{USA} and $1 - D$ for D in equation (3) and rearranging:

$$D_{max} \leq 1 - \frac{L_{Mexico} + L_{Canada}}{(B - C) \cdot F}. \tag{6}$$

If D_{max} is less than D, then $L_{Mexico} + L_{Canada}$ exceeds the proportional F implied by the HCR. If D_{max} is less than zero, then $L_{Mexico} + L_{Canada}$ alone exceeds the target total F.

Similarly, D_{min} and D_{max} were calculated using the OFL formulation (equation 4):

$$D_{min} \geq \frac{L_{USA}}{B \cdot F_{MSY}} \tag{7}$$

and

$$D_{max} \leq 1 - \frac{L_{Mexico} + L_{Canada}}{B \cdot F_{MSY}}. \tag{8}$$

For either HCR formulation (HG: equations 5 and 6; or OFL: equations 7 and 8), if D_{min} exceeds D_{max} then the total landings for the northern stock exceed the target total F biomass (i.e., $L > [B - C] \cdot F$ or $L > B \cdot F_{MSY}$, respectively).

Determining the fishing fraction.—Based on the HG formulation used by the PFMC from 2000 to 2011 (equation 1) and assuming that the northern stock is located entirely within the EEZs of the USA, Mexico, and Canada (i.e., $D + [1 - D] = 1.0$), values of the historic total F for 1993–2011 were calculated by

$$F = \frac{L_{Mexico} + L_{USA} + L_{Canada}}{B - C}. \tag{9}$$

Likewise, the annual proportions of F associated with landings at Mexico (F_{Mexico}), the USA (F_{USA}), and Canada (F_{Canada}) were calculated by

$$F_{Mexico} = \frac{L_{Mexico}}{B - C}, \tag{10a}$$

$$F_{USA} = \frac{L_{USA}}{B - C}, \tag{10b}$$

and

$$F_{Canada} = \frac{L_{Canada}}{B - C}. \tag{10c}$$

We did not also calculate the historic values of F_{MSY} because to date, the PFMC has only used HG (i.e., the default HCR formulation).

Optimizing U.S. quotas.—For the future, assuming that the total tri-national F for the northern stock of Pacific Sardine

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

should not exceed the target F (i.e., $L_{Mexico} + L_{USA} + L_{Canada} \leq F \cdot [B - C]$), optimal values for L_{USA} could be calculated by rearranging equation (9) as

$$L_{USA} \leq F \cdot (B - C) - (L_{Mexico} + L_{Canada}). \quad (11)$$

Similarly, optimal values for L_{USA} could be calculated based on the OFL formulation:

$$L_{USA} \leq F_{MSY} \cdot B - (L_{Mexico} + L_{Canada}). \quad (12)$$

In equations (11) and (12), the summed landings at Ensenada and Vancouver Island serve to limit the total F to the target value. The practical challenge is to forecast this sum. If the annual values for $L_{Mexico} + L_{Canada}$ are just stochastic estimates of the historic mean landings (i.e., no autocorrelation or trend), then a mean (e.g., long-term, short-term, arithmetic, or geometric) or median value should serve to stabilize the total F about the target value. However, Pacific Sardine biomass and migration are highly variable and exhibit trends. Consequently, for the period 1993–2011, the annual values for $L_{Mexico} + L_{Canada}$ (Table 1) had positive autocorrelation coefficients (undifferentiated: $r = 0.59$, $r^2 = 0.35$; differentiated: $r = 0.69$, $r^2 = 0.47$). For the PFMC management period 2000–2011, the values were somewhat different (undifferentiated: $r = 0.46$, $r^2 = 0.21$; differentiated: $r = 0.73$, $r^2 = 0.53$). Because the annual summed landings during these periods included some short-term trend information (i.e., 21–53% of the year-to-year variance is explained), the prior year's value is the best alternative predictor tested (Figure 2).

For 1993–2011, the annual HG was retrospectively optimized by solving equation (11) with the target F (e.g., 0.15), the assessment-estimated B of age-1+ fish, the current C (e.g., 150,000 metric tons), and $L_{Mexico} + L_{Canada}$ from the prior year. The OFL was similarly optimized by solving equation (12) with the target F_{MSY} (e.g., 0.18), the assessment-estimated B of age-1+ fish, and $L_{Mexico} + L_{Canada}$ from the prior year. Because the historic landings did not necessarily reach the respective harvest quotas (Hill et al. 2012), the performance of our method was evaluated against (1) the allowed values of F, substituting the actual U.S. quotas (Q; Table 1) for L_{USA} (equation 9; 2000–2011); and (2) the actual values of F calculated using estimates of B from the 2012 assessment (equation 9; 1993–2011; Hill et al. 2012).

RESULTS

Undifferentiated Fishery Landings

Without differentiating the landings from just the northern stock of Pacific Sardine, landings in Mexico peaked at about 70,000 metric tons in 1997, 2000, 2008, and 2011, comprising 41–60% of the total annual landings in those years (Table 1). Landings at U.S. ports exceeded 100,000 metric tons in 2002 and 2007, comprising about 68% and 77% of the total landings, respectively. Only between 2009 and 2011 did the Canadian landings comprise an appreciable proportion (11–15%) of the total landings. On average, during 1993–2011, the U.S. fishery accounted for 53% (SD = 12%) of the undifferentiated landings of Pacific Sardine.

Differentiated Fishery Landings of the Northern Stock

Differentiated landings of Pacific Sardine in Mexico and in the USA were reduced from the aforementioned estimates, and the proportions of the catch landed in Canada were consequently increased (Table 1). For the northern stock, peak annual landings in Mexico were less than 40,000 metric tons and constituted less than 50% of the total landings—and often, since 2001, less than 20% of the total. The peak U.S. landings of the northern stock were approximately 107,000 metric tons in 2007, but even smaller landings of the northern stock comprised larger proportions (>80%) of the total catch in 1998, 2002, and 2004–2007. Stock differentiation did not affect the landings of the northern stock in Canada, but the proportion of Canadian landings among the total catch did increase to between 15% and 23% during 2009–2011. On average, during 1993–2011, the U.S. fishery accounted for 70% (SD = 13%) of the differentiated northern stock landings.

Exploring the Effectiveness of the Distribution Parameter

Values of D_{min} and D_{max} were calculated by using the HG formulation (equations 5 and 6), the annual assessment-estimated B of age-1+ fish, a C-value of 150,000 metric tons, and an F of 0.15 (Table 1). During 1994–2011, D_{max} ranged from 0.35 in 2011 to 0.79 in 2007 and was always less than the D of 0.87. During the entire study period, the mean D_{max} was 0.53 (SD = 0.21). That is, $L_{Mexico} + L_{Canada}$ consistently exceeded the proportional target F biomass implied by the HG. In 1993, D_{max} was negative because the total landings at Ensenada and Vancouver Island alone exceeded F (Figure 3a). With stock differentiation, D_{max} ranged from 0.67 in 2011 to 0.94 in 1997 and 1998, and the mean D_{max} was 0.85 (SD = 0.07; Table 1; Figure 3b). In other words, with stock differentiation, $L_{Mexico} + L_{Canada}$ sometimes exceeded the proportional target F biomass implied by the HG and also exceeded the target F biomass on average.

The D_{min} and D_{max} values were also calculated using the OFL formulation (equations 7 and 8), the annual assessment-estimated B of age-1+ fish, and the F_{MSY} of 0.18 (Table 1). During 1993–2011, D_{max} ranged from 0.45 in 1993 to 0.84 in 2007, with a mean of 0.69 (SD = 0.09), and was always less than the D of 0.87 (Table 1; Figure 3c). In other words, $L_{Mexico} + L_{Canada}$ consistently exceeded the proportional target F biomass implied by the OFL. With stock differentiation, D_{max} ranged from 0.73 in 2011 to 0.95 in 1997 and 1998, and the mean was 0.88 (SD = 0.06; Table 1; Figure 3d). On average, with stock differentiation, $L_{Mexico} + L_{Canada}$ did not exceed the proportional target F biomass implied by the OFL.

Determining the U.S. Fishing Fraction

The total F and the proportions that were associated with each country (F_{Mexico}, F_{USA}, and F_{Canada}) were estimated

TABLE 1. Estimated prior-year (July 1) biomass (B; metric tons) of age-1+ northern-stock Pacific Sardine from the 2012 assessment (Hill et al. 2012); the actual U.S. harvest quota (Q; metric tons); undifferentiated and stock-differentiated biomass landed (metric tons) at Ensenada, Mexico (L_{Mexico}), at U.S. ports (L_{USA}), and at Vancouver Island, British Columbia, Canada (L_{Canada}), and their respective proportions of the total annual catch (Prop.); and the fishing fractions allocated to the USA (D_{min}) and Mexico plus Canada (D_{max}), determined using harvest guideline (HG) and overfishing limit (OFL) harvest control rule formulas (equations 1 and 2; PFMC 2011). For 1992, only the values needed to calculate the autocorrelation of $L_{Mexico} + L_{Canada}$ are shown.

			Mexico		USA		Canada		HG		OFL	
Year	B	Q	L_{Mexico}	Prop.	L_{USA}	Prop.	L_{Canada}	Prop.	D_{max}	D_{min}	D_{max}	D_{min}
Biomass, quota, and undifferentiated landings												
1992			34,568				0					
1993	324,550	18,144	32,045	0.66	16,192	0.34	0	0.00	−0.23	0.62	0.45	0.28
1994	507,320	9,072	20,877	0.62	12,701	0.38	0	0.00	0.61	0.24	0.77	0.14
1995	691,760	47,305	35,396	0.46	41,489	0.54	23	0.00	0.56	0.51	0.72	0.33
1996	915,256	34,791	39,065	0.53	34,056	0.47	0	0.00	0.66	0.30	0.76	0.21
1997	977,035	48,988	68,439	0.60	46,198	0.40	71	0.00	0.45	0.37	0.61	0.26
1998	998,922	43,545	47,812	0.54	41,056	0.46	488	0.01	0.62	0.32	0.73	0.23
1999	1,134,060	120,474	58,569	0.50	57,522	0.50	25	0.00	0.60	0.39	0.71	0.28
2000	1,333,310	186,791	67,845	0.48	72,497	0.51	1,721	0.01	0.61	0.41	0.71	0.30
2001	1,246,290	134,737	46,071	0.37	78,520	0.62	1,266	0.01	0.71	0.48	0.79	0.35
2002	1,032,760	118,442	46,845	0.31	101,367	0.68	739	0.00	0.64	0.77	0.74	0.55
2003	868,532	110,908	41,342	0.35	74,599	0.64	978	0.01	0.61	0.69	0.73	0.48
2004	634,081	122,747	41,897	0.30	92,613	0.67	4,438	0.03	0.36	1.28	0.59	0.81
2005	976,986	136,179	55,323	0.37	90,130	0.61	3,232	0.02	0.53	0.73	0.67	0.51
2006	1,107,780	118,937	57,237	0.38	90,776	0.61	1,575	0.01	0.59	0.63	0.71	0.46
2007	1,365,980	152,564	36,847	0.22	127,695	0.77	1,522	0.01	0.79	0.70	0.84	0.52
2008	1,356,860	89,093	66,866	0.41	87,175	0.53	10,425	0.06	0.57	0.48	0.68	0.36
2009	1,286,760	66,932	55,911	0.40	67,083	0.48	15,334	0.11	0.58	0.39	0.69	0.29
2010	1,106,180	72,039	56,821	0.39	66,891	0.46	22,223	0.15	0.45	0.47	0.60	0.34
2011	1,077,220	50,526	70,337	0.51	46,745	0.34	20,719	0.15	0.35	0.34	0.53	0.24
Mean	996,906	88,538	49,766	0.44	65,543	0.53	4,462	0.03	0.53	0.53	0.69	0.36
SD	290,304	49,608	13,821	0.12	29,889	0.12	7,188	0.05	0.21	0.24	0.09	0.16
Differentiated northern stock landings												
1992			1,051				0					
1993			9,469	0.43	12,400	0.57	0	0.00	0.80	0.47	0.84	0.21
1994			9,074	0.45	11,111	0.71	0	0.00	0.88	0.21	0.90	0.12
1995			11,184	0.24	34,558	0.76	23	0.00	0.89	0.43	0.91	0.28
1996			16,038	0.42	22,445	0.58	0	0.00	0.88	0.20	0.90	0.14
1997			8,911	0.28	23,266	0.72	71	0.00	0.94	0.19	0.95	0.13
1998			8,773	0.20	34,681	0.84	488	0.01	0.94	0.27	0.95	0.19
1999			37,861	0.48	41,189	0.52	25	0.00	0.77	0.28	0.81	0.20
2000			29,243	0.30	67,086	0.68	1,721	0.02	0.84	0.38	0.87	0.28
2001			13,547	0.18	56,800	0.79	1,266	0.02	0.92	0.35	0.93	0.25
2002			13,552	0.14	82,052	0.85	739	0.01	0.91	0.62	0.92	0.44
2003			18,487	0.22	64,846	0.77	978	0.01	0.85	0.60	0.88	0.41
2004			6,297	0.07	76,964	0.88	4,438	0.05	0.88	1.06	0.91	0.67
2005			15,583	0.16	75,334	0.80	3,232	0.03	0.87	0.61	0.89	0.43
2006			11,215	0.12	78,905	0.86	1,575	0.02	0.92	0.55	0.94	0.40
2007			19,919	0.16	106,748	0.83	1,522	0.01	0.89	0.59	0.91	0.43
2008			21,548	0.19	80,222	0.73	10,425	0.09	0.84	0.44	0.87	0.33
2009			24,718	0.24	63,773	0.64	15,334	0.15	0.79	0.37	0.83	0.28
2010			17,076	0.18	57,529	0.59	22,223	0.23	0.76	0.40	0.80	0.29
2011			31,751	0.34	41,642	0.44	20,719	0.22	0.67	0.30	0.73	0.21
Mean			17,066	0.25	54,291	0.70	4,462	0.05	0.85	0.44	0.88	0.30
SD			8,676	0.12	26,710	0.13	7,188	0.07	0.07	0.21	0.06	0.14

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

FIGURE 2. Alternative predictors for the sum of Pacific Sardine landings at Ensenada, Mexico (L_{Mexico}), and Vancouver Island, British Columbia (L_{Canada}), including the **(a)** prior year's value, **(b)** all prior years' arithmetic mean, **(c)** prior 3 years' arithmetic mean, **(d)** all prior years' geometric mean, **(e)** prior 3 years' geometric mean, and **(f)** all prior years' median. The 1:1 line (solid black line) indicates perfect prediction. Prediction bias is indicated by the difference between the slope of the least-squares fit to the data and 1.0. The dashed lines indicate the 1:1 line $\pm$ 50%. The smallest root mean square deviation (RMS) ($\text{RMS} = \sqrt{\sum_{t=1}^{n} [y_t - \hat{y}_t]^2 / n}$, where y_t is the actual value during year t, $\hat{y}_t$ is the predicted value, and n is the number of annual predictions) indicates deviation from perfect prediction (i.e., imprecision). The prior year's value had the best combination of low bias (slope $\sim$ 1.0) and high precision (low RMS) and was therefore the best candidate predictor.

FIGURE 3. Annual estimates of the Pacific Sardine fishing fractions allocated to the USA (D_{min}) and Mexico plus Canada (D_{max}), calculated using the prior year's (July 1) annual assessment-estimated biomass (B) of age-1+ fish and **(a)** the harvest guideline (HG) formulation with annual undifferentiated landings; **(b)** the HG formulation with differentiated northern stock landings; **(c)** the overfishing limit (OFL) formulation with annual undifferentiated landings; and **(d)** the OFL formulation with differentiated northern stock landings. The D_{min} values (dashed lines) were estimated using landings at U.S. ports. The D_{max} values (solid lines) were estimated using landings at Ensenada, Mexico, and Vancouver Island, British Columbia, Canada. The value of D_{min} exceeds D_{max} when the total fishing fraction (F) exceeds the target F based on 2012 assessment-estimated B (Hill et al. 2012). In 1993, D_{max} was less than zero (panel a) because the combined landings in Mexico and Canada exceeded the target F of 0.15. In 2004, D_{min} exceeded 1.0 (panels a and b) because the U.S. landings alone exceeded the target F of 0.15 and the F_{MSY} of 0.18.

annually using equations (9) through (10c), which were parameterized with undifferentiated and differentiated landings from each country (L_{Mexico}, L_{USA}, and L_{Canada}) and assessment estimates (Hill et al. 2012) of northern stock B (Figure 4). Irrespective of stock differentiation, F trended upward during 1994–2011 and peaked during (1) 2004 due to a peak in the U.S. landings and (2) 2010–2011 due to increased landings in Mexico and Canada (Figure 4). The undifferentiated F (Figure 4a) exceeded the HG target F-value (0.15) during 1993, 2002–2006, and 2010. In 2002–2006, the rise in F was driven mostly by L_{USA}. In contrast, the more recent increase in F resulted from increases in L_{Mexico} and L_{Canada}. With stock differentiation (Figure 4b), F only exceeded 0.15 in 2004, and this was due to L_{USA}. Since then, because F_{USA} has decreased while F_{Mexico} and F_{Canada} have increased, the F for the northern stock has remained relatively stable between approximately 0.10 and 0.13.

Optimizing the U.S. Fishing Fraction

Equation (11) was solved for optimized F_{USA} using prior-year values for L_{Mexico} and L_{Canada}, the assessed B of age-1+ Pacific Sardine from July 1 of the previous year, and an F of 0.15 (Figure 4c, d). When applied to the HG, our method stabilized the total F within ($\pm$95% confidence interval) approximately $\pm$23.4% (undifferentiated stocks) or $\pm$20.7% (differentiated stocks) of the target F of 0.15 (Figure 4a, c). For the management period 2000–2011, compared to the potential tri-national fishing fraction calculated using equation 9 and substituting the U.S. harvest quotas (Q; Table 1) for L_{USA}, our method reduced the root mean square deviation (RMS) by 80% (RMS = 0.0142 versus 0.0704) for the presently undifferentiated landings (Figure 4c). For the period 1993–2011, compared to the actual tri-national fishing fraction (equation 9, Figures 4a, b), our method reduced the RMS by 77% (0.0153 versus 0.0663) for the presently

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

FIGURE 4. Total fishing fraction (total F; solid black line from 1993 to 2011) and the values of F for Mexico (dashed line), the USA (dotted–dashed line), and Canada (dotted line), defined as the respective annual landings of Pacific Sardine divided by the prior year's (July 1) assessment-estimated biomass of age-1+ fish (Hill et al. 2012) minus the cutoff value (150,000 metric tons), and calculated based on **(a)** the actual harvest guideline (HG) quota and undifferentiated landings, **(b)** the actual HG quota and differentiated northern stock landings, **(c)** the optimized HG value and undifferentiated landings, and **(d)** the optimized HG value and differentiated northern stock landings. For comparison with the current harvest control rule, panels a and c show the total F (solid black line from 2000 to 2011) that would have occurred if the U.S. landings equaled the HG quota. The optimized HG values panels c and d (dotted–dashed line; calculated using equation 9) would ensure that the total F (solid black line) approximates the target F (0.15; gray horizontal line) of biomass above the cutoff.

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

undifferentiated landings (Figure 4c) and reduced the RMS by 64% (0.0182 versus 0.0508) for the potentially differentiated landings (Figure 4d). These results were also plotted in terms of landed B computed with and without stock differentiation (Figure 5).

Between 1993 and 2011, without differentiation, L_{USA} was on average 10,239 metric tons (SD = 29,457 metric tons) below the target F (Figures 4c, 5c); during 1993 and 2002–2007, F exceeded the target. With differentiation, L_{USA} was on average 53,834 metric tons (SD = 30,111 metric tons) below the target F (Figures 4d, 5d); during 2004, F exceeded the target.

When D_{max} was calculated with undifferentiated landings and either the HG or the OFL (Figure 3a, c), D_{max} for 1993–2011 was always less than the D-value of 0.87 derived from the aerial spotter data (1963–1992 data; PFMC 1998). Incidentally, when using the HG, the average D_{max} of 0.53 (SD = 0.12; Table 1) was slightly less than the average proportion of the stock in the U.S. EEZ (0.57), as estimated using the aerial spotter data along with fish egg and larva data for 1951–1985 (PFMC 1998). When using the OFL, the average D_{max} was 0.69 (SD = 0.09).

Calculated with the differentiated landings and the HG, D_{max} was less than 0.87 during 8 of the 19 years in the study. The average D_{max} was 0.85 (SD = 0.07), and the lowest value (0.67) occurred most recently, in 2011 (Table 1). When calculated by use of the OFL, D_{max} was less than 0.87 during 5 of the 19 years; the average D_{max} was 0.88 (SD = 0.06), and the lowest value (0.73) also occurred in 2011. Therefore, the constant value of D in the HCR did not sufficiently account for landings at Ensenada and Vancouver Island, thereby creating the potential for the target F or F_{MSY} to be exceeded.

When calculated with undifferentiated landings and the HG, the target F was indeed exceeded in 1993, 2002–2006, 2010, and 2011 (Figures 3a, 4a). When calculated with undifferentiated landings and the OFL, the target F_{MSY} was exceeded during

FIGURE 5. Total harvested biomass (metric tons) of Pacific Sardine (solid black line) and harvested biomasses (landings L) for Mexico (dashed line), the USA (dotted–dashed line), and Canada (dotted line) based on **(a)** the actual harvest guideline (HG) quota and undifferentiated landings, **(b)** the actual HG quota and differentiated northern stock landings, **(c)** the optimized HG value and undifferentiated landings, and **(d)** the optimized HG value and differentiated northern stock landings. The biomass that is equivalent to the target fishing fraction (target $F = 0.15$) of the prior year's (July 1) assessment-estimated (Hill et al. 2012) biomass of age-1+ fish minus the cutoff (150,000 metric tons) is shown (solid gray line). For comparison with the current harvest control rule, panels a and c show the total fished biomass (solid black line from 2000 to 2011) that would have occurred if the U.S. landings equaled the HG quota. The optimized U.S. landings (panels c and d; dotted–dashed line; calculated using equation 9) ensure that the total landings (solid black line) approximate the target F (0.15) of biomass above the cutoff value.

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

2004 (Figure 3c). These results would have been different if the values used for B (i.e., from the 2012 assessment; Hill et al. 2012) had been taken from another assessment (e.g., the 2011 or 2010 assessment). Based on calculations with differentiated landings and the HG, the target F was exceeded only during 2004 (Figures 3b, 4b). Again, these results would have been different if B-values had been obtained from a different assessment, particularly if the assessment had considered stock-differentiated landings.

DISCUSSION

To set the U.S. quotas for Pacific Sardine such that the actual F more consistently matches the target F or F_{MSY}, we proposed a practical method. In this method, the exploitation of the northern stock by Mexico and Canada, uncontrolled by the USA, is essentially added to the mortality from predators (e.g., marine mammals, fishes, and seabirds) and other causes of natural attrition. The performance of our method depends on the variance and trend of the summed landings at the ports in Mexico and Canada ($L_{Mexico} + L_{Canada}$). Although the summed annual landings are positively autocorrelated, harvest quotas for Mexico and Canada could be even better predictors of the landings there if such quotas existed and were known prior to setting the U.S. quota. In that case, the quotas could be substituted for L_{Mexico} and L_{Canada} in equation (11) or (12).

We recognize that the potential precedent of allocating the U.S. landings based on landings or quotas in Mexico and Canada may draw some concern. This is because landings are influenced by the fish stock, the environment, markets, geopolitics, and other human factors; without cooperative management, the USA has no control over the international landings (PFMC 1998) and could be subjected to lower or unstable F. Nevertheless, due to the variety of common goals (e.g., stabilizing socio-economic

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

returns, sustaining exploitation rates, and preserving biodiversity), international managers may be motivated to cooperate in optimizing quotas with respect to target total *F*.

The abundance, distribution, and migration of the northern stock of Pacific Sardine in the California Current are highly variable. Depending on the size and demographic structure of the stock, Pacific Sardine migrate seasonally, spawning offshore of southern and central California during spring and foraging off central and northern California, Oregon, Washington, and Vancouver Island during summer. The seasonal migration spans the waters off Mexico, the USA, and Canada. To set the annual U.S. quota for the northern stock, the HCR designates a proportion of the stock to be present in the U.S. EEZ. However, prorating a coastal pelagic fish stock's target *F* based on the designated proportion in U.S. waters will not protect the stock against high combined exploitation (PFMC 1998). We developed a practical method to optimize the U.S. harvest quotas irrespective of the HCR and its parameterization and to approximate the target total *F* of the internationally exploited northern stock of Pacific Sardine.

We demonstrated that our method, if used, could serve to stabilize the actual values of *F* about the target value, permit more U.S. fishing of Pacific Sardine during most periods when the northern stock is large and predominantly located in the U.S. EEZ, and curtail U.S. fishing during periods when a large proportion of the northern stock is present and fished in the Mexican EEZ, Canadian EEZ, or both. Although the USA does not currently assess or manage the southern stock, these methods could also be applied to that stock if it is present and exploited in U.S. waters.

ACKNOWLEDGMENTS

We are grateful to Randy Cutter, Roger Hewitt, Sam Herrick, Dale Sweetnam, Russ Vetter, Bill Perrin, Alec MacCall, and others for reviewing drafts of this paper as part of the National Marine Fisheries Service (NMFS) Southwest Fisheries Science Center's internal review process. We also thank Carryn de Moor, Sarah Kraak, and three anonymous reviewers for their thorough and constructive critiques. This article does not necessarily reflect the official views or policies of the NMFS, the National Oceanic and Atmospheric Administration, or the Department of Commerce.

REFERENCES

Castañeda, F. J. M. 2012. Fishery management plan for the fishery of small pelagics (sardines, anchovies, mackerel, and similar) off northwestern Mexico. Available: http://www.dof.gob.mx/nota_detalle_popup.php?codigo=5276945. (September 2014).

Clark, F. N., and J. F. Janssen Jr. 1945. Movements and abundance of the sardine as measured by tag returns. California Department of Fish and Game Fishery Bulletin 61:7–42.

Demer, D. A., and J. P. Zwolinski. 2014. Corroboration and refinement of a method to differentiate landings from two stocks of Pacific Sardine (*Sardinops sagax*) in the California Current. ICES Journal of Marine Science 71:328–335.

Demer, D. A., J. P. Zwolinski, K. A. Byers, G. R. Cutter, J. S. Renfree, T. S. Sessions, and B. J. Macewicz. 2012. Prediction and confirmation of seasonal migration of Pacific Sardine (*Sardinops sagax*) in the California Current ecosystem. U.S. National Marine Fisheries Service Fishery Bulletin 110:52–70.

Demer, D. A., J. P. Zwolinski, G. R. Cutter Jr., K. A. Byers, B. J. Macewicz, and K. T. Hill. 2013. Sampling selectivity in acoustic-trawl surveys of Pacific Sardine (*Sardinops sagax*) biomass and length distribution. ICES Journal of Marine Science 70:1369–1377.

DFO (Department of Fisheries and Oceans Canada). 2011. Evaluation of Pacific Sardine (*Sardinops sagax*) stock assessment and harvest guidelines in British Columbia. Canadian Science Advisory Secretariat Science Advisory Report 2011/016.

Félix-Uraga, R., V. M. Gómez-Muñoz, C. Quiñónez-Velázquez, and W. García-Franco. 2004. On the existence of Pacific Sardine groups off the west coast of Baja California and southern California. California Cooperative Oceanic Fisheries Investigations Reports 45:146–151.

Félix-Uraga, R., V. M. Gómez-Muñoz, C. Quiñónez-Velázquez, F. N. Melo-Barrera, K. T. Hill, and W. García-Franco. 2005. Pacific Sardine (*Sardinops sagax*) stock discrimination off the west coast of Baja California and southern California using otolith morphometry. California Cooperative Oceanic Fisheries Investigations Reports 46:113–121.

García-Morales, R., B. Shirasago-German, R. Félix -Uraga, and E. L. Pérez-Lezama. 2012. Conceptual models of Pacific Sardine distribution in the California Current system. Current Development in Oceanography 5:1–47.

Hargreaves, N. B., D. M. Ware, and G. A. McFarlane. 1994. Return of the Pacific Sardine (*Sardinops sagax*) to the British Columbia coast in 1992. Canadian Journal of Fisheries and Aquatic Sciences 51:460–463.

Hill, K. T., P. R. Crone, N. C. H. Lo, D. A. Demer, J. P. Zwolinski, and B. J. Macewicz. 2012. Assessment of the Pacific Sardine resource in 2012 for U.S. management in 2013. NOAA Technical Memorandum NMFS-SWFSC-501.

Hill, K. T., P. R. Crone, N. C. H. Lo, B. J. Macewicz, E. Dorval, J. D. McDaniel, and Y. Gu. 2011. Assessment of the Pacific Sardine resource in 2011 for U.S. management in 2012. NOAA Technical Memorandum NMFS-SWFSC-487.

Hill, K. T., N. C. H. Lo, B. J. Macewicz, P. R. Crone, and R. Felix-Uraga. 2010. Assessment of the Pacific Sardine resource in 2010 for U.S. management in 2011. NOAA Technical Memorandum NMFS-SWFSC-469.

Lo, N. C. H, B. J. Macewicz, and D. A. Griffith. 2011a. Migration of Pacific Sardine (*Sardinops sagax*) off the west coast of United States in 2003–2005. Bulletin of Marine Science 87:395–412.

Lo, N., B. J. Macewicz, and D. A. Griffith. 2011b. Spawning biomass of Pacific Sardine (*Sardinops sagax*) off U.S. in 2011. NOAA Technical Memorandum NMFS-SWFSC-486.

MacCall, A. D. 1979. Population estimates for the warming years of the Pacific Sardine fishery. California Cooperative Oceanic Fisheries Investigations Report 20:72–82.

Morales, G. J. 1993. [Mexican Official Norm 003-PESC-1993 to regulate the use of the following sardine species: *monterrey*, *pina*, *crinuda*, *bocona*, and *japonesa*, and the species of anchovy and mackerel using purse-seine methods in Pacific waters under federal jurisdiction, including the Gulf of California.] Mexico Distrito Federal, Fisheries Secretary, Mexico City. (In Spanish.) Available: www.conapesca.sagarpa.gob.mx/work/sites/cona/resources/LocalContent/8739/21/003pesc1993SARDINA.pdf. (September 2014).

Murphy, G. I. 1966. Population biology of the Pacific Sardine (*Sardinops caerulea*). Proceedings of the California Academy of Sciences 34:1–84.

PFMC (Pacific Fishery Management Council). 1998. Amendment 8, appendix B, options and analyses for the coastal pelagic species fishery management plan. PFMC, Portland, Oregon.

PFMC (Pacific Fishery Management Council). 2011. Coastal pelagic species fishery management plan as amended through amendment 13. PFMC, Portland, Oregon.

Smith, P. E. 2005. A history of proposals for subpopulation structure in the Pacific Sardine (*Sardinops sagax*) population off western North America. California Cooperative Oceanic Fisheries Investigations Report 46:75–82.

Vrooman, A. M. 1964. Serologically differentiated stocks of the Pacific Sardine, *Sardinops caerulea*. Journal of Fisheries Research Board of Canada 21:661–680.

Ware, D. M. 1999. Life history of Pacific Sardine and a suggested framework for determining a B.C. catch quota. Canadian Science Advisory Secretariat Research Document 1999/204.

Zwolinski, J. P., and D. A. Demer. 2012. A cold oceanographic regime with high exploitation rates in the Northeast Pacific forecasts a collapse of the Sardine stock. Proceedings of the National Academy of Sciences of the USA 109:4175–4180.

Zwolinski, J. P., D. A. Demer, K. A. Byers, G. R. Cutter, J. S. Renfree, S. T. Sessions, and B. J. Macewicz. 2012. Distributions and abundances of Pacific Sardine (*Sardinops sagax*) and other pelagic fishes in the California Current ecosystem during spring 2006, 2008, and 2010, estimated from acoustic-trawl surveys. U.S. National Marine Fisheries Service Fishery Bulletin 110:110–122.

Zwolinski, J. P., R. L. Emmett, and D. A. Demer. 2011. Predicting habitat to optimize sampling of Pacific Sardine (*Sardinops sagax*). ICES Journal of Marine Science 68:867–879.

Downloaded by [NOAA NMFS La Jolla] at 08:01 04 November 2014

Agenda Item E.2.c
Supplemental Public Comment 3
Electronic Only
November 2014

Comments on Pacific Sardine Harvest Parameters

Geoff Shester, Ph.D.

November 15, 2014
Presentation to the Pacific Fishery Management Council, Agenda Item E.2

OCEANA

We request the PFMC select Alternative 2a as PPA

- CalCOFI more accurately predicts recruitment as intended
- Alt 2a is only alternative whose performance falls within the status quo range, yet allows greater harvest more of the time than status quo

Changes to FRACTION bounds are unjustified

- Draft EA analysis insufficient
- Evidence of exceeding target harvest rates
- Evidence of inadequate forage
- Failing to achieve OY and prevent overfishing

Retrospective comparison of % of years each alternative would have had higher and lower harvest rates than under No Action (SIO)

Data from CPSMT presentation to SSC 11/14/14

Harvest rate: Alt 1 < Alt 2a < Alts 2b,c,d

Alternative 2a is most similar to status quo.

Alternatives 2b, 2c, and 2d are ***MORE AGGRESSIVE*** than status quo: Higher catch and lower biomass

	Alt 1 * (No Action)	Alt 2a	Alt 2b	Alt 2c	Alt 2d
Fraction	15%	5-15%	10-20%	5-20%	0-20%
Mean B1+ (tmt)	1208	1220	1182	1186	1187
Depletion	77%	78%	75%	75%	76%
Mean catch (tmt)	107	106	112	111	111

Data from Draft EA. Agenda Item E.2, Table 1

**Alt. 1 (No Action) from Scenario code 22, Table 4, Hurtado-Ferro & Punt 2014 (March 2014), bounding No Action as per SSC recommendation.*

Optimizing fishing quotas to meet target fishing fractions of an internationally exploited stock of Pacific sardine (Sardinops sagax)

***North American Journal of Fisheries Management*, 2014**

D. A. Demer and J. P. Zwolinski (NMFS/SWFSC)

"…the current harvest control rule for sardine has not consistently maintained a total fishing fraction below the US target value because the 'distribution' parameter, which is intended to account for the proportion of the stock in the US exclusive economic zone (EEZ), has **not adequately accounted for landings** of the stock at **Mexico and Canada**."

U.S. Landings as proportion of coastwide landings from 1993-2011:

- Differentiated landings of Northern stock only: **70%**
- Undifferentiated landings of N and S stocks: **53%**

The Repercussions…

Proportion of Target Coastwide Harvest intended by US HCR	US	Mex & Can	**Total**
Assumed (Draft EA)	87%	13%	**100%**
Actual (1993-2011 - N. stock only)	87%	37%	**124%**
Actual (1993-2011 - both stocks)	87%	77%	**164%**

Actual harvest on average **exceeds target (OY) by 24-64%,** counteracting the predicted benefits provided by U.S. CUTOFF

Performance measures are highly sensitive when Mexico and Canada don't follow U.S. HCR

	Status quo*	Alt 2a	Alt 2b	2a (MF)*	2b(MF)**
Fraction	15%	5-15%	10-20%	5-15%	10-20%
Mean B1+ (tmt)	1208	1220	1182	**716**	**660**
Depletion	77%	78%	75%	**46%**	**42%**
Mean catch (tmt)	107	106	112	**57**	**60**

*Sensitivity Run corresponding to Alternative 2a when Mexico and Canada do not follow US Harvest Control RuleTable 6, S14, Hurtado-Ferro & Punt 2014
** Additional Sensitivity Run of Alternative 2b (Oceana Public Comment)

Need to Update Distribution

"The Workshop noted that the current 87% was based on an examination of CalCOFI data from 1951-1985 and aerial spotter data from 1962-1992, and that the distribution of the stock had changed markedly since then. It therefore ***agreed*** *that any new basis for defining DISTRIBUTION should focus on data from the most recent decade or at the most, the last two decades."*

PFMC Sardine Workshop Report, Feb. 2013

Sardine Collapse: The Role of Fishing

- Decline (2007-2014):
  - 1,050,000 mt (74%) drop
- Fishery removals:
  - 715,000 mt
  - US Fraction was at 15% through 2013
- No “surplus” production, low recruitment

Evidence of Inadequate Forage

Specifically Sardine and Anchovy

- **California Sea Lions**
  - 2013: Unusual Mortality Event
    - *(Melin et al., NOAA, 2014)*
  - 2014: Double average pup mortality

Ingrid Overgard/TMMC

- **Brown Pelicans**
  - 5 consecutive years of nesting failures (Harvey 2013)
  - 2014: First range-wide nesting failure in 25 years of monitoring

Ingrid Taylar

- Draft EA does not take a hard look at effects of action on these predators

Primary forage: sardines & anchovies

Geoff Shester/Oceana

Less Forage than Previously Thought

Predicted Average Forage Contribution of Sardines to Ecosystem under Existing Harvest Guideline

Annual Forage production = Natural Mortality = 33% of total biomass

Please Support Alternative 2A

Consensus on using CalCOFI to determine FRACTION

Increasing FRACTION would be a mistake at this time.

- Sardine population just plummeted by 74% while recruitment and biomass are at 20-year lows…
- The problem is that the current rule has been *overestimating* productivity in the HG for the last 7 years
- New published NMFS science shows Mexico and Canada taking far more sardines than assumed in US HCR, target F is being exceeded
- Warning signs in key indicators of "adequate forage for predators" without hard look at the consequences of fishery and proposed action on predator reproductive failures

4,604 CA, 620 OR, 891 WA, and 94 ID residents **Support Alternative 2A**

OCEANA

METHODOLOGY PRELIMINARY TOPIC SELECTION AND REVIEW PROCESS

The Pacific Fishery Management Council's (Council) Terms of Reference (TOR) for Methodology Reviews describes a procedure for considering new methodologies related to the assessment and management of coastal pelagic species (CPS) and groundfish. The TOR focuses on methodologies that are useful components for stock assessments, but it can be used to consider other methods such as economic analyses and ecosystem-based fishery management.

For CPS topics, the TOR process calls for a 1-2 page proposal to be submitted by the methodology proponent, submitted for the briefing book of the "appropriate Council meeting." In recent years, this has occurred at November Council meetings. The proposal should include the title, the names of the principals, a statement of how the proposed methodology will improve assessment and management for the stocks in question, and an outline of the field and analytical methods. The proposal is reviewed by the Scientific and Statistical Committee, Coastal Pelagic Species Management Team (CPSMT), and Coastal Pelagic Species Advisory Subpanel (CPSAS), and the Council. If the Council approves the review of the proposed methodology, Council and NMFS staff will schedule a methodology review panel meeting, with the appropriate independent experts, plus a representative each from the CPSMT and the CPSAS. The panel will then submit a report its findings, for Council consideration.

As of the advance Briefing Book deadline, no proposals for methodology reviews had been received.

Council Action:

Consider topics for review.

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Kerry Griffin
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Consider Methodology Topics for Review and Provide Additional Guidance as Necessary.

PFMC
10/21/14

2015 EXEMPTED FISHING PERMIT (EFP) NOTICE OF INTENT

The Coastal Pelagic Species Fisheries Management Plan allows for exempted fishing permit (EFP) activities to be conducted under a permit issued by the National Marine Fisheries Service. Council Operating Procedure (COP) 23 was adopted in 2012, which outlines the process for proposing EFPs. Under COP 23, an initial notice of intent is to be submitted in time for inclusion in the November briefing book, with final action typically occurring at the following March Council meeting.

As of the November 2014 Briefing Book deadline, no requests for EFPs had been received.

Council Action:

1. **Adopt EFP proposal for public review.**
2. **Determine amount to be set aside for EFP research.**

Reference Materials:

None.

Agenda Order:

a. Agenda Item Overview — Kerry Griffin
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action:** Adopt Preliminary EFPs for Public Review

PFMC
10/23/14