

# Fishing People of the North

## Cultures, Economies, and Management Responding to Change

### Program and Abstracts

**27th Lowell Wakefield Fisheries Symposium**

Anchorage, Alaska U.S.A. | September 14-17, 2011



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**Cultures, Economies, and Management  
Responding to Change**

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Alaska Sea Grant College Program  
University of Alaska Fairbanks

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## Overview

The registration desk will be open from 5:00 to 7:00 pm on Tuesday, September 13, and at 7:10 am on Wednesday, September 14, to pick up name badges and symposium materials. Presentations will begin on Wednesday morning.

Oral presentations and posters addressing Fishing People of the North will be presented within the following themes and panels:

### Theme 1: Human-Environment Relationships

1. Environmental and Climate Change and Commercial Fisheries
2. Fisheries as Community

### Theme 2: Fishing Communities in Transition

1. Reconsidering the Coastal Community in the 21st Century
2. Community Activism
3. Forgone Harvests: Exploring New Opportunities for Community-Based Fisheries
4. Experiences with Fisheries Enclosure

### Theme 3: Indigenous and Rural Knowledge and Communities

1. Using Local and Traditional Knowledge to Document Environmental Change and Human Resilience
2. Indigenous Mapping and Local Knowledge
3. Infusing Traditional Indigenous Practices into Contemporary Fishery Management

### Theme 4: Governance and Management Issues in the North

1. Reimagining Fisheries Governance
2. Local Institutions, Risk, and Resilience

### Theme 5: Celebrating the Lives of Fishing Peoples

1. An evening of fishing prose and poetry
2. A private tour of the Bristol Bay Sailing for Salmon exhibit at the Anchorage Museum

## Events Held During the Symposium

**Wednesday September 14, 6–9:00 pm.** Reception and Poster Session, Hilton Hotel, hors d'oeuvres will be provided, with a cash bar.

**Thursday, September 15, 7–9:00 pm.** The Heart of Fishing at Snow City Café: An evening of poetry, prose, visuals, and music to celebrate the lives of fishing people.

**Friday, September 16, 7–9:30 pm.** Sailing for Salmon Exhibit Tour and Reception at the Anchorage Museum: From 1884 to 1952, salmon in Bristol Bay, Alaska, was harvested by fishermen in double-ender sailboats. Motorized vessels were not allowed in the fishery until 1952. An exhibit of photographs of this unique, often dangerous and grueling fishery is currently at the Anchorage Museum. Tim Troll, curator of the exhibit and Bristol Bay historian, will give us a guided tour of the exhibit. A special guest, a former Bristol Bay sailboat fisherman, will speak about his time fishing during the sailboat days. At the reception hors d'oeuvres will be provided, with a cash bar.

## Invited Speakers

The following experts will give invited talks at the symposium.

### Welcome

Dorothy Cook *President of the Native Village of Eklutna*

Debra Call *President of the Knik Village Council*

### Symposium keynote speakers

Alexandra “Sasha” Lindgren and Clare Swan *Kenai Peninsula Dena’ina Elders*

### Theme 1: Human-Environment Relationships

Ronald H. Brower Sr. *Alaska Native Language Center, University of Alaska Fairbanks*

### Theme 2: Fishing Communities in Transition

Svein Jentoft *Norwegian College of Fishery Science, University of Tromsø, Tromsø*

### Theme 3: Indigenous and Rural Knowledge and Communities

Einar Eythórsson *Norwegian Institute for Cultural Heritage Research, Tromsø*

### Theme 4: Governance and Management Issues in the North

Bonnie McCay *Department of Human Ecology, Rutgers University*

### Alaska State Perspective

John Moller *Rural Advisor, Alaska Governor’s Office*

## Invited Speaker Biographies

### Debra Call, Welcome

Debra Call is Dena'ina Athabascan from Knik, Alaska. She serves as president of the Knik Tribal Council, with a membership in the Matanuska-Susitna area of over 4,000. She is also president/CEO of the Calista Heritage Foundation and is the former vice president of operations/HR at the Alaska Native Heritage Center. Debra has an MBA from Washington State University and enjoys the Alaska life with her husband Rusty Gump, a veterinarian, and their son Ryan, a 7th grader at Central Middle School of Science in Anchorage.

### Sasha Lindgren, Keynote Speaker

Alexandra "Sasha" Lindgren is an Elder of the Kenaitze Indian Tribe and has worked for her Tribe for over twenty years in cultural and educational programs.

### Clare Swan, Keynote Speaker

Clare Swan was born and raised on the Kenai Peninsula, Alaska. Following passage of the Alaska Native Claims Settlement Act in 1971, she spent two decades immersed in research and litigation, culminating in the Kenaitze Indian Tribe receiving state regulations and rights on the eve of open fishing in June 1989. That decision has had long-reaching legal ramifications, extending to Indian grazing rights in southwestern America.

Ms. Swan worked to establish the Cook Inlet Council on Alcoholism and Drug Abuse. She was chair of the Kenaitze Indian Tribe and was instrumental in establishing the Dena'ina Health Clinic and youth and community agricultural programs. She served on the Board of Directors for Cook Inlet Region, Inc. and is board chair of the Cook Inlet Tribal Council.

In 2009, Clare Swan was honored with the Alaska Federation of Natives President's Award for Elder of the Year. In 2010 she celebrated her 60th wedding anniversary, and in 2011 she was inducted into the Alaska Women's Hall of Fame.

### Ronald H. Brower Sr., Invited Speaker

Ronald Brower teaches Iñupiaq Language at the University of Alaska Fairbanks. He was involved in the development of the North Slope Borough and the North Slope Borough Commission on Iñupiat History, Language and Culture, and he served as president of the Ukpeaġvik Iñupiat Corporation.

Mr. Brower was an archeology facilitator for the Alaska Office of History and Archaeology, and was the founding director of the Iñupiat Heritage Center museum. He worked with the Inuit Elders International Conference from Greenland from 1979 to 1998 and served on the Inuit Circumpolar Conference executive council from 1998 to 2006.



### **Svein Jentoft, Invited Speaker**

Svein Jentoft is a sociologist and a professor at the Norwegian College of Fishery Science, University of Tromsø, Norway. He specializes in issues pertaining to small-scale fisheries, community development, co-management, and governance. His latest book is *Poverty Mosaics: Realities and Prospects in Small-Scale Fisheries*, published by Springer in 2011, which is based on case studies in 15 countries around the world.

### **Einar Eythórsson, Invited Speaker**

Einar Eythórsson, born in 1956 in Iceland, has a Ph.D. in planning and community studies from the University of Tromsø. His main subjects of research are marine natural resource management, coastal Sami fishing communities, local ecological knowledge, and resource rights. He is a researcher at the Norwegian Institute for Cultural Heritage Research (NIKU), High North Department, in Tromsø.

### **Bonnie McCay, Invited Speaker**

Bonnie McCay is an environmental anthropologist and professor in the Department of Human Ecology at Rutgers University, New Brunswick, New Jersey. Her northern-most site of field research is the northeast coast of Newfoundland, Canada; she has also done research along the U.S. Atlantic coast and on the Pacific coast of Mexico. Adaptation to environmental change, institutions for managing the commons, and conditions for collaborative research and management are topics about which she has written.

### **John Moller, Invited Speaker**

John Moller is senior rural affairs advisor and special staff assistant to Governor Sean Parnell. Born in Unalaska, John lives in Juneau with his wife and four children, ages 5 to 18. John has worked for many years in Alaska as a commercial fisherman and owns and operates a commercial fishing vessel in Southeast. He also owns and manages commercial properties in Juneau and Unalaska.

John's desire to serve his community and to effect change has led him to serve on a number of Native and local government community boards and committees, including four years on the Advisory Panel to the North Pacific Fishery Management Council. He also served for 13 years as general manager of the Aleutian Pribilof Island Community Development Association.

John's Native heritage, experience as a community leader, and knowledge of the fishing industry has provided him the expertise to be an effective advocate for Alaska rural communities and a trusted advisor to the Governor.

# Tuesday, September 13, 2011

5:00–7:00 PM

REGISTRATION

# Wednesday, September 14, 2011

7:10–8:00 AM

REGISTRATION

8:00–8:10 AM

Welcome by Paula Cullenberg, Alaska Sea Grant Marine Advisory Program

8:10–8:15 AM

Welcome by Dorothy Cook, President, Native Village of Eklutna

8:15–8:20 AM

Welcome by Debra Call, President, Knik Village Council

8:20–9:00 AM

KEYNOTE ADDRESS

Kenaitze Tribe and Subsistence Fishing Rights in Face of Urbanization and Industrial Development

Clare Swan and Alexandra “Sasha” Lindgren, Kenai Peninsula Dena’ina Elders..... 16

THEME 1: HUMAN-ENVIRONMENT RELATIONSHIPS

Theme Chair: Keith Criddle

9:00–9:30 AM

Invited Talk: Inuit, Global Climate Change, and the Need for Social Science Policy Processes

Ronald H. Brower Sr., Alaska Native Language Center, University of Alaska Fairbanks .....17

9:30–9:50 AM

BREAK

PANEL: ENVIRONMENTAL AND CLIMATE CHANGE AND COMMERCIAL FISHERIES

Panel Chair: Erica McCall Valentine



**9:50–10:10 AM**  
**In Times of Change: Cultural Responses to Biodiversity among Coastal Fishermen from Nordland, Norway**  
*Harald Broch, University of Oslo, Norway* ..... 18

**10:10–10:30 AM**  
**Ecosystem Based Management of Arctic Fisheries and the Arctic Council**  
*Vince Gallucci, University of Washington*..... 19

**10:30–10:50 AM**  
**Planning for Cushioning Japanese Salmon Fisheries against Climate Change Effects**  
*Ikutaro Shimizu, National Research Institute of Fisheries Science, Japan*..... 20

**10:50–11:10 AM**  
**A Framework for the Preliminary Assessment of Vulnerability of Alaska Fisheries-Dependent Communities**  
*Hunter Berns, Oregon State University (Flaxen Conway, presenter)* ..... 21

**11:10–11:30 AM**  
**Taphonomic Analysis of Mink Island (XMK-030) Archaeoichthyofauna: Implications for Stable Isotope Research**  
*Holly McKinney, University of Alaska Fairbanks* ..... 22

**11:30–11:50 AM**  
**The Impact of Recolonization by Sea Otters, *Enhydra lutris*, on Communities in Southern Southeast Alaska**  
*Zachary Hoyt, University of Alaska Fairbanks* ..... 23

**11:50 AM–12:00 PM                      QUESTIONS/DISCUSSION**

**12:00–1:30 PM                         LUNCH**

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**PANEL: FISHERIES AS COMMUNITY**  
*Panel Chair: Davin Holen*

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**1:30–1:50 PM**  
**The Praxis of Fisheries as Culture: The Adaptive Capacity of Fishing Communities in Alaska**  
*Davin Holen, Alaska Department of Fish and Game*..... 24

<b>1:50–2:10 PM</b>	
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<i>Emilie Springer, University of Alaska Fairbanks</i>	25

<b>2:10–2:30 PM</b>	
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<i>Jory Stariwat, University of British Columbia</i>	26

<b>2:30–2:50 PM</b>	
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<i>James Magdanz, Alaska Department of Fish and Game</i>	27

<b>2:50–3:10 PM</b>	<b>BREAK</b>
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<b>3:10–3:30 PM</b>	
<b>The Role of the Bristol Bay Native Association in the Co-management of Subsistence Fisheries</b>	
<i>Courtenay Gomez, Bristol Bay Native Association</i>	28

<b>3:30–3:50 PM</b>	
<b>Research and Participation within Rural Alaska Subsistence Communities</b>	
<i>Robbin La Vine, Alaska Department of Fish and Game</i>	29

<b>3:50–4:00 PM</b>	<b>QUESTIONS/DISCUSSION</b>
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<b>4:00–4:30 PM</b>	
<b>Invited Talk: The Importance of Alaska Fishing Communities to the State's Identity and Economy</b>	
<i>John Moller, Rural Advisor, Alaska Governor's Office</i>	

<b>5:30–6:00 PM</b>	<b>POSTER SETUP</b>
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<b>6:00–9:00 PM</b>	<b><u>RECEPTION AND POSTERS AT HILTON HOTEL</u></b>
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# Thursday, September 15, 2011

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## THEME 2: FISHING COMMUNITIES IN TRANSITION

Theme Chair: Courtney Carothers

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**8:00–8:30 AM**

Invited Talk: Roots and Wings: The Need for Community  
Transition in the Age of Globalization

Svein Jentoft, Norwegian College of Fishery Science, University of Tromsø, Tromsø ..... 30

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## PANEL: FORGONE HARVESTS: EXPLORING NEW OPPORTUNITIES FOR COMMUNITY-BASED FISHERIES

Panel Chair: Steve J. Langdon

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**8:30–8:50 AM**

The History of Forgone Harvests in Bristol Bay

Ralph Andersen, Bristol Bay Native Association ..... 31

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**8:50–9:10 AM**

Local Knowledge and Tribal Management: K'iis Haida Views  
on the Development of Small-Scale Salmon Fisheries

Anthony Christianson, Hydaburg Cooperative Association ..... 32

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**9:10–9:30 AM**

Small-Scale Beach Seine Fisheries in Icy Strait: Opportunities  
Resulting from the Closure of Icy Strait to Purse Seine Fisheries

Ken Grant, Glacier Bay National Park ..... 33

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Forgone Harvests: Developing Local, Community-Based Fisheries to Improve  
Economic Opportunities and Provide Culturally Appropriate Employment

Steve J. Langdon, University of Alaska Anchorage ..... 34

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**9:50–10:00 AM**

**QUESTIONS/DISCUSSION**

**10:00–10:20 AM**

**BREAK**

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## PANEL: EXPERIENCES WITH FISHERIES ENCLOSURE

Panel Chairs: Gunnar Knapp and Jahn Petter Johnsen

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**10:20–10:40 AM**

Changes in the Distribution of Alaska's Commercial Fisheries Entry Permits

Marcus Gho, Alaska Department of Fish and Game ..... 35

**10:40–11:00 AM****The Challenge of Local Permit Ownership in Alaska Salmon Fisheries***Gunnar Knapp, University of Alaska Anchorage* ..... 36**11:00–11:20 AM****Fisheries Privatization, Sociocultural Transitions,  
and Well-Being in Kodiak, Alaska***Courtney Carothers, University of Alaska Fairbanks* ..... 37**11:20–11:40 AM****Quotas for Society's Service? The Use of Transferable  
Quotas in Norwegian Fisheries***Jahn Petter Johnsen, Norwegian College of Fishery Science, University of Tromsø* ..... 38**11:40–11:50 AM****QUESTIONS/DISCUSSION****11:50 AM–1:10 PM****LUNCH****PANEL: RECONSIDERING THE COASTAL  
COMMUNITY IN THE 21ST CENTURY***Panel Chairs: Marie Lowe and Katherine Reedy-Maschner***1:10–1:30 PM****Engaging Communities to Improve Data Collection for  
Fisheries Management: The Alaska Community Survey***Amber Himes-Cornell, NOAA Fisheries* ..... 39**1:30–1:50 PM****What Do You Mean Recruitment?***Signe Annie Sønvisen, Norwegian College of Fishery Science, University of Tromsø* ..... 40**1:50–2:10 PM****Fragmentation and Reformation of Aleutian Fishing Communities***Katherine Reedy-Maschner, Idaho State University* ..... 41**2:10–2:30 PM****Place-Based Social and Human Capital among  
Alaska's Coastal Community Youth***Marie Lowe, University of Alaska Anchorage* ..... 42**2:30–2:50 PM****Left Behind?: Fisheries Decline, Development, and  
(Dis)Connection in Northwest Ireland***Rachel Donkersloot, University of British Columbia* ..... 43



# Friday, September 16, 2011

## THEME 3: INDIGENOUS AND RURAL KNOWLEDGE AND COMMUNITIES

Theme Chair: James Fall

### 8:00–8:30 AM

Invited Talk: Time, Space and Power: How Local Knowledge on Environmental Change Can Make a Difference

Einar Eythórsson, Norwegian Institute for Cultural Heritage Research, Tromsø ..... 50

## PANEL: USING LOCAL AND TRADITIONAL KNOWLEDGE TO DOCUMENT ENVIRONMENTAL CHANGE AND HUMAN RESILIENCE

Panel Chair: Henry Huntington

### 8:30–8:50 AM

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Henry Huntington, Pew Environment Group ..... 51

### 8:50–9:10 AM

Walrus, Ice, Wind: Assessing Environmental Influences on Spring Harvest Levels of Walrus in Savoonga

George Noongwook, Savoonga Whaling Captains Association ..... 52

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Continuity and Change in Subsistence Harvests in Three Bering Sea Communities in Alaska: Akutan, Emmonak, and Togiak

James Fall, Alaska Department of Fish and Game ..... 53

### 9:30–9:50 AM

### BREAK

### 9:50–10:10 AM

“I’m always watching...”: Local Observations of Change by Subsistence Harvesters in Emmonak, Alaska

Caroline Brown, Alaska Department of Fish and Game ..... 54

### 10:10–10:30 AM

Local Observations of Change by Subsistence Harvesters in Togiak, Alaska

Theodore Krieg, Alaska Department of Fish and Game ..... 55





2:30–2:40 PM

QUESTIONS/DISCUSSION

2:40–3:00 PM

BREAK

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PANEL: INFUSING TRADITIONAL INDIGENOUS PRACTICES  
INTO CONTEMPORARY FISHERY MANAGEMENT

Panel Chair: Charles Kaaia'i

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3:00–3:20 PM

Gitxaała Nation’s Seal Fishery: An Indigenous Approach to Harvest

Charles Menzies, University of British Columbia ..... 63

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Implementing Traditional Resource Management  
Practices in Today’s Community

Timothy Bailey, National Park Service, Hawaii ..... 64

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Traditional Access and Practice Enhances Social Cohesion and Cultural Values

Arnold Palacios, Division of Fish & Wildlife, Northern Mariana Islands ..... 66

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Local Subsistence Fisher Input for In-season Salmon  
Management on the Kuskokwim River

Eva Patton, Orutsararmiut Native Council, Alaska ..... 67

4:40–5:00 PM

Community Involvement in Characterizing Biological Composition  
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Douglas Molyneaux, Alaska Department of Fish and Game (retired) ..... 68

5:00–5:10 PM

QUESTIONS/DISCUSSION

7:00–9:30 PM

RECEPTION AND PRIVATE TOUR OF THE BRISTOL BAY SAILING  
FOR SALMON EXHIBIT, ANCHORAGE MUSEUM

# Saturday, September 17, 2011

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## THEME 4: GOVERNANCE AND MANAGEMENT ISSUES IN THE NORTH

Theme Chair: Charles Menzies

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### 8:00–8:30 AM

Invited Talk: Controlling Interests in Out-of-Control Places:  
Challenges to Resource Governance in the North

Bonnie McCay, Department of Human Ecology, Rutgers University..... 69

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## PANEL: REIMAGING FISHERIES GOVERNANCE

Panel Chair: Phillip Loring

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### 8:30–8:50 AM

Traditional Fishing and Problems of Legal Regulations of Local and  
Indigenous Peoples' Access to Aquatic Biological Resources

Victoria Sharakhmatova, Russian Association of Indigenous Peoples of the North, Russia ... 70

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### 8:50–9:10 AM

Community Interpretations of Fishing Outside Legal  
Regulations: A Case Study from Northwestern Russia

Maria Nakhshina, Max Planck Institute for Social Anthropology, Germany, and Barents Center  
for Humanities, Russia..... 71

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### 9:10–9:30 AM

The Western Alaska Community Development Quota Program:  
Supporting the Advancement of Bering Sea Communities

Aggie Blandford, Western Alaska Community Development Association..... 72

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### 9:30–9:50 AM

Economic Transition in Western Alaska: Salmon Fishery  
and Emerging Groundfish Fishery Dependence

Scott Miller, NOAA Fisheries..... 73

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### 9:50–10:10 AM

Alternative Visions for Fisheries Governance: The Rights of  
Individuals Versus the Interests of Communities

Keith Criddle, University of Alaska Fairbanks.....74

10:10–10:20 AM

QUESTIONS/DISCUSSION

10:20–10:40 AM

BREAK

PANEL: LOCAL INSTITUTIONS, RISK, AND RESILIENCE

Panel Chair: Drew Gerkey

10:40–11:00 AM

Resolving the Policy Dilemma Posed by a First Nation’s Right to First Access in a Regionally Managed Fishery

Martin Robards, Wildlife Conservation Society, Fairbanks, Alaska ..... 75

11:00–11:20 AM

Testing the Robustness of Institutional Design with Alaska Ocean Policy Decision-Makers

Chanda Meek, University of Alaska Fairbanks ..... 76

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Economies of Interdependence: Subsistence Salmon Harvests and Risk-Sharing in Kamchatka, Russia

Drew Gerkey, University of Washington ..... 77

11:40 AM–12:00 PM

Is Sharing an Effective Tool to Improve Cooperation and Smooth Consumption in a Social Dilemma? Evidence from Kamchatka, Russia

E. Lance Howe, University of Alaska Anchorage (James Murphy, presenter) ..... 78

12:00–12:10 PM

QUESTIONS/DISCUSSION

12:10–12:30 PM

CONFERENCE WRAP-UP

## **Keynote: Kenaitze Tribe and Subsistence Fishing Rights in Face of Urbanization and Industrial Development**

Clare Swan and Alexandra “Sasha” Lindgren

Dena’ina Elders, Cook Inlet Tribal Council, Anchorage, Alaska

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A brief history of the Kenaitze Tribe and its Tribal fishing will be presented. This will include significant legal decisions and their impact, followed by a discussion on the Tribe today as a direct result of its “educational” fishery.

## **Invited Talk: Inuit, Global Climate Change, and the Need for Social Science Policy Processes**

**Ronald H. Brower Sr.**

*University of Alaska Fairbanks, Alaska Native Language  
Center, Fairbanks, Alaska, [rbrowers@alaska.edu](mailto:rbrowers@alaska.edu)*

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Inuit hunters and fishermen have been living in a time of rapid climate change throughout the Circumpolar North. They observe the impact of climate change among the animals upon which they depend. Global political and environmental changes also affect important aspects of life in the Arctic resulting in social, economic, and cultural upheaval. Because Inuit still depend on natural renewable resources of the north such as the bowhead whale, in the midst of environmental, social, and economic change, serious challenges for human health and food security are raised, along with a rapidly growing need for social science research and policy processes that have direct benefit to the fishing people of the north including provisions for protecting arctic cultures.

## **In Times of Change: Cultural Responses to Biodiversity among Coastal Fishermen from Nordland, Norway**

**Harald Beyer Broch**

*University of Oslo, Department of Social Anthropology, Blindern, Oslo, Norway*

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This presentation explores how local fishermen conceptualize and adjust to changes in their marine environment during fishing from 35-40 foot long vessels. Vestfjorden, the banks off the Røst Islands and banks off Troms County are visited. Commercial fishing for species such as cod and haddock is rigidly regulated by quotas in order to not deplete the stocks. Local fishermen doubt the need for these strong regulations when they experience a rich supply of coastal cod, for example. New species of fish to the area have been fished for commercial purposes during the last ten years. Not only fish are moving north—crabs and prawn-lobsters create new options and difficulties for the fishing population. Norwegian authorities agree that biodiversity is a goal and also a strongly regulated harvest is needed if a sustainable fishery is to be achieved, they claim. Yet the largest trawlers are subsidized and drilling for oil is considered where corals thrive and some of the world's largest fisheries are carried out. Long-standing cultural traditions and a high level of resilience have marked the adaptation of Norwegian coastal fishermen. The presentation aims to underline the need to apply ecological, psychological, and anthropological insights in order to explain this resilient adaptation to environmental changes.

## Ecosystem-Based Management of Arctic Fisheries and the Arctic Council

**Vince Gallucci**

*University of Washington, School of Aquatic and Fishery Sciences, Seattle, Washington, [vgallucc@uw.edu](mailto:vgallucc@uw.edu)*

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The Arctic Ocean and its subarctic seas contain numerous ecosystems, many quite different from each other. Significant commercial harvest activity already occurs in some of these ecosystems. The North Pacific's Bering Sea and its related Gulf of Alaska are already heavily exploited. The North Atlantic has extensive fisheries in the Barents Sea and in the vicinity of Greenland and Iceland, into the North Sea. New fisheries will develop as polar region warm and, inevitably, some will overlap coastal areas where Inuit or related Native peoples have traditionally fished. Potential fisheries in the Beaufort and Chukchi seas are examples. As ice cover diminishes commercial fisheries are aided and artisanal or indigenous fisheries are hindered. This duality places urgent allocation demands on fisheries management, especially in ecosystems where no harvest record exists and where fisheries science data are slim. Similar effects will be seen in the Arctic Ocean itself, as ice cover changes in extent, time present, and depth. An international, integrated ecosystem-based management approach is needed to deal with topics such as emergence of new and linked fishing grounds, the artisanal vs. commercial balance, and trophic linkages such as those between fish and mammals. Two suggestions are advanced. One, invent a new international management regime like ICES. The other adds to the mission of the Arctic Council, an existing organization of nation-states and indigenous groups. The Arctic Council is suggested as the natural organization to spearhead ecosystem-based management of international artisanal and commercial fisheries in the Arctic Ocean.



## Planning for Cushioning Japanese Salmon Fisheries against Climate Change Effects

**Ikutaro Shimizu**

*National Research Institute of Fisheries Science, Fisheries Research Agency, Yokohama, Kanagawa, Japan, [ikutaro@affrc.go.jp](mailto:ikutaro@affrc.go.jp)*

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Salmon is an important fishery commodity with global commercial value and one of the most important target species in northern Japan. Global warming is expected to have significant influences on salmon inhabiting subarctic waters. There is a risk that the stability and yield of coldwater fisheries resources will decrease, causing prices to rise and pricing salmon out of the global market. It is necessary to examine strategies for global warming effects from an economic viewpoint. The results of field investigation and historical analysis on Japanese salmon fisheries suggest the cornerstones for building economic strategies and the stability of resource levels and their market prices. Alleviation of the climate change effects to salmon fisheries would be enabled by a combination of economic and resource strategies. Local strategies are saving fishing profits in rich years and using them as funds for lean years; developing local resources to complement more regional resources; and maintaining prices of local resources by cooperation between hatcheries, set-net fisheries, and processing industries. Regional strategies are planning the coexistence of hatchery-reared salmon and wild salmon and letting both resources stabilize, and examining methods of raising the return rate of salmon based on joint observations with Russia. Global strategies are planning differentiation of Japanese salmon by eco-labeling in the global market, and expanding the shares of salmon products in the Asian market. The combination of these strategies is likely to help to stabilize the livelihood of salmon-dependent fishers, as well as to improve the basis of fisheries management.

## **A Framework for the Preliminary Assessment of Vulnerability of Alaska Fisheries-Dependent Communities**

**Hunter Berns and Flaxen Conway**

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Global climate change is projected to have far-ranging effects on the oceans and marine life. In turn, fisheries will likely undergo changes in their distributions and abundance. Coastal Alaska communities are often highly dependent on commercial fisheries, and as a result will likely be vulnerable to climate change. The purpose of this project is to construct a framework for a preliminary assessment of the vulnerability of the fisheries-dependent communities in Alaska to climate change and variability. Employing an indicator-based framework, vulnerability is assessed according to the levels of natural, social, and economic capital found in each community. A graphical instrument is used to communicate these findings. The communities of Cordova, Kodiak, Petersburg, Seward, and Sitka are assessed using this method and found to have differing levels of capital and vulnerabilities.

## **Taphonomic Analysis of Mink Island (XMK-030) Archaeoichthyofauna: Implications for Stable Isotope Research**

**Holly McKinney**

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Archaeologically deposited fishbone data-sets have the potential to elucidate the causes and consequences of long-term variability in local fish assemblages when combined with modern fisheries and paleo-oceanographic data-sets. To use these data-sets, it is essential to account for biostratinomic and diagenic agents that may have structured and contaminated the fishbone assemblage. Inter-taxa and inter-elemental differences in bone density, shape, size, protein, and lipid content result in differing preservation and contamination potential. Skeletal elements that are denser, larger, have reinforced shapes, and have higher protein and lower lipid content tend to be better preserved and are less affected by contamination than skeletal elements that lack those characteristics. Without mitigating for the effects of these agents, stable isotope ( $\delta^{15}\text{N}$ ,  $\delta^{13}\text{C}$ ) values may reflect differences in preservation and contamination rather than variability in ecosystem structure and function. A series of experiments (bulk bone percent nitrogen, bulk bone percent carbon, expected versus actual bulk bone percent carbon, collagen yield, and stable isotope quality control assessments) using modern and Mink Island specimens have been conducted to assess preservation and contamination levels. The modern specimens provide baseline data to which the ancient Mink Island specimens have been compared.

## **The Impact of Recolonization by Sea Otters, *Enhydra lutris*, on Communities in Southern Southeast Alaska**

**Zachary Hoyt and Ginny L. Eckert**

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Sea otters were extirpated by the fur trade from southeast Alaska (SEAK) by the late 1800s. In the absence of sea otters, macroinvertebrate populations increased, and lucrative fisheries developed. In an effort to re-establish sea otters, the Alaska Department of Fish and Game (ADFG) translocated sea otters to SEAK between 1965 and 1969. The re-introduction was successful, and the sea otters population is currently growing at an exponential rate and expanding in distribution. We examined ADFG biomass survey data collected from the California sea cucumber, red sea urchin, and geoduck clam fisheries in southern SEAK since 1990 and Dungeness crab catch and effort data collected since sea otter reintroduction. Evaluation of both fishery survey and catch data demonstrate that in the last 20 years sea otters have impacted commercial fisheries. Since 1993, ADFG has closed 18 dive fishery sub-districts within the red sea urchin, geoduck clam, and California sea cucumber fisheries, due in part to presumed sea otter predation. In addition, the Dungeness crab fishery has compressed away from areas with sea otters. Finally, using sea otter abundance data collected in 1988, 2003, and 2010, trends in biomass and catch per unit effort declines were investigated on a spatial and temporal scale of sea otter persistence. It is concluded that sea otters are impacting invertebrate fisheries in southern SEAK and this reduction in fishing opportunity has impacted several small communities in southern SEAK.

## The Praxis of Fisheries as Culture: The Adaptive Capacity of Fishing Communities in Alaska

**Davin Holen**

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Fisheries are composed of a community of actors linked by social, political, and economic relations. In rural Alaska a fishing community is a social-ecological system incorporating ecological boundaries and fishers with a central interest in ensuring the continuity of both the subsistence and commercial fisheries in their region. Alaska fisheries are complex systems where knowledgeable users maintain the adaptive capacity of the system through their participation in the fishery and involvement in local fisheries politics. This research project investigates the long-term viability of rural fishing communities in Alaska by understanding how fisheries create and maintain culture and community. There are many contemporary internal and external factors that create long-term viability of rural fishing communities in Alaska. To understand long-term viability of rural fishing communities this project focuses on internal sociocultural factors such as culture change, kinship-based social networks, and local-level politics that shape contemporary commercial and subsistence fisheries in Alaska. Salmon as a resource has become a reified symbol of the reliance on subsistence for many rural communities in subarctic Alaska situated along river and coastal marine environments. This project identifies whether a robust subsistence economy is an indicator of cultural success in these communities. Finally this research identifies whether a project such as this could create indices to measure the long-term viability of rural fishing communities in Alaska. This research could be a model for other projects to investigate long-term viability of fishing communities in Alaska, or potentially across the north.

## Industry Identity: Cultural Community in Alaska Commercial Fisheries

Emilie Springer

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Recent research demonstrates assortments that contribute to industry identity and community structure in the context of Alaska commercial fisheries. Group identity develops with many features and the individual cohesion to a particular group results from a community structure developed through an array of conditions. In any community setting, there are outliers and side bonds that disrupt the entirety of group cohesion. Individuality and peripheral relationships do not indicate lack of “community” but contribute to the complexity of interpreting community identity in general. In commercial fisheries, group identity may occur under sub-fields such as homeport, gear or vessel type, harvest area, primary harvest species, cooperative partnerships, company loyalty, or buyer/seller market relationships. On a larger scale, combinations of all of these features imply a more general community identity of “fishermen.” This paper will use case studies to explore the above group identity factors as well as the role and significance of geographic location and the features of place-based identity. This will be considered in terms of the extent to which occupationally specific characteristics are influenced by physical features, for example regionalism such as eastern or western Prince William Sound, and more major variations such as Gulf of Alaska or Bering Sea Aleutian Islands, management district, and primary port utility/delivery options.

## Community Viability and the De-centering of Fishing Activity

**Jory Stariwat**

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Since the 1980s on the Nushagak River of southwest Alaska, summer relocation of New Stuyahok residents to the Lewis Point subsistence salmon fish camp has been declining. In previous decades, nearly every household moved to the camp seasonally. This shifting pattern of use of the camp, however, should not be interpreted as an indication of declining importance in the fishery or as a fragmentation of the community. Instead, research reveals that an expansion of fishing strategies has accompanied advancements in boating technology since the 1980s, allowing for faster river travel on the 80-mile trip between the community and the fish camp. Accordingly, strategies in harvest location, timing, and methods have been adapted to accommodate increasing summer economic opportunities in the community of New Stuyahok and decreasing opportunities in the commercial salmon fishery of Bristol Bay, located just downriver from the Lewis Point fish camp. While at face value the changes in the fishery could be misinterpreted as a splintering of the community, the opposite is true. The de-centering of fishing activity reflects efforts being made by residents to sustain a viable cash economy in conjunction with a proud identity and the “subsistence way of life,” an effort that seeks to ensure the solidarity and longevity of a rural community negotiating its position in a mixed cash/subsistence economy.



## **A Structural Analysis of Mixed Economies in Alaska**

**James Magdanz**

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In remote, rural Alaska Native communities, households typically rely on a combination of fish and wildlife harvests, wage labor, and transfer payments. Previous research has documented the magnitude of subsistence harvests and cash income for households and communities, described the non-normal distribution of subsistence harvests among households, explored factors associated with these variations in household productivity, and graphed flows of subsistence foods and food processing services among households in these communities. Relying on subsistence harvest and cash income data from recent comprehensive community surveys, this paper explores and compares the economic structures of selected rural Alaska communities. It uses network analyses to identify the structural positions of different subsistence foods and cash sources in community economies, allowing graphical and statistical comparisons of economic structures among different communities or over time for a single community. Analyses scale from households to communities to regions.

## The Role of the Bristol Bay Native Association in the Co-management of Subsistence Fisheries

**Courtenay Gomez**

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The Natural Resource Department of the Bristol Bay Native Association (BBNA) hosts a variety of programs designed to assist member tribes in managing natural resources and monitoring subsistence harvest throughout the region. The Partners for Fisheries Monitoring Program was established in 2002 to build local capacity by involving residents and local tribal governments in both management and research in federal subsistence fisheries. Communities are engaged in the management process through an internship program and involvement in numerous research projects. Through this program BBNA serves as a true agent of co-management by providing an intermediary between tribal governments, harvesters, and resource managers. The BBNA internship program provides educational employment opportunities for students interested in fisheries, ecosystem science, and natural resource management. This presentation will discuss the role of a regional nonprofit tribal consortium in subsistence fisheries co-management through exploring the successes and challenges of community involvement, tribal capacity building, and fisheries workforce development.

## Research and Participation within Rural Alaska Subsistence Communities

**Robbin La Vine**

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This paper explores ways in which subsistence fishers collaborate with and contribute to management through participation in, and awareness of, ongoing research in their communities. Common community engagement with the management process usually involves passive adherence to seasons and the permitting process. In Alaska, subsistence users can participate in a greater capacity representing their communities as members of advisory committees and councils. I will examine the prospects for a meaningful role in the subsistence fisheries management process through participation in local and regional research. I will highlight examples from a number of research projects in Alaska through my work with the Bristol Bay Native Association and the Alaska Department of Fish and Game. In review of collaborative methodologies employed by these projects, and in consideration of interviews with subsistence management and research professionals, I find that the deep engagement of local people in the research process provides context-rich data that contributes to defining and explaining trends, develops the capacity of both researcher and consultant, and provides opportunity for a meaningful community input in subsistence fisheries management.

## **Invited Talk: Roots and Wings: The Need for Community Transition in the Age of Globalization**

**Svein Jentoft**

*University of Tromsø, Norwegian College of Fishery Science, Tromsø, Norway*

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Are coastal communities doomed in an increasingly globalized world? Are small-scale fisheries about to become extinct? Or does globalization provide them an opportunity to thrive again? In this paper I argue that in order to survive and grow it is essential for small-scale fisheries communities to combine the global and the local. They must be able to balance between the need to sustain a culture embedded in tradition, belonging, and community with the need to open up to the larger world, be more competent and self-reliant, and hence responsive to the threats as well as the opportunities that come with globalization. Drawing from the Norwegian experience I discuss some ways to deal with these conflicting demands.

## **The History of Forgone Harvests in Bristol Bay**

**Ralph Andersen**

*Bristol Bay Native Association, Dillingham, Alaska*

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This paper will discuss how “forgone harvests” were initially conceptualized by a coalition of Bristol Bay commercial fishermen and associations. It will discuss the formation of a task force, the generation of a report identifying “lost earnings” from forgone harvests, and the initiation of a dialogue with processors and management to address the issues. Outcomes to date of the process and dialogue will be described.

## **Local Knowledge and Tribal Management: K'iis Haida Views on the Development of Small-Scale Salmon Fisheries**

**Anthony Christianson**

*Mayor of Hydaburg, and Fisheries for Hydaburg Cooperative Association, Hydaburg, Alaska*

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The traditional waters of the southwestern Prince of Wales Archipelago include many small and medium-size salmon streams that are geographically dispersed. Traditional knowledge obtained from elders and observations of the contemporary commercial purse seine fishery in our waters indicate that there are regular, substantial surpluses in several different streams, which could be harvested by our beach seine skiff subsistence technologies in the bays. In addition, our documentation through weir studies of sockeye runs to Hetta indicate a recent shift in the peak of the runs by as much as two-three weeks from those of the 1980s, creating late season abundances that go unharvested. Such fisheries would provide new economic opportunities for our community in which unemployment and earnings opportunities are limited and commercial salmon permits and halibut quota holdings have almost disappeared.

## **Small-Scale Beach Seine Fisheries in Icy Strait: Opportunities Resulting from the Closure of Icy Strait to Purse Seine Fisheries**

**Ken Grant**

*Glacier Bay National Park, Gustavus, Alaska*

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Huna Kaawu encompasses all of the waters and streams from the outer coast on either side of Cross Sound and Icy Strait to Chatham Strait including Glacier Bay, Excursion Inlet, and Port Frederick. Traditionally, all of the salmon streams in these waters were claimed and utilized by the house groups of the Tlingit people. Hoonah supported a fleet of 25 limit seiners to fish these waters through much of the 20th century, but now only one permit remains in the community. At the same time, management practices have essentially closed Cross Sound and most of Icy Strait to purse seine harvesting in order to insure passage of stocks to Lynn Canal and Chatham Strait streams. As a result there are many salmon streams along the shores of Icy Strait that receive virtually no commercial harvest pressure at present. A small-scale beach seine fishery, similar to one that operated in the area a century ago, would make possible capture of those “forgone harvests,” create new economic opportunities, and also provide a way to reconnect our young people with the cultural heritage of our landscapes and seascapes.



## **Forgone Harvests: Developing Local, Community-Based Fisheries to Improve Economic Opportunities and Provide Culturally Appropriate Employment**

**Steve Langdon**

*University of Alaska Anchorage, Department of Anthropology, Anchorage, Alaska*

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The limited entry permit system has reduced the commercial salmon fishing opportunities in many of the coastal villages of southern Alaska. However, a variety of circumstances, including the manner in which the current commercial fishery is prosecuted, lead to surpluses of unharvested salmon returning to certain streams. This paper will discuss the circumstances that led to “forgone harvests” and the possibilities such conditions create for the development of small-scale local and community-based fisheries built on local and traditional knowledge, subsistence technologies that provide new economic opportunities compatible with local cultural patterns and interests.

## Changes in the Distribution of Alaska's Commercial Fisheries Entry Permits

**Marcus Gho, Nancy Free-Sloan, Kurt Iverson, Kurt Schelle, et al.**

*Alaska Department of Fish and Game, Commercial Entry  
Commission Research Unit, Juneau, Alaska*

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A brief overview on the changes in the distribution of permanent entry permits in Alaska's limited fisheries will be provided in this presentation. From 1975 until now, 79 permit types have been issued in 65 fisheries. This presentation will provide both statewide and some of the fishery-specific data on the number of permit transfers, the geographic distribution of permit holders, changes due to permit transfers, changes due to the relocation of permit holders, and the year-end 2010 geographic distribution of permit holders.

## The Challenge of Local Permit Ownership in Alaska Salmon Fisheries

**Gunnar Knapp** *University of Alaska Anchorage, Institute of Social and Economic Research, Anchorage, Alaska, [Gunnar.Knapp@uaa.alaska.edu](mailto:Gunnar.Knapp@uaa.alaska.edu)*

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Changes in ownership of limited entry permits by “local” residents of the region where a fishery occurs may have significant economic and social implications for fishery-dependent regions. In some Alaska salmon fisheries, a long-term decline in local permit ownership is an important policy concern. This paper examines the causes of declining local permit ownership, and the policy challenges of slowing or reversing permit loss.

Theoretically, permit markets allocate permits over time to the individuals who are willing to pay the most for them. Any factors that differentially affect what local and nonlocal residents are willing to pay for permits may affect the equilibrium share of permits held by local residents. For remote rural fisheries in particular, these may include differences between local and nonlocal residents with respect to access to and costs of financing permits and boats, costs of travel to the fishery, opportunity costs of participation in the fishery, and many other factors.

As salmon fisheries become more profitable, differences between local and nonlocal residents in access to financing matter more while differences in costs of travel and opportunity costs matter less in the relative ranking of what local and nonlocal residents are willing to pay for permits. This tends to increase the share of nonlocal residents among buyers willing to pay the market price for permits, reducing the equilibrium share of permits held by local residents. This leads to a conflict between two important policy goals: increasing fishery profitability and maintaining remote rural local permit ownership in profitable fisheries.

There may be no easy or cheap ways to reverse market-driven declines in local permit ownership, when all citizens—both local and nonlocal residents—enjoy federal and/or state constitutional guarantees of equal protection. Subsidizing permit loans or purchases is expensive, and does not necessarily result in fewer net sales of permits from local to nonlocal residents. Allowing community organizations to buy and hold permits for sale or lease to local residents raises a variety of other challenges.

When fishery managers create tradable fishery access privileges, regardless of the initial allocation of those privileges, markets become powerful forces for the reallocation of privileges over time, both among individuals and among geographic regions. Great care should be taken in creating tradable fishery access privileges and in consideration of potential restrictions on how and to whom they may be traded.

## **Fisheries Privatization, Sociocultural Transitions, and Well-Being in Kodiak, Alaska**

**Courtney Carothers and Catherine Chambers**

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Scholars and fishermen alike view the privatization of fishing rights as a fundamental driver of change in fishing livelihoods and communities. Expanding upon ethnographic research conducted in rural fishing communities in the Gulf of Alaska, this paper explores the social and cultural shifts linked to the privatization of fishing rights in the diverse fishing community of Kodiak, Alaska. We present initial results of our attempts to (1) understand how the privatization of fishing rights has been experienced across diverse human groups that participate in fishery systems; (2) explore the relative importance and magnitude of the impacts of fisheries privatization compared with other ecological, economic, and technological drivers of change; and (3) assess the relationship between the social and cultural shifts linked to fishery privatization and individual and community well-being. Our ethnographic study, employing mixed methods of interviews, surveys, participant observation, and archival research, helps to provide rich qualitative and systematic quantitative data to assess how regulatory and related changes affect the social and cultural dimensions of fishery systems and fishing communities. The research framework joins scholarship in political ecology, social-ecological systems, and the anthropology of fishing communities to provide insights into the relationship between the enclosure of resources and changing nature-society relationships. We relate our research findings to understanding well-being and transitions in fishing communities in the Gulf of Alaska, Bering Sea, and throughout the Circumpolar North.

## Quotas for Society's Service? The Use of Transferable Quotas in Norwegian Fisheries

Jahn Petter Johnsen and Petter Holm

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The relationships between communities, states, and markets are central in fisheries governance. To some extent, fisheries governance is understood as the outcome of a struggle between untamable market forces, communities under pressure, and states with capacity problems. In response to the change in many world fisheries, from open to closed access, use of market arrangements in the form of transferable fishing quotas (TFQs) has been promoted as an efficient way to manage the fisheries, and to control overcapacity. Application of TFQs is seen, by some, as an abandonment of political and public control of fish resources, moving the system in favor of market control, and leaving the fishing grounds open for pure economic exploitation of fish resources at the expense of wider social values.

Since the 1930s, the open access fisheries of Norway have been managed through a corporative system, with the fishermen and their organizations at the wheel. This corporative system has been part of a mixed economy, where coordination problems have been solved through political and administrative interventions and planning, partly in the form of heavy subsidizing of an overly large fish capture capacity. Severe collapses of important fish stocks in Norwegian waters (first, Atlantic herring around 1970, and then arctic cod around 1990), as well as the general process of closing the ocean commons through UNCLOS in the 1970s, had the result that the most commercially interesting fisheries were closed, and fishing quotas were introduced as the main management instrument.

While the quotas were sufficient tools for controlling fish mortality, the quota regime could not solve the major coordination problems in the sector—namely resource allocation and low profitability. Thus, these problems were addressed by establishing a variety of arrangements for adapting fishing fleet capacity to resources. These arrangements have developed into a structural policy that (1) established markets for fishing rights and quotas, and (2) facilitates concentration of quotas into fewer hands. The transactions take place inside a complex framework.

The outcome of the process is not yet clear. The relationships between communities, states, and markets have to be conceptualized under new terms. Do we see a transition toward a market-based system, where the resources are privatized and monopolized, or do we see development of a system that has tamed the market forces for society's service?

## **Engaging Communities to Improve Data Collection for Fisheries Management: The Alaska Community Survey**

**Amber Himes-Cornell**

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Most Alaska fishing communities are isolated and cannot easily participate in fisheries management public forums. In addition, socioeconomic data about Alaska fisheries is usually collected and organized around different units of analysis, such as counties, vessels, sectors, and gear groups. It is often difficult to aggregate or disaggregate these data for analysis at the individual community or regional level. In addition, at present some relevant community-level economic data are simply not collected at all. As a result, information about individual community dependence on fishing is lacking, limiting the ability of regulators to effectively analyze the potential impacts of fisheries management decisions. This paper gives an overview of a survey that was used to engage Alaska communities to provide much needed information about their social and economic ties to fishing. A summary of the results of this survey is presented and the potential is explored for this and other methods of engaging communities to better inform fisheries management in isolated areas of Alaska. In addition, this paper explores the relative resilience of Alaska fishing communities and how they will be able to respond to climate change and socioeconomic shifts in the fishing industry given their current level of participation in North Pacific fisheries.

## **What Do You Mean Recruitment?**

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In our research we have previously asked the question whether or not there is a recruitment problem in the Norwegian fishing fleet. According to Norwegian fisheries media, regional and national politicians, and the fisheries sector, the main future challenge for the Norwegian fishing fleet is the lack of recruitment. It was therefore quite puzzling when over 70% of our respondents (vessel owners with crew) reported not having experienced problems recruiting crew. Stories told about recruitment and experiences with recruitment do not correspond. Rather than saying one claim is more correct than the other, I ask: when different groups talk about recruitment, are they talking about the same phenomenon? If not, then what is recruitment? And are there any consequences related to a specific way of looking at recruitment?

## Fragmentation and Reformation of Aleutian Fishing Communities

**Katherine Reedy-Maschner**

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Fishing villages and fishing fleets of the southern Bering Sea are rapidly becoming distinctive components of the greater fishing community. Management of Alaska's fisheries in both federal and state waters focuses on fleets, not villages. Because holding a permit gives the same rights as living in an Aleutian village and holding a permit, regulations do not distinguish transients from locals. Processors offer assembly-line jobs at low wages and recruit internationally—jobs that local Aleuts do not want. Community, then, is a problematic unit of analysis because of layers of transients, international workers, variously owned processors, villages, and gear groups with different levels of tenure and title in the fisheries. This paper reports on research contracted with the U.S. Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) to explore local subsistence harvesting, commercial fishing, community economics, and interdependencies of Aleutian residents. A different kind of “community” emerges when using social network analysis of food sharing between individuals—analysis that preserves genealogical relationships, reaches between households and across regions, and identifies the key behaviors and relationships that supports large networks.



## **Place-Based Social and Human Capital among Alaska's Coastal Community Youth**

**Marie E. Lowe**

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Focused group interviews with youth in fishing communities of southeast Alaska and the Kodiak archipelago demonstrate how coastal youth possess tremendous social capital because of the small size, geographic remoteness, and interconnectedness of their communities. Coastal youth are “hands-on” people—interviews and ranking exercises reveal a cultural affinity toward outdoor and/or vocational work. Although some coastal youth express desire for more vocational and technical programs, diminished state funding for technical training combined with increasing scarcity of vocational teachers precludes technical and career education options. As opportunities in traditional occupations such as fishing diminish, coastal youth are encouraged to pursue higher education—but they report themselves or their peers attending college for often only a short period of time, returning home far in advance of completing their degrees. Those who do earn degrees must sometimes leave home permanently to pursue careers unavailable at home. Young women are more likely to move away from home communities and seek higher education as gender roles change, while young men tend to remain in or return to home communities because of the importance of subsistence and other outdoor activities and work. Overall, youth demonstrate a connectedness to their physical environment and to the place of their home communities, characteristics important for assuming leadership, citizenship, and stewardship community roles in the future. The research reveals the critical importance of not only future diversified economic development opportunities for coastal communities, but also the strength of social and cultural ties for community empowerment and development.

## **Left Behind?: Fisheries Decline, Development, and (Dis)Connection in Northwest Ireland**

**Rachel Donkersloot**

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Ireland's booming "Celtic Tiger" economy of the late 1990s instilled in the public imagination impressions of savvy transnational entrepreneurialism and unprecedented prosperity. Touted as "Europe's shining light" at the dawn of the 21st century, Ireland went on to capture the title of the world's most open (i.e., global) economy between 2002 and 2004 (Ingilis 2008:16). But never mind the transnational and global fanfare surrounding Ireland's once mighty Celtic Tiger. Nowhere does Ireland appear more globalized than at sea. This paper approaches the subject of globalization and transformation with an eye toward the unsettled social and economic landscape of Killybegs, Ireland's premier fishing port located in the rural northwest corner of the republic. It is from here that Irish pelagic vessels depart for fishing grounds as far away as the South Pacific while the local whitefish fleet ebbs and endures declining quotas and increased operating costs at home. In this paper I discuss the twin forces of decline and delocalization in the context of Irish fisheries, and ask what role large-scale fisheries can play in shoring up the oftentimes single-resource-dependent communities that they are leaving behind.

## Implications of Arctic Change and Circumpolar Indigenous People

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Debate over arctic marine transportation routes has a long history, but the intensity and significance of the debate has risen with the warming of the Arctic Ocean. Access to natural resources believed to lie in and below arctic waters is one reason, and transport routes between the Atlantic and Pacific oceans is another. The “Northern Sea Route” is viewed at least by the Russian Federation to be subject to its absolute jurisdiction. The “route” has several options, all of which provide travel between the Novaya Zemla strait and the Bering Strait.

Different circumstances are associated with the Canadian claim to the “Northwest Passage.” These are reviewed in light of Russian’s claim to the Northern Sea Route (as distinct from the “Northeast Passage”). Claims to jurisdiction over both routes are rooted as much in historical occupation as they are in the UN Convention on the Law of the Sea (UNCLOS), neither of which offers an unequivocal resolution. The resolution of both the transport and mineral resource claims point toward a future with enormous world geopolitical implications that extend well beyond the five countries that border the Arctic Ocean, as well as beyond the eight nation states that make up the permanent members of the Arctic Council. Since the Inuit and other indigenous groups cannot at present enter into bi- or multilateral relations with nation states in the usual sense of the word, the Arctic Council’s role is central in defining a future in which the Inuit culture and way of life continues.

## **Participation and Resistance: Tribal Involvement in Bering Sea Fisheries Management and Policy**

**Julie Raymond-Yakoubian**

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This paper outlines the various ways that Bering Strait region Tribes and Tribal organizations have been involved in federal fisheries management and policy in the northern Bering Sea. This involvement has focused on the issues of salmon bycatch in the pollock fishery, the management of the Northern Bering Sea Research Area, and National Marine Fisheries Service (NMFS) research activities.

Tribes and Tribal organizations have both participated in and resisted the current management regime through involvement in North Pacific Fishery Management Council (NPFMC) meetings, planning workshops, informal meetings, Tribal consultations, and other activities in attempts to effect management and policy that reflects tribal concerns. This paper will outline some of the successes and problems Tribes have encountered while trying to work with the NPFMC and NMFS on Bering Sea fisheries issues.

## **The Kodiak Archipelago Rural Regional Leadership Forum: A Place to Explore Strategies of Community Resiliency**

**Roberta Townsend Vennel**

*Kodiak Archipelago Rural Regional Leadership Forum, Homer, Alaska*

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Key factors were identified through community planning processes that must be addressed in order for Kodiak's small coastal communities to maintain. One of these factors, the continuing decline of local access to maritime resources, presents significant challenges for community members to engage in the regulatory process. These challenges include effectively communicating the impacts of regulatory decisions on Kodiak's communities and arriving at clear strategies that will ensure long-term, local access to maritime resources. The Forum has evolved out of community planning processes as a place where information panels and discussion groups bring together community members, researchers, regulatory personnel and decision makers, local and state government representatives, agency partners, and other identified community partners to first raise awareness of regulatory impacts and then explore community strategies that address these and other critical issues. Supported by the Kodiak Island Housing Authority and Kodiak College and meeting in its sixth year, the Forum is gaining recognition as a regional planning best practices model.

## **Reclaiming a Vibrant Past: Community Activism and Marine Dependency in Gulf of Alaska Small Remote Communities**

**Gale K. Vick**

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In considering the current situation for small, remote fishing communities of the Gulf of Alaska, it is easy to be underwhelmed by the magnitude of the growing crisis and it is too easy to dismiss the clearly needed solutions. Community activism can change the way lawmakers and regulators perceive both the problem and the solutions but communities themselves need a platform for getting good information and communicating solutions back to regulators. GOAC3 is an important part of this process. More than 50 communities in the Gulf of Alaska are under 2,000 in population and accessible by air or water only; 42 of these form the CQE program. There is only one way to truly sustain them in a world of closed access: there absolutely has to be a certain amount of access that is guaranteed to the community in perpetuity. We know what happens without that access. This is not a substitute for individual access to fisheries but rather a catalyst to encourage a more vibrant participation by local residents. The CQE program, with its leasing component, does not fish directly. This is a very important distinction that often gets lost in the discussion of CQEs in comparison to the CDQ program, which does directly fish and control fishing companies.

## How Can Catch Shares Be Shaped So Historically Fisheries-Dependent Communities Can Thrive Economically?

**Terry Haines**

*Fish Heads, Kodiak, Alaska*

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Catch shares management programs have been identified as a key element in the current reshaping of our national fisheries management policy. Programs in effect now have shown potential to make management easier, make fisheries safer, and increase the quality and value of the product. However, the virtual privatization of stocks has enabled consolidation of fleets and fishing rights, and allowed those gifted initial allocations to charge access fees that have topped 80% of dock price. The unintended consequence has been to challenge the economic viability of traditionally fisheries-dependent communities who find that their tax base, user fees, and entry-level opportunities have shrunk.

To date fishing communities have lacked the legal structure, quality data, and political will to advocate effectively for their constituents. But work done by Nobel Prize Laureate Elinor Ostrom might give direction to the development of as-yet skeletal provisions in the Magnuson Stevens Act, such as regional fisheries associations, which could provide a platform for municipalities to act as genuine stakeholders in development of such programs. How can communities successfully advocate for inclusion in the present environment?

## **Tribal Marine Mammal Ordinances of St. Lawrence Island**

**Vera Metcalf**

*Eskimo Walrus Commission, Nome, Alaska*

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This presentation will focus on the history of the development of marine mammal ordinances in the Alaska communities of Gambell and Savoonga. Also reviewed are: the role of the communities in ordinance creation; facilitation provided by the Eskimo Walrus Commission; participation of the regional nonprofit; and outside expert assistance in the creation of the ordinances. The intent of these ordinances is to give more local control, guidance, and enforcement over the harvest and regulation of marine mammals to St. Lawrence Island residents. The process of the final approval and adoption of the ordinances, and current plans for ordinance implementation, are outlined.



## **Invited Talk: Time, Space, and Power: How Local Knowledge on Environmental Change Can Make a Difference**

**Einar Eythórsson**

*Norwegian Institute for Cultural Heritage Research (NIKU), Fram Centre  
for Climate and Environment, Tromsø, Norway, [ee@niku.no](mailto:ee@niku.no)*

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It is frequently assumed that experience-based knowledge of people in fisheries communities is essential for sustainable use and management of marine resources and for sustainable livelihoods in fisheries-dependent communities. The same is true of scientific knowledge. How have these contributed to the sustainability of fisheries resources in rural fishing communities in the Arctic?

Experience-based knowledge on the natural world is in academic literature and in policy guidelines referred to as indigenous knowledge, traditional knowledge, and local ecological knowledge. These terms, respectively, relate to the power dimension, the temporal dimension, and the spatial dimension of peoples' knowledge about the environment. Power is about who is being represented in the knowledge base about the environment, the temporal dimension related to which timeline is being used for evaluating the current state of the ecosystem, and the spatial dimension how fish interact and behave in small or large areas. These dimensions are also relevant for scientific knowledge about the same environment. How experience-based and scientific knowledge has contributed most to sustainable management of fisheries can be studied from how the two types of knowledge relate to time, space, and power.

How important are these dimensions for the validity and relevance of both types of knowledge for sustainable fisheries management? Are they decisive for how knowledge is mediated between communities and academic institutions as well as between communities and management institutions? Drawing on case studies from rural communities in Finnmark, northern Norway, changes in knowledge mediation and definitions of valid knowledge in relations between local communities and local fishers on one side and management and planning on the other side, are discussed with reference to the power dimension, time depth, and spatial level of local ecological knowledge and scientific knowledge.

## The “Calorie-Sheds” of Savoonga and Togiak, Alaska: Examining the Geographic Range of Subsistence Foods

**Henry P. Huntington**

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**Ivonne Ortiz**

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Subsistence harvests draw on a wide range of resources. Much attention has been given to subsistence use areas—the places people hunt, fish, gather, and travel—but little attention has been given to the areas over which the subsistence species range. The “calorie-shed” is the spatial extent of the food web of which subsistence harvests are the apex. In this first attempt to delineate a calorie-shed, we use the top marine resources harvested at Togiak and Savoonga, Alaska, according to recent harvest surveys conducted by the Alaska Department of Fish and Game and Kawerak Inc. as part of the Bering Sea Integrated Ecosystem Research Project. Using available data on the ranges and migrations of the species in question, we compiled a map of the first-order calorie-shed for these two communities. Further work is needed to determine the range of the stocks or populations actually harvested at each site, should those differ from the overall species range, and to trace the calorie-shed further down the food web. Other approaches to consider include weighting according to level of use of the species in question, or according to intensity of use of a particular location by that species. Producing calorie-shed maps for other communities will allow comparisons to determine different spatial domains of harvests. The maps can also be used to identify potential impacts from human activity and environmental change.

## Walrus, Ice, Wind: Assessing Environmental Influences on Spring Harvest Levels of Walrus in Savoonga

**George Noongwook**

*Savoonga Whaling Captains Association, Native Village of Savoonga, Alaska, [gnunguk@hotmail.com](mailto:gnunguk@hotmail.com)*

**Henry P. Huntington**

*Huntington Consulting/Pew Environment Group, Eagle River, Alaska, [hph@alaska.net](mailto:hph@alaska.net)*

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During local and traditional knowledge (LTK) interviews conducted in Savoonga, hunters said that in years when the spring ice retreat is particularly rapid, walrus hunting is poor because good ice conditions do not last long. We are investigating this statement, and have added wind conditions to the analysis. Determining environmental influences on subsistence harvest levels is of interest for two main reasons. First, little work of this kind has been done, and connecting environmental conditions with a tangible, important outcome may provide insight into ways that environmental variability affects subsistence communities, and therefore how subsistence hunters deal with such variability to maintain adequate subsistence production from year to year. Second, identifying pertinent environmental influences on subsistence harvests may help identify potential impacts of climate change on access to subsistence resources, which is likely to be a critical variable for hunters as they adapt to changing conditions. Our results indicate that variability in ice and wind account for a substantial portion of the variability in spring walrus harvests in Savoonga in the past two decades, potentially offering a means of assessing impacts due to projected changes in ice and winds in the years to come.

## **Continuity and Change in Subsistence Harvests in Three Bering Sea Communities in Alaska: Akutan, Emmonak, and Togiak**

**James A. Fall**

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The Bering Sea Integrated Ecosystem Research Program (BSIERP), funded by the North Pacific Research Board, is a five-year investigation of the implications of climate change for the resources and Alaska communities of the Bering Sea. Included in BSIERP is a local and traditional knowledge (LTK) component, which focuses on climate and ocean conditions that may affect subsistence fisheries and other marine resources. As a first step in the LTK component, subsistence harvest data, as well as other economic and demographic information, were collected for five study communities: Akutan, Emmonak, Savoonga, St. Paul, and Togiak. The Division of Subsistence of the Alaska Department of Fish and Game was responsible for data collection in Akutan (Aleutian Islands), Emmonak (lower Yukon River), and Togiak (western Bristol Bay). This presentation will summarize key findings from these surveys and follow-up interviews, addressing continuities and changes in harvest quantities, species harvested, and location of harvests, as well as explanations offered by local residents for differences between harvest patterns in the 2008 study year and other recent years. The study found differences in harvest trends between the three communities: harvest quantities and diversity were lower in Akutan in 2008 compared to the previous study year and slightly higher in Togiak. In Emmonak, shifts in the composition of the subsistence harvest occurred. However, subsistence harvests in all three communities contributed substantially to local food supplies and supported the transmission of traditional knowledge, skills, and values.

## **“I’m always watching...”: Local Observations of Change by Subsistence Harvesters in Emmonak, Alaska**

**Caroline Brown and Nicole M. Braem**

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**Michael Jimmy**

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Located at the mouth of the Yukon River, Alaska, the primarily Yup'ik community of Emmonak is uniquely situated in an estuarine environment where hunters and fishermen access both marine and in-river or terrestrial resources. As a result, Emmonak residents have accumulated a rich body of knowledge about the complex interactions of land and sea that shape their subsistence activities. Furthermore, subsistence users continue to deal with a changing climate, as well as social and economic factors that affect these activities. For example, residents expressed concerns about shorter, warmer winters and wetter summers, affecting the formation of sea ice necessary for seal hunting, access to harvest locations, and conditions necessary for salmon processing, among others. Emmonak residents must negotiate these challenges as well as other factors such as declining commercial fishing opportunities and changing technology that restructure how certain subsistence activities are organized.

This paper will describe research conducted between March 2009 and April 2011 as part of the Bering Sea Integrated Ecosystem Research Project (BSIERP) on the local traditional knowledge of Emmonak hunters, fishers, and gatherers and analyze the strategies and adaptations they employ to deal with a changing world.

## Local Observations of Change by Subsistence Harvesters in Togiak, Alaska

**Theodore M. Krieg**

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This paper will describe selected findings of research conducted between January 2009 and March 2010 as part of the Bering Sea Integrated Ecosystem Research Project (BSIERP) on the local traditional knowledge of Togiak, Alaska, hunters, fishers, and gatherers associated with changes in the environment both natural and human.

Togiak is located at the mouth of the Togiak River at the head of Togiak Bay within Bristol Bay area of the Bering Sea. Togiak Bay is the premier herring spawning location within Bristol Bay and the location of the Yup'ik-named Qayassiq Island (Round Island), a significant Pacific walrus haul-out for males in the summer and fall. Commercial fishing for herring in the spring and salmon in the summer is conducted in Togiak Bay. Trawling for yellowfin sole takes place outside of Togiak Bay. Hunting for marine and land mammals, and fishing for salmon and non-salmon fish in ocean and freshwater have sustained the Yup'ik residents of the area for millennia. Togiak residents have observed a decline in the presence of ice seals in Togiak Bay due to the infrequency of the southern extent of the sea ice. Changing climate has thus affected hunting patterns for some marine mammals, but observed changes in the behavior of some species including walrus and king eiders are attributed by Togiak residents to human disturbance from commercial fishing.

## **Resisting the Imminent Death of Wild Salmon: Local Knowledge of Tana Fishermen in Subarctic Norway**

**Gro B. Ween**

*University of Oslo, Department of Social Anthropology, Oslo, Norway*

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In 2009, the Norwegian Directorate of Nature Management warned that the Atlantic salmon population in the River Tana in subarctic Norway was dramatically reduced. Active measures had to be taken to prevent future extinction. Local fishermen protested against this description of reality. They appealed to the Sámi Parliament and to local members of the Norwegian Parliament. Leaders of fishermen's organizations rallied. Outside the public sphere expert claims were continuously discussed.

I wish to make this commentary, taking place as part of daily conversations engaged in while fishing, my point of access into local ecological knowledge (LEK). Although such running commentary is a substantial part of everyday interaction among locals, and between locals and anthropologist, it is not normally considered an appropriate gateway to local knowledge. Partly, this is because the representations of techno-science offered are not always considered correct in the eyes of environmental managers and natural scientist. However, setting aside the issue of the scientific merit of particular local knowledge claims, such commentary offers crucial insights into local knowledge. In this paper local knowledge is enacted as positioned against the knowledge of experts. It is also perceived as acts of resistance. My questions are what characterizes the knowledge enacted and what is resisted?

## The Performance of Land and Indigeneity in Sápmi Norway

**Britt Kramvig**

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In this paper I explore human-nature relations in a multiethnic community in the European Arctic. While the Saami are the indigenous people, the region has for centuries been the scene of cultural encounter and a meeting-place for different ethnic groups. The encounters have not been without friction—the harsh assimilation policies toward the indigenous people of the region almost wiped out the Saami in many parts. The colonial situation in the Arctic is slowly changing; the Norwegian government ratified the ILO-convention, and agreed to establishing the Saami Parliament and introducing the Finnmark Act. Government politics feed into a construction of the Saami as “others,” sharpening the ethnic awareness in the region. The processes I would like to highlight are those that, at the local community level, oppose this sharpening of the ethnic division. I will explore the way the gift works in these multiethnic arctic communities. I take inspiration from Mauss (1990) and Ricoeur (2005), arguing that autonomy, identity, and community (which transgress ethnic boundaries) are expressed through the process of gift giving, paradoxically at the same time as the act of giving can be seen as performing indigeneity.



## The Role of Bering Sea Sub-Network (BSSN) to Map Subsistence Use and Explore Climate Change Impacts and Adaptations

**Maryann Smith and Victoria Gofman**

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Melting sea ice and warming ocean waters have led to increased interest in development in the Bering Sea, including marine transport, offshore oil and gas exploration, and commercial fishing. Development can have both positive and negative impacts on the indigenous groups who occupy the area. Although development can potentially bring economic activity to depressed rural areas, development that disrupts subsistence activity has the potential to affect food security, cultural continuation, and well-being of indigenous groups. In order to understand impacts of development, maps of subsistence use locations are needed. Phase two of the Bering Sea Sub-Network, community-based research, endeavors to map subsistence activity by sampling a consensus of “high harvesters” within a community. In order to deal with the abundant mapped data an innovative technique of density mapping is being used. Density mapping using Geographic Information Systems displays, on an interval scale, areas from high-density subsistence use to low. The power of these maps lies in their ability to allow decision makers to rate a project’s desirability based on its potential to disrupt subsistence activity. During year three of this seven-year project, 1,706 interviews were conducted with 546 people in six indigenous Alaskan and Russian villages bordering the Bering Sea. Communities included Sand Point (Unangas), Togiak (Central Yup’ik), Gambell (Siberian Yupik), Kanchalan (Chukchi), Tymlat (Koryak), and Nikolskoye (Unangas). These data can facilitate the mapping of harvest locations, and also allow researchers to spatially explore the effects of climate change to subsistence activity and resulting adaptations.

## **Integrating Local Traditional Knowledge and Subsistence Use Patterns with Aerial Surveys to Improve Scientific and Local Understanding of Iliamna Lake Seals**

**Jennifer Burns**

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In response to concerns about the absence of information on the status of the seals found in Iliamna Lake, the tribal communities of Iliamna, Kokhanok, and Newhalen, in partnership with Bristol Bay Native Association, University of Alaska Anchorage, Alaska Department of Fish and Game (ADFG), and NOAA have joined together. In partnership, we have gathered baseline information on seasonal shifts in abundance and distribution of the unique freshwater seal population inhabiting Iliamna Lake, and documented subsistence use patterns and local traditional knowledge (LTK) from communities that traditionally harvest seals from the lake.

To assess local harvest levels and changes in subsistence use patterns, local research assistants conducted subsistence household surveys and key respondent interviews in 2010 and 2011. These data were compared to subsistence household surveys (SHS) data collected by ADFG in 2004 and 2005. Traditional knowledge about seal abundance and habitat use was also compared with that obtained through aerial surveys flown periodically throughout the year (prior to spring ice breakup, during seal pupping and molting periods, and prior to fall ice formation).

Aerial surveys suggested that seal abundance and use of the lake is highly variable seasonally, a pattern that was not noted in villager surveys. Therefore, this project will now work with communities to integrate western and local knowledge, so that an accurate synthetic understanding of the role of seals in the human and lake ecosystem can be developed. This integration is part of an ongoing effort to understand how the variations in environmental and socioeconomic conditions impact everyday life in indigenous communities in Alaska.

## Representation of Ethno-ecological Knowledge in Native Language Dictionaries

**Benjamin Blount**

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The description of the ecological knowledge of a social or occupational group is typically through ethnographic research, involving extensive interviews, creation of texts, and identification and description of knowledge through keyword analyses. Content models of varying degrees of formality are the expected outcome. The indication that ecological information is shared among individuals is the common presence of a keyword that refers to domain-based content, as for example types of habitat, types of diet, and life-stages. Collectively the keywords of a language that name the major ecological concepts serve to reference the local ecological knowledge.

Similarly the lexical entries in dictionaries, especially nouns, can be seen as keywords that label the knowledge basic to the speakers of given languages. Dictionary construction occurs through procedures much like ethnography, in which selected texts are analyzed to identify core terms (keywords) and their meanings. Categorization of dictionary keywords into ecological categories, or domains, then could be expected to provide an approximation of an ethno-ecological model. This presentation will give results for lexical/keyword analyses of selected indigenous languages of Alaska, utilizing extant dictionaries. The focus will be on fishing knowledge and practices.

The value of the ethno-ecological documentation lies in a demonstration of the usefulness of ethno-ecological knowledge already recorded in dictionaries, how dictionaries can be seen as recordings not only of words but of culture, and how local experiences of indigenous peoples can be recorded at particular points in time as baselines for understanding changes that lead to altered ethno-ecology. Documentation of the importance of fishing will be especially important.

## **Intertidal Invertebrate Declines in Southern Alaska: Traditional Knowledge and Traditional Management**

**Henry P. Huntington**

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**Nick M. Tanape Sr.**

Native Village of Nanwalek, Alaska

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The black leather chiton (*Katharina tunicata*, known locally as the bidarki) is an important subsistence resource for Sugpiaq (Chugach Alutiiq) peoples on the lower Kenai Peninsula of Alaska. Reports of declining abundance were investigated using ecological field methods, confirming local depletions. Traditional knowledge provided a historical context for these declines, including rising sea otter populations and changes in human behavior. In the course of this collaborative study, residents of the villages of Port Graham and Nanwalek also described traditional management practices for bidarkis and other marine resources. This presentation will review the study's origins, methods, inclusion of local residents, and analyses to illustrate a pattern of serial decline in intertidal species sought by both humans and sea otters. This story is the backdrop for local efforts to restore traditional practices to sustain subsistence resources. The study's results, particularly local perspectives on ecology and traditional management practices, are also documented in a book, *Imam Cimiucia*, published in 2011 by Alaska Sea Grant.

## Protecting Salmon Habitat on Alaska Native Corporation Lands

**Tim Troll**

*Nushagak-Mulchatna/Wood-Tikchik Land Trust, Dillingham, Alaska*

**Marcus Geist**

*The Nature Conservancy in Alaska, Anchorage, Alaska*

**Jerry Liboff**

*Koliganek Natives LTD, Dillingham, Alaska*

**Herman Nelson**

*Koliganek Natives LTD, Koliganek, Alaska*

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Authors will describe strategy to integrate traditional ecological knowledge and scientific methods for assessing salmon habitat to create a tool that Alaska Native corporations can use for planning development and conservation on their lands. Authors will describe work with the Native Village of Koliganek, the creation of a private salmon reserve on 90,000 acres of the Koliganek Village Corporation lands, cooperative efforts to purchase and protect private parcel inholdings on village corporation lands, and the long-term outlook for conservation of salmon habitat on Alaska Native corporation lands.

## **Gitxaala Nation's Seal Fishery: An Indigenous Approach to Harvest**

**Charles R. Menzies**

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For many urban North Americans and western Europeans seals are anthropomorphized and represented as infant-like. Seals are, for these nonindigenous people, one of a prestigious set of green icons in the arena of animal rights struggles. For Gitxaala people, however, seals are food. Seals form a critical component of the diet of Gitxaala people living in the traditional home village. This paper documents and describes the contemporary Gitxaala seal fishery within its own historical and social context. Reference is made to the conservation values of the Gitxaala approach.

## **Implementing Traditional Resource Management Practices in Today's Community**

**Timothy Bailey**

*National Park Service, Kula, Hawaii*

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Native Hawaiians cannot relinquish their responsibility for the health of their environment. The responsibility is clearly acknowledged in tradition and traditional concepts. Even though weakened through benign neglect, condescension, and oppression, the Native Hawaiian community carries on the tradition of responsibility for their land and ancestors. The holders of traditional practices have formed communities identified as kipuka, a Hawaiian term for an island of land that is formed when new lava encircles land and leaves an island of mature native vegetation and indigenous species that repopulates the new lava flow. The Puwalu conference series brought these holders of traditional knowledge together to discuss their disappointment in the current resource management regime and how to implement a natural resource management regime based on traditional practices.

The Aha Moku system of traditional natural resource management was identified, defined, and acknowledged through a series of conferences from 2006 to 2010. The first conference involved Native indigenous practitioners—Ho`ohanohano I Na Kupuna Puwalu series (Honoring the ancestors) and finished with a conference that invited public participation—Ho`olei la Ka Pae `Aina Hawai`i (Casting the net, bringing everyone together in Hawai`i). The first series served to identify practitioners and practitioner communities, identify traditional practices, and define traditional resource management practices. The second series of conferences served to engage the broader society in the traditional resource management discussion and gained broad support from the general public. Throughout the process community engagement was carried on by dedicated individuals disseminating information and engaging the public in a dialogue about traditional practice and natural resource management. This process was essential to development and promotion of the initiative. This presentation is about the community engagement initiative as conducted on the island of Maui, and the difficulties and successes of the initiative.

## Customary Exchange Maintains Cultural Continuity

**Richard Seman**

*Western Pacific Regional Fishery Management Council, Honolulu, Hawaii*

**Craig Severance**

*University of Hawaii, Hilo, and Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, [sevc@hawaii.edu](mailto:sevc@hawaii.edu)*

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For many generations, the people of the small Pacific islands have managed to conserve and protect its marine resources utilizing traditional means. Through traditional practices, generations after generations were able to learn and practice such conservation measures and the resources have been harvested for the community sustainably. An important fishing tradition in the Mariana Islands is sharing the catch. Every indigenous fisherman from the islands goes out fishing with the intent of sharing his or her catch upon return. *Peskadot* is a term used to describe a seasoned fishermen who has fished and given his catches to the community.

Many of our small boat fishermen fish in order to share and to give fish at a variety of cultural and ceremonial occasions. Often, the stimulus to make a trip on the deep ocean is an upcoming party, social obligation, or cultural event where fish is a desired or expected contribution. Commercially licensed fishermen also share a significant portion of their catch. Even if there are no ceremonial obligations, fishermen often give a portion of their catch to friends and neighbors with no real expectation of return.

Chamorro and Refaluwasch in the Commonwealth of the Northern Mariana Islands (CNMI), and others who live in these islands and have been influenced by these cultures, expect to have fish at important cultural occasions and rely on fishermen to provide those fish for the benefit of all the participants. More generally, the concept and practice of customary exchange better explains why we fish, why we spend what we do, and why giving and sharing fish is so important for us in the Western Pacific Regional Fishery Management Council region. It also shows that the Magnuson Act's clear distinction between purely commercial (defined as the sale, trade, or barter of even one fish) and purely recreational fishing without having a subsistence or cultural fishing category creates real problems for our region.



## **Traditional Access and Practice Enhance Social Cohesion and Cultural Values**

**Arnold Palacios**

*CNMI Division of Fish and Wildlife, Saipan, Commonwealth of the Northern Mariana Islands, [aipalacios@yahoo.com](mailto:aipalacios@yahoo.com)*

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The Mariana Archipelago has had a long history of occupation and colonization. In the face of that history maintaining Chamorro and Refaluwasch culture is difficult. Colonialist history changed the indigenous politics, government, social structure, and economics. Colonialism is imperialist, creating and maintaining a set of unequal relationships between the colony and the indigenous population. In that history indigenous practices and knowledge are maligned and become lost. Many of those practices served to protect and ensure the survival of the indigenous population for many thousands of years by husbanding, conserving, and exploiting a specific collection of naturally occurring resources for the benefit of the community. Managers and the community are trying to implement those practices into the current natural resource regime so a greater understanding of the resources and practices related to those resources can continue to enhance and benefit the community. Currently, traditional access to harvest juvenile manahak, ti'ao, and i'i in closed areas around Guam is granted through a process involving the village mayors, Mayors Council of Guam, and the Department of Agriculture. This is the result of public discussions and agency actions supported by the Council. While there is no policy in place governing this action, there is a record of action and precedent that could be used to maintain this practice.

In Saipan the community and the CNMI Department of Land and Natural Resources have developed a process to provide an exemption to allow the practice of chenchulun, traditional fishing using a surround net. Many traditional fishing practices around the Pacific are community activities. The exemption is given in support of a community festival or church activity. The catch is distributed to the community. The activity is monitored and the fishery and biological data are recorded from the activity. Along with scientific information, social cohesion through customary exchange is enhanced and cultural values are maintained. This presentation will discuss the history and value of this activity and how it may help in understanding traditional practices in natural resource conservation, management, and exploitation.

## Local Subsistence Fisher Input for In-season Salmon Management on the Kuskokwim River

**Eva Patton**

Orutsararmuit Native Council, Bethel, Alaska, [epatton@nativecouncil.org](mailto:epatton@nativecouncil.org)

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The Kuskokwim area subsistence salmon fishery is one of the largest in Alaska. More than 2,000 households in the Kuskokwim area annually harvest salmon for subsistence use. Many households not directly involved in catching salmon assist family and friends with processing fish. From June through August, the daily activities of many Kuskokwim area households revolve around harvesting, processing, and preserving salmon for subsistence use. Time at family fish camps has been, and remains, an important part of Kuskokwim River subsistence activities.

The Orutsararmuit Native Council in collaboration with the Alaska Department of Fish and Game has been conducting weekly summer surveys of Bethel area subsistence salmon fishers at family fish camps in the lower Kuskokwim River since 2001. The project was developed in an effort to address local subsistence management concerns for salmon declines and to ensure local input in the fisheries management process. Data collected from these surveys is used to qualitatively assess salmon run timing, fishers' success in achieving their subsistence harvest goals, and other associated fish harvest and environmental details. Summaries of the surveys are relayed to fishery managers and reported at Kuskokwim River Salmon Management Working Group meetings on a weekly basis throughout the Chinook, chum, and sockeye run past Bethel. The in-season subsistence survey information is used in conjunction with other monitoring projects to provide an early assessment tool of salmon run strength, timing, and subsistence harvest trends. This program enhances management through local fisher input on the evaluation of salmon health, abundance, and corresponding management strategies.

## **Community Involvement in Characterizing Biological Composition of Kuskokwim River Chinook Salmon Subsistence Harvest**

**Douglas B. Molyneaux and Chris Shelden**

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The average annual Chinook salmon subsistence harvest in the Kuskokwim River is 90,000 fish, which accounts for about half of the total subsistence Chinook harvest in Alaska. This harvest constitutes a large fraction of the total annual Chinook run to the Kuskokwim River, where subsistence is a core part of local culture and way of life. Subsistence harvest practices tend to be selective for larger Chinook salmon, which include older aged and female fish. Informed management decisions, whether in regard to harvest or assessing the quality of the spawning population (escapement), requires a clear understanding of the age, sex, and length (ASL) composition of the subsistence harvest. Effective collection of this data benefits from active involvement of subsistence fishermen and their families through a partnership between the Alaska Department of Fish and Game and Orutsararmuit Native Council. Our approach has proven to be an effective method for data collection, and has become a model for similar data collections elsewhere in Alaska.

## **Invited Talk: Controlling Interests in Out-of-Control Places: Challenges to Resource Governance in the North**

**Bonnie McCay**

*Rutgers University, Department of Human Ecology, New Brunswick, New Jersey*

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The dominant institutions for governance and resource management in northern regions—Arctic and subarctic—are “controlling interests” in that they have evolved around the authority of central governments responding to interest groups inside and outside of government, tempered by efforts to incorporate scientific and indigenous knowledge into decision-making. The problem in many parts of the North today is that climate change and attendant environmental and socioeconomic consequences pose new risks and challenges, creating situations and places that are increasingly difficult to control under the reign of controlling interests. It is an old problem: mismatch, inertia, lag, resistance to change, exacerbated by scientific uncertainty and by competition among governments and industries for greater control of places newly open to transport and exploitation, but equally “out-of-control.” What and where, then, are signs of “adaptive governance” in the North? Glimmers can be seen among indigenous groups and resource-dependent individuals and communities resisting or working “under the radar” of controlling interests. They may also be found in resource management programs that create openings for innovation or that build on customary and creative ways of producing and sharing knowledge and resources. Control, such as it is, may be highly localized and transient, but that may be the point when adapting to out-of-control situations.

## **Traditional Fishing and Problems of Legal Regulations of Local and Indigenous Peoples' Access to Aquatic Biological Resources**

**Victoria N. Sharakhmatova**

*Ethno-Ecological Information Center, Russian Association of Indigenous Peoples of the North, Petropavlovsk-Kamchatky, Russia*

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According to the Russian Federation Constitution all natural resources, including land or fish, must be used as the basis livelihood for indigenous (local) populations inhabiting the territory of the natural resource. Within the large complex of legislative regulation of fishing and preservation of aquatic biological resources, a dramatic situation is observed in access to aquatic biological resources of indigenous peoples and the local population for personal consumption and for their economic activities.

Numerous complaints and petitions by citizens, organizations, and indigenous communities of northern Siberia and the Far East, about violations of rights for priority access to fishing grounds and water resources, are fielded by federal and regional authorities and in the mass media.

The Fisheries Law artificially divided the population into those who are entitled to receive fishing quotas for their own use for free (indigenous peoples), and those who have no such right (locals not belonging indigenous peoples although they live in similar conditions). Thus, we have created an environment leading to the emergence of social and ethnic tension in areas inhabited by indigenous peoples. Competitive distribution of fishing grounds has pushed a sharp increase in the number of indigenous communities.

It is quite possible to link poaching prevention with community development and meaningful incentives for sustainable use. The "Community Development Concept for Indigenous Communities on the Base of Using Fish Resources" idea can be promoted as one that gives local people an incentive to follow and enforce fishery management laws.

## **Community Interpretations of Fishing Outside Legal Regulations: A Case Study from Northwestern Russia**

**Maria Nakhshina**

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Economic reforms of the 1990s in Russia have made the question of access to local resources a crucial aspect of people's everyday existence. In rural areas, this question is often closely connected to the sense of belonging to place. This paper explores the connection in a context of post-Soviet transition in a coastal village in northwestern Russia. Salmon fishing is the main occupation in the village and salmon is the most valuable local resource. Official forms of fishing management in the area have habitually coexisted with informal ways of regulation. This presentation deals with the informal aspect of fishing management via two interrelated issues: first, it looks at the variety of people's attitudes to salmon fishing depending on the length and regularity of their stay in the village; and second, it looks at informal ways of negotiating entitlement to fishing resources. It focuses on how people reify and manipulate their sense of belonging to place by ascribing place-related identities to themselves and others in their everyday conversations in order to regulate access to salmon fishing. It looks in particular at the difference between local people and incomers regarding their interpretations of fishing outside legal regulations. It shows that people's understandings of illegal fishing are situational and depend on the type of their engagement with place.

## The Western Alaska Community Development Quota (CDQ) Program: Supporting the Advancement of Bering Sea Communities

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The Western Alaska CDQ Program is widely viewed as one of the most successful rural development programs ever undertaken in Alaska. Established by the North Pacific Fishery Management Council in 1992, this innovative federal community and economic development program provides 65 eligible communities with a 10% share of the Bering Sea Aleutian Island (BSAI) commercial fisheries. The goal of the CDQ Program is to encourage fisheries-related economic development in rural western Alaska communities, helping to build the infrastructure to support long-term participation in the fishing industry. For nearly 20 years, residents of western Alaska, through six nonprofit CDQ entities or community coalitions, have implemented the CDQ Program in an effort to overcome the geographic isolation, heavy reliance on subsistence, high cost of living, high unemployment, and limited economic opportunities that make this area one of the most economically challenged in the United States. The CDQ entities work independently and through partnerships to generate revenues from the BSAI commercial fisheries, which make it possible to invest in community, human, and economic capital. By balancing these investments, eligible communities are provided the right mix of resources and assets to achieve future economic sustainability, which will give residents more control over their economic future. The presentation will highlight successes realized through the CDQ Program; illustrate the positive impacts of CDQ investments, programs, and jobs to member villages; and discuss how CDQ entities are responding to the ongoing and future challenges faced by western Alaska.

## **Economic Transition in Western Alaska: Salmon Fishery and Emerging Groundfish Fishery Dependence**

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Many western Alaska communities have traditionally depended on salmon resources that support commercial and subsistence fisheries. Those traditional salmon fisheries have been a primary income source and have provided necessary funds to support subsistence harvest activities that ensure the primary food supply. However, many western Alaska salmon run fisheries have experienced economic disasters in the past and several salmon fisheries are now restricted or closed due to poor in-river returns. Some decline in salmon runs is thought to be affected by high-seas bycatch of salmon in the federally managed groundfish fisheries.

In 1992, the Community Development Quota (CDQ) Program within federal groundfish fisheries of the Bering Sea and Aleutian Islands (BSAI) was enacted. This program established six regional CDQ holding entities, representing 65 communities within 50 miles of the Bering Sea, and allocated to them a portion of BSAI groundfish and crab harvest. Revenue earned by CDQ entities has led to increased ownership of harvesting and processing assets in the BSAI groundfish fisheries. In addition, the CDQ entities have utilized CDQ-derived revenues to make infrastructure investments, provide employment training, and provide scholarships within their region.

This paper explores economic dependencies on western Alaska salmon fisheries, CDQ program effects on regional economies, and emerging differences between views of traditional salmon-based commercial and subsistence users and views of CDQ-based groundfish beneficiaries. This analysis is conducted within the context of past Chinook salmon Prohibited Species Catch (PSC) actions and ongoing chum salmon PSC actions in the BSAI CDQ and non-CDQ pollock fisheries.



## **Alternative Visions for Fisheries Governance: The Rights of Individuals Versus the Interests of Communities**

**Keith R. Criddle**

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At the heart of debates over the consequences of alternative governance structures in fisheries is the ageless philosophical dispute regarding the supremacy of the rights of individuals or the supremacy of the rights of societies in which they reside: are fishermen endowed with an unalienable right to dispose of their catches or are those rights circumscribed by the rights of fishery-dependent communities or other social constructs? This dispute has been sharpened by the emergence of governance regimes that limit entry and even more so by the emergence of governance regimes that create individual or collective rights to options to harvest dedicated shares of a fish stock. This paper reviews the legal basis of fisheries management in the U.S. EEZ (Exclusive Economic Zone). That review is used to provide context for an examination of how the choice of governance structures affects the preeminence of individual liberty or social contracts and in turn affects the magnitude and distribution of benefits. The rancor of disputes over the evolution of governance structures is found to be correlated with the magnitude of windfall benefits attributable to the change.

## **Resolving the Policy Dilemma Posed by a First Nation's Right to First Access in a Regionally Managed Fishery**

**Martin Robards**

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Around the world, indigenous people are struggling to attain control of their traditional resources, to use that control to enable higher standards of living, and at the same time retain and reinvigorate traditional values, knowledge, and beliefs. However, national or state/provincial resource law and policies, combined with global markets and economic trends, can make participation in resource industries difficult. In Canada, the Supreme Court's decision in *Regina v. Gladstone* focused attention on the unextinguished right of the Heiltsuk people (Central Coast of British Columbia) to engage in their traditional commercial herring spawn-on-kelp fishing practices, to benefit from that fishing, and to have priority access to the herring resource. This posed a policy dilemma about how to integrate the local allocation of resources to a First Nation into a long-standing, centralized management system not designed to achieve this. Resolution of the dilemma is far from trivial and is widely relevant, where the rights of indigenous groups have been upheld but have not been adequately reflected in federal revisions to fisheries management approaches. Resolution of such dilemmas requires concerted interdisciplinary efforts that incorporate the social, cultural, and economic drivers of demand with the ecological limits to supply, and the blending of Western scientific, local, and traditional knowledge. In this presentation, I discuss the results of an interdisciplinary and cross-cultural workshop focused on resolving the policy dilemma presented by the *Regina v. Gladstone* decision.

## Testing the Robustness of Institutional Design with Alaska Ocean Policy Decision-Makers

**Chanda Meek**

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**Sharman Haley**

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Institutionally neglected for many years, ocean policy is once again on the agenda of the American federal government. The aim of the recent Interagency Ocean Policy Task Force is to establish a vision, purpose, and plan for more carefully managing human uses of the oceans in the United States. Under the plan, each of nine coastal regions would house a coordinating body to self-organize an institutional venue and create marine spatial plans for the ocean. However, given the considerable unknowns in future Alaskan ocean uses, it is unclear which configurations of rules, authorities, and partnerships would create the most robust venues for decision-making under conditions of uncertainty.

In this presentation, we outline the process and preliminary findings of an experimental workshop with federal, state, and regional governments as well as tribal marine mammal co-management partners in visioning and evaluating institutional design for robustness. Institutions for mediating conflict between industrial and subsistence uses of the sea were highlighted. Drawing on the fields of democratic theory and institutional analysis, we developed a template for evaluating five institutional designs. Venue designs differed through the following characteristics: purpose, lead actors, network characteristics, empowerment of stakeholders, nature and frequency of deliberations, and reflexivity. Workshop participants examined how well the designs were likely to achieve goals of democratic process and robustness to a suite of disturbances, as well as their administrative feasibility.

## **Economies of Interdependence: Subsistence Salmon Harvests and Risk-Sharing in Kamchatka, Russia**

**Drew Gerkey**

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This presentation examines the cultural norms, values, and institutions that guide the production and circulation of salmon in rural villages in northern Kamchatka. Since the collapse of the Soviet state economy, people in these villages have come to rely on seasonal salmon harvests to provide food and income for their families. As in other parts of Siberia and the Circumpolar North, a balance exists between subsistence production and the limited market opportunities available in Kamchatka's formal and informal economies. This way of life entails a number of risks, stemming from unpredictable fluctuations in post-Soviet social and ecological contexts. Frequently, individuals and communities experience difficulties that disrupt access to natural resources and monetary income. People adapt to these difficulties by sharing risk in a variety of ways: coordinating subsistence production with other families, transferring food between households, and lending money informally. One goal of our project is to understand how these risk-sharing practices respond to varying levels of social and environmental change. This knowledge should help us anticipate and assess the challenges posed by climate change, fluctuations in fisheries abundance, debates over natural resource management, and plans for economic development. After I examine ethnographic and ecological contexts in Kamchatka, my colleagues will present preliminary results of field experiments that we conducted in Kamchatka and make connections to previous research and future projects in Alaska.

## Is Sharing an Effective Tool to Improve Cooperation and Smooth Consumption in a Social Dilemma? Evidence from Kamchatka, Russia

**E. Lance Howe and James J. Murphy (presenter)**

*University of Alaska Anchorage, Anchorage, Alaska*

**Drew Gerkey**

*University of Washington, Department of Anthropology,  
Seattle, Washington, [gerkey@u.washington.edu](mailto:gerkey@u.washington.edu)*

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Much of the discussion about motivation for food sharing among hunter-gatherer societies focuses on explanations, such as kin selection, mutualism, or costly signaling (among others), yet there is little discussion about the extent to which food sharing may be used to facilitate higher levels of cooperation by rewarding pro-social behavior. Sharing may also be an effective tool to smooth consumption in risky environments.

To test hypotheses about sharing as a mechanism to improve cooperation and to smooth consumption, we are presently in the midst of completing a series of social dilemma experiments in rural areas of Kamchatka, Russia. The field experiments will be completed in June, with results available to be presented at the conference.

## NOAA's Voices from the Fisheries Oral History Project

Theme 1 • Human-Environment Relationships

**Susan Abbott-Jamieson**

*NOAA Fisheries, Office of Science and Technology, Silver Spring, Maryland*

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*Voices from the Fisheries* (VFF) is a web portal for accessing first-hand accounts of the human connection with our nation's and territorial coasts, marine environment, and living marine resources, and with those of our Great Lakes. The site serves as a "one stop shop" for everyone interested in learning more, locating resources, and developing new oral history projects. More than 350 interviews are already available, and many more will be added in the months and years ahead. Examples of resources on the site are the VFF Database and a search engine for locating interviews, podcast exhibits drawn from individual interviews organized by theme, instructions for donating copies of existing collections, guidance for developing new fisheries oral history projects, and links to related websites with over 1,000 additional interviews and key resources.

Concerned that oral histories related to the human experience of marine fisheries were not being conserved and were difficult to access, staff of the NOAA National Marine Fisheries Service (NMFS) initiated the project with agency funding. Original VFF Project partners were the Working Waterfront Festival in New Bedford, Massachusetts; MIT Sea Grant, Massachusetts; Rutgers University, New Jersey; and the Commercial Fishermen of America. Stop by and find out more about the project. Learn how you can make sure the experiences, knowledge, and cultures—the *voices*—of Alaskans and other northern peoples, whose lives are shaped by their relationship to the marine environments, are preserved. Take a look at the *Voices from the Fisheries* website at <http://www.voices.nmfs.noaa.gov>.

## **A Case Study: Social and Cultural Dimensions of the Kodiak Island Salmon Fishery**

Theme 1 • Human-Environment Relationships

**Lacey J. Berns**

*Humboldt State University, Environment and Community Program, Arcata, California*

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The Alaska salmon industry was declared a statewide, economic disaster in 2002, after a decade of declining prices for wild salmon. Coastal communities, highly dependent on the largest fishery in the state, experienced a decade of rapid change as evidenced by the attrition rate of fishermen and vessels out of the fishery and the consolidation of the processing sector.

The drop in prices displaced thousands of salmon fishermen, as permit and vessel values declined. Within ten years, the economic viability collapsed. While the economic impacts have been recognized (Alaska Salmon Industry Baseline Study 2003) there is little documentation about the social, cultural, and human impacts on the harvesters, their families, and communities. In order to better understand the nature of this critical event that spanned more than a decade, this paper explores the complexities of the Kodiak salmon fishery from 1991 through 2002, as a “point in time.”

Several frameworks of assessment are utilized: a place-based ecosystem model and capital-based approach to analyze fishery. Additionally, extensive and personal interviews of longtime Kodiak salmon fishermen provide a first-time, reflective commentary about the disaster. Interviews indicate a deep attachment to their way of life and their fishing livelihood, and strong connections to friends and “sense of place” despite severe obstacles. Cultural aspects such as legacy, tradition, and values are also at risk because of the uncertainty and instability of the fishery.

The disintegration of the most fishing-dependent community and its imbalance of “capital” leaves the future of the salmon fishery questionable. There is no evidence to predict the return of over 200 salmon vessels and permits into the fishery again. Given the evidence, this documents for the first time the sustainability of the fishery and the importance of understanding forms of “capital” within the community.

## **Simple Words of Water and Lands: Subsistence Salmon Fishing and Federal Law in Bristol Bay, Alaska, 1867 to Present**

Theme 4 • Governance and Management Issues in the North

**Johanna Blume**

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Subsistence fishing in the Bristol Bay region of Alaska has persisted for centuries, changing with time and technology but remaining central to the culture and economy. This poster, based on a master's thesis, examines effects of federal legislation on subsistence salmon fishing in Bristol Bay. Looking at conflicts over natural resources through the lens of Alaska statehood, the Alaska Native Claims Settlement Act, the Alaska National Interest Lands Conservation Act, and the Community Development Quota program within the Magnuson-Stevens Act, the poster analyzes how each of these federal laws treated subsistence, and how members of the Bristol Bay community viewed them. For the residents of the region, and Alaska Natives in particular, Alaska statehood, ANCSA, and ANILCA profoundly affected the aquatic resources of the region and commercial, subsistence, and sport fisheries of the area that made use of those resources. Subsistence fishing in particular, a fundamental aspect of life in Bristol Bay, suffered under federal legislation that ignored it, prohibited it, or failed to address the particular nature of salmon. Interviews, legislative history, law review articles, agency technical papers, and historical and anthropological sources examine the effects of each federal law at the national, state, and local level, and the poster analyzes how subsistence users fared compared to other fishing interests. Lessons from the creation of the CDQ program, advocated by local interests, inform concluding observations about the core role of salmon in the region, and the potential for competing interests to join forces against threats to this iconic resource.



## Sharing as Risk Pooling in a Social Dilemma Experiment

Theme 4 • Governance and Management Issues in the North

**Todd Cherry**

*Appalachian State University, Boone, North Carolina*

**E. Lance Howe (presenter) and James J. Murphy**

*University of Alaska Anchorage, Anchorage, Alaska*

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Incomplete insurance and credit markets are common features of remote rural regions in high and low-income countries alike. Consequently, households have developed a variety of informal mechanisms to protect against idiosyncratic risk, and a large literature tests the efficiency of various informal insurance arrangements that include risk-sharing mechanisms such as reciprocal credit, bequests, and gift exchange. This paper tests whether a simple sharing institution can sustain risk pooling in a social dilemma with idiosyncratic risk. We find that even in the absence of a strong commitment device, subjects voluntarily pool risk thereby reducing variance in individual earnings. Under certain conditions, the sharing institution also facilitates increased cooperation in a social dilemma, which is consistent with innovation type spillover effects from social learning. We also find that the history of group sharing is important in sustaining sharing.

## The Northern Bering Sea: Our Way of Life

Theme 3 • Indigenous and Rural Knowledge and Communities

### Dorothy Childers

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During a series of exceptionally warm years (2000-2005), the winter sea ice extent was reduced in the Bering Sea and 45 fish species shifted the center of their distribution northward. In 2007 federal fishery managers established a northern bottom trawl boundary as a precautionary measure to prevent movement of fleets northward beyond their current footprint. The NOAA Alaska Fisheries Science Center was also asked to develop a Northern Bering Sea Research Plan to consider the potential effects of bottom trawling in the region. If trawling is permitted in the future, fishery managers will first consider protections for marine mammals, crab, Endangered Species Act (ESA) listed species, and subsistence.

The Bering Sea Elders Advisory Group, consisting of 39 tribes from throughout the region, collaborated with the Alaska Marine Conservation Council to create maps of subsistence use in the Northern Bering Sea Research Area and habitats important for the species that tribal communities rely on. The purpose was to show the extent of culturally and ecologically important areas. The maps can inform fishery management decisions and support development of a long-term conservation regime that is responsive to traditional tribal values.

Our report, *The Northern Bering Sea: Our Way of Life*, presents maps for walrus, seals, whales, fish, and eiders compiled from the Cenaliulriit and Bering Strait Coastal Resource Service Area publications, interviews with elders and active hunters from 18 tribes, and scientific data on species distribution. The report provides cultural dimension to the maps through excerpts from project interviews and traditional knowledge documents.

## Kolarctic Salmon: Merging Modern Science with Traditional Knowledge to Improve Management of Atlantic Salmon in the Barents Region

Theme 1 • Human-Environment Relationships

**Bente Christiansen and Tiia Kalske** *The County Governor of Finnmark, Vadsø, Norway, [bch@fmfi.no](mailto:bch@fmfi.no), [thk@fmfi.no](mailto:thk@fmfi.no)*

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The Kolarctic ENPI CBC project “Trilateral cooperation on our common resource: the Atlantic salmon in the Barents region (KO197)” aims to merge modern science with traditional salmon fishing knowledge to create a future sustainable, long-term and knowledge-based salmon management regime for the common Atlantic salmon stocks of the Barents region. The border areas between Norway, Russia, and Finland have unique natural qualities and natural resources. The Atlantic salmon is a symbol of healthy and vital ecosystems and is of significant economic and cultural importance, both through commercial and recreational fishing. Fishing for Atlantic salmon has a long tradition in the area, as evidenced by a unique vocabulary about the species in the Sami language, and the existence of a large number of traditional fishing methods. The project is a joint venture between management, research, salmon fishing organizations, and salmon fishermen in the participating countries.

Aims of the project are to develop an integrated, long-term management of Atlantic salmon in the northernmost distribution area of the species; to provide data to implement customized, sustainable, knowledge-based harvesting regimes; to preserve the rich traditions of fishing and coastal culture; to unite empirical knowledge (local and traditional) with scientific knowledge; and to provide synthesized and new knowledge about Atlantic salmon, its adaptation to climate change, and its migration along the coast. We will also leave a legacy of active cooperation and dialogue among management, various research disciplines, sea salmon fishing organizations, and local fishermen.

## Investing in Higher Education—Near and Far—Can Contribute to Alaska’s Fishing Community Sustainability

Theme 1 • Human-Environment Relationships

### Flaxen D.L. Conway

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Young adults in Alaska’s fishing community possess two critical components for the sustainability of their community. First, they care deeply about Alaska and its resources. Second, they feel a profound connection to the fishing community. Yet they find themselves facing the challenge of how to help their fishing community transition to a sustainable future. Once completing their undergraduate degree—often in Alaska—many head to the Lower 48 to get graduate degrees and the skills needed to execute their plan to return. This paper shares an example of a young Alaska fisherman who did just that: his history, his experience, his education and research at Oregon State University studying the vulnerability of fishing communities to climate change and variability, and now his job with an Alaska seafood company. In short, walking proof of how investing in higher education—near and far—can contribute to Alaska’s fishing community sustainability.

## The Kvichak Watershed Subsistence Salmon Fishery: An Ethnographic Study

Theme 1 • Human-Environment Relationships

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**Karen Evanoff** *National Park Service, Anchorage, Alaska*

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This poster highlights the methods and findings of an ethnographic project that investigated how families in four communities of the Kvichak District (Iliamna, Newhalen, Nondalton, Port Alsworth) of the Bristol Bay Management Area of southwest Alaska developed subsistence fishing strategies, such as when to fish, where to fish, who to fish with, and how much to harvest, in response to changing sociocultural, economic, and environmental circumstances. Research methods included participant observation at fish camps, key respondent interviews, family case studies, and systematic household surveys. The report describes examples of summer subsistence fishing for sockeye salmon, examples of subsistence fishing in the fall for spawning sockeye salmon, and a review of seine net use as a subsistence sockeye salmon fishing method at Nondalton. The project concluded that the subsistence fishery is vital to the way of life of the communities, and is accomplished in an efficient and sustainable manner informed by traditional knowledge. Annual and long-term variations in the fishery are shaped by a complex set of environmental, economic, cultural, and personal factors. Also, findings based on household surveys and permit returns suggest that relying solely on permit returns results in an underestimate of subsistence sockeye salmon harvests. Additional outreach is necessary to encourage households to obtain permits and keep accurate records of their harvests.

## **Alaska Department of Fish and Game, Division of Subsistence: Updated Overview of Its Research Program and Findings**

Theme 1 • Human-Environment Relationships

**James A. Fall**

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The Division of Subsistence, Alaska Department of Fish and Game, was created by the Alaska Legislature in 1978 to compile data and conduct studies “on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the state” (Alaska Statute 16.05.094). The division’s applied social science research program includes systematic household surveys, mapping of harvest areas, harvest monitoring and assessment, key respondent interviewing, and participant observation. The types of information collected range from harvest estimates, harvest locations, demographic data, and sources of cash income, to oral histories, traditional knowledge, and social networks. Most studies are conducted through partnerships with study communities, such as hiring and training local research assistants and incorporating community reviews into final reports. Final products include reports in the division’s Technical Paper Series and Special Publications Series, as well as two databases: the Community Subsistence Information System and the Alaska Subsistence Fisheries Database. A primary goal of the research is to inform Alaska’s fisheries management process. The poster will describe the division’s research methods, and provide examples of study results including a recent update of statewide patterns of subsistence fisheries harvests. The intent is to promote awareness and discussion of the division’s program to explore the symposium themes of the role of social science research in understanding the continuing and changing role of fishing in the economies and ways of life of northern communities.

## Linking Local and Global: Working Together with One Mind

Theme 3 • Indigenous and Rural Knowledge and Communities

**Ann Fienup-Riordan, Mark John, and Alice Rearden,**

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Work with Yup'ik elders in southwest Alaska provides a unique nearshore perspective on the Bering Sea. While oceanographers attempt a comprehensive understanding of the ocean, from the surface to the seafloor, Yup'ik hunters are most concerned with surface features of the water and ice cover that impact hunting success and travel safety.

Yet coastal Yup'ik residents also see the ocean as an integral part of *ella*, a word they translate as weather, world, universe, and awareness, depending on context. The emerging question that concerns both Yup'ik and non-Yup'ik ocean observers is: how can we link local observations with large-scale environmental issues?

## Historical Ecology Model for the North Slope Coastal Region of Alaska

Theme 1 • Human-Environment Relationships

**Anne Garland, Kathleen Fischer, Lloyd Mitchell, and Susan Lebo**

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Applied Research in Environmental Sciences Nonprofit, Inc., ARIES, and the Barrow Arctic Science Consortium, BASC, are collaborating to plan, develop, and implement a historical ecology model for the North Slope Coastal Region of Alaska. Historical ecology is an applied research program that focuses on the interaction of people and their environments. Research applications involve studying and understanding this relationship in both time and space in order to gain the long history of its accumulated effects. The research program can be applied to understanding changes among community landscapes from past to present that can assist strategies for the future. For this poster the emphases align with the ARIES mission that combines research, education, and community outreach. The emphases are (1) a bibliographic database of relevant historical resources; (2) an examination of the shoreline to provide a time-series baseline; (3) simulation models to demonstrate socio-natural cycles of change for the North Slope shoreline; (4) the historical ecology study of the shoreline, interactive mapping and database available as a web-based resource to assist academia, industry, regional government, and local communities for sociocultural and management purposes; (5) an integrated team that can work with interested researchers, industry planners, and risk management of the North Slope Borough to extract data and provide simulation models that apply to current studies of the region; and (6) provide a variety of eco-heritage opportunities that include community participation in research, educational products, age-appropriate activities, and outreach for community service learning.



## Traditional Knowledge Observations about Climate Change and the Bering Sea from Akutan, Alaska

Theme 3 • Indigenous and Rural Knowledge and Communities

**Gene Hunn**

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The Bering Sea Integrated Ecosystem Research Program (BSIERP), funded by the North Pacific Research Board, is a five-year investigation of the implications of climate change for the resources and Alaska communities of the Bering Sea. Working with five study communities, BSIERP includes a local and traditional knowledge (LTK) component, which focuses on climate and ocean conditions that may affect subsistence fisheries and other marine resources. Akutan, an Aleut community of approximately 88 people, was chosen to represent communities on the southern, ice-free edge of the Bering Sea. Commercial fishing and subsistence activities (focused primarily on marine resources) are key components of Akutan's economy and way of life, but household surveys indicate declining subsistence harvests. Key respondent interviews and participant observations explored potential reasons for this change, including demographic, economic, and environmental factors. The poster will summarize the findings from this research. Among other things, Akutan residents discussed the effects of commercial fisheries on local subsistence resources, and population trends for key resources such as sea lions, migratory waterfowl, and marine invertebrates. They shared observations about food web relationships, traditional conservation practices, and changing weather patterns. The latter include more persistent storms and less predictable, shifting winds that inhibit access to harvest areas and alter the geographic distribution of resources.

## Chignik, Alaska, Subsistence Salmon Ethnographic Project

Theme 1 • Human-Environment Relationships

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The Division of Subsistence, Alaska Department of Fish and Game, is conducting ethnographic research on the subsistence salmon fisheries in the Alaska Peninsula communities of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville. This research updates studies conducted by the division in 1990. Most residents of these communities are of Alaska Native heritage and participate in harvesting or using salmon for subsistence. Commercial fishing is the economic mainstay for these communities. In 2010, populations ranged from 73 to 113, with summer populations in Chignik Bay and Chignik Lagoon substantially larger due to the influx of nonlocal commercial fishermen and fish processors.

The subsistence harvest of salmon in these communities is influenced by the commercial salmon fishery. The study focuses on continuity and change of the local salmon subsistence harvest and use patterns, and seeks to understand the strategies that families in these communities employ in adapting to environmental, sociocultural, and regulatory changes. This project has several components, including mapping harvest areas by species, timing, and gear type; interviews with knowledgeable, community-identified residents to understand customary and traditional uses and harvests of salmon; and participant observation during fishing and processing. The poster will present preliminary findings of the research. The project is funded primarily by the Alaska Sustainable Salmon Fisheries Fund.

## The Greenlandic Small-Scale Fishery: A Limit to Governmentality?

Theme 4 • Governance and Management Issues in the North

**Rikke Becker Jacobsen**

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In Greenland the need to outface of the Greenland halibut small-scale fishery and the need to release the workforce from the small-scale fisheries to the oil industry have become dominant discourses. The poster will focus on the everyday challenges of fisheries managers and the dominant governance rationalities in the institutional context in which they work. Based on the governmentality school of thought starting from Foucault, it will examine whether the current tendency of subjecting the small-scale fisheries to ITQ regimes and long-term out-phasing can be understood through the concept of “limits to governmentality.”

The Greenlandic shrimp fishery has already been subjected to increased governance through the introduction of ITQs and the resulting consolidation. It is considered a success in many ways. But small-scale fishers are still difficult for managers to control: their practices are considered to be biologically and economically unsustainable and they manage to force the government to bust its own TAC.

We therefore ask the question: are small-scale fisheries in Greenland a limit to governmentality and how? Our hypotheses is that compared to the shrimp fishery, the inshore small-scale fisheries have not and cannot easily be subjected to a successful “conduct of conduct.” Outfacing the coastal fisheries may thus solve more than a need for workers in new industries emerging in the context of climate change. It may also be a way to deal with the limits of governmentality.

## Benefits of Implementing TEK into Educational Programs within the U.S.: A Pacific Islands Perspective

Theme 3 • Indigenous and Rural Knowledge and Communities

**Charles Kaaiai**

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In the U.S. Pacific Islands, the population of indigenous peoples remains high—about 90% in American Samoa, 80% in parts of the Commonwealth of the Northern Mariana Islands, 40% in Guam, and 20% in Hawaii. These Polynesian and Micronesian populations have place-based TEK and natural resource management practices that span thousands of years. Imposition of Western systems of land tenure, capitalism, governance, and education in the past 200-500 years has resulted in diminished rights and incentive to gather, hunt, and fish using TEK. It has also resulted in the impoverishment of the Native people, and serious declines in environmental health and the health and resilience of Native cultures. Consequently, cultural practices and associated TEK may be on the brink of being lost. Today, many indigenous U.S. Pacific Islanders, who traditionally pass down TEK within the family, are willing and wanting to work with others to keep this knowledge and these practices alive.

Over the past five years an effort has been made in the Hawai`i community to revive traditional management practices and implement those practices into the current natural resources regime. It is an uphill struggle. Implementing TEK into educational programs within the U.S. Pacific Islands is one step toward reaching this goal. The culture is in the language and Hawaiian immersion language schools are particularly successful in this endeavor. Another step in education is the acceptance of TEK as a complex, rational approach to adaptive management of natural resource conservation and utilization and a suitable discipline for a science curriculum.

It is our hope that teaching Native and non-Native children to appreciate TEK and the associated cultural practices will foster a population of citizens who will support the integration of indigenous and modern natural resource management practices in the near future for the benefit of all the peoples who depend on our island ecosystems.

## Natural Resource Management in Hawaii from an `Aha Moku System Perspective

Theme 3 • Indigenous and Rural Knowledge and Communities

**Ke'eaumoku and U'ilani Kapu**

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Native Hawaiian culture and tradition are part of the Polynesian oceanic culture spanning over four millennia. The land tenure system used in Hawaii prior to Western contact was called `aha moku and was based on the `ahupua`a, the smallest unit of land that has all of the natural resources necessary for survival of its tenants and continuation of the culture. The `ahupua`a/`aha moku system was not only used to manage terrestrial resources, but also applied to the ocean.

In 2007 the Hawaii State Legislature established the `Aha Ki`ole Advisory Committee to advise the legislature on the system of best practices for traditional management of natural resources. After more than five years of discussion and analysis of consultation with Hawaiian practitioners and fishermen, the traditional `aha moku conservation and management practice was rejuvenated and defined. In this poster, we will discuss how natural resource management in Hawaii may be undertaken in an `aha moku system. We present this approach as a possible future for all people of Hawaii, as we look into our past and learn from our Native Hawaiian ancestors. We also offer this approach as a starting point of discussion among Pacific people working to incorporate traditional approaches into modern natural resource management.

## Bridge over Knowledge Waters: Linking Science and Traditional Knowledge of Arctic Char for Community-Based Monitoring

Theme 3 • Indigenous and Rural Knowledge and Communities

**Jennie A. Knopp**

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**Chris Furgal**

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**James D. Reist**

*Fisheries and Oceans Canada, Freshwater Institute, Winnipeg, Manitoba, Canada*

**Community of Sachs Harbour**

*Sachs Harbour Hunters and Trappers Committee/Sachs Harbour Community Corporation, Banks Island, Northwest Territories, Canada*

**Community of Ulukhaktok**

*Olokhaktokmuit Hunters and Trappers Committee, Ulukhaktok, Victoria Island, Northwest Territories, Canada*

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This project, on community-based monitoring (CBM) and the potential for bringing together traditional knowledge (TK) and scientific knowledge, identifies key indicators of change in char using quantitative (char growth, environment conditions) and qualitative (TK) data. Arctic char (*Salvelinus alpinus*) is a staple subsistence resource for Inuit on Banks and Victoria islands. In recent years significant climate variability has been observed in the area, and there are concerns about how this variability will affect subsistence resources. Community residents are the first point of contact, observing these changes and the effects on their land, water, and animals. Centuries of knowledge and observations about the environment and natural resources exist among Inuit hunters and fishers. TK can expand our understanding of environmental variability and its effects on arctic species. Further, CBM provides an opportunity to better understand the current status of species and can form the basis for understanding and preparing for future changes in arctic species in light of climate change.

A summary of the preliminary investigation is presented. Insights from TK interviews about char and the environment are explored. This novel multidisciplinary research provides insights into environmental indicators that could be used in CBM plans, and it is an example of how science and TK can complement one another providing a better understanding of northern fish species in a changing environment.

## The Community Subsistence Information System of the Alaska Department of Fish and Game, Division of Subsistence

Theme 1 • Human-Environment Relationships

**David Koster**

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The Community Subsistence Information System (CSIS), formerly the Community Profile Database, is the primary repository of the results of systematic household surveys conducted by the Division of Subsistence of the Alaska Department of Fish and Game and its partner organizations. This searchable database is available at <http://www.adfg.alaska.gov/sb/CSIS/>. Comprehensive harvest data for 183 rural communities and 21 urban communities are available in CSIS. For each represented community, data include study background, research methods (including survey sample characteristics), harvest and use statistics for each resource (such as harvest quantities in numbers of animals and in pounds usable weight and percentage of households in the community using or harvesting each resource), demographic data, and information on the cash sector of the local economy (jobs, earned income, other sources of income). Searches can be made at the community level (all results for one community for the study year) or at the resource level (findings for a particular resource or category of resource from all studies in the database).

The poster will describe the organization and search capabilities of CSIS as a tool for researching patterns and trends of subsistence fisheries, and other resource harvests, in Alaska communities. We will also discuss some limitations of the data sets and efforts under way to enhance geographic coverage and to develop a time series of estimates of subsistence harvests at a subregional or regional level.

## **A Survey of Pacific Halibut and Sablefish Individual Fishing Quota (IFQ) Holders: Characterizing Crew and Fuel Price Impacts**

Theme 2 • Fishing Communities in Transition

**Alexander Kotlarov**

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In February 2010, the University of Alaska Fairbanks/Alaska Sea Grant conducted a stratified random postal survey of 895 Alaska halibut IFQ program quota shareholders (QS) 400 sablefish IFQ program QS holders. The survey explored trends in the number of full- and part-time crew positions, the extent to which QS-holders fish from their homeport and where they purchase gear and supplies. The survey also asked QS-holders about the impact of recent variation in fuel prices and operations costs and asked about their plans to purchase more halibut or sablefish quota shares. The results show that crew on smaller vessels tend to be local while crew on larger vessels in more remote areas tend to live outside Alaska. In addition, vessels operated in remote areas have higher operating costs and more difficulty finding crew when compared to vessels operated from ports that had a larger population base.

The response on the question to purchase more halibut and sablefish quota in the future had the highest percentage positive response in area 4 for halibut, and in the Aleutian Islands for sablefish. This response could show that residents in remote areas in Alaska are interested in increasing their quota holdings in these fisheries. The results also show that the same remote areas have the highest percentage response to the question indicating difficulty in obtaining financing to purchase more quotas.



## Long-Term Monitoring of Biological Communities in the Bering and Chukchi Seas

Theme 1 • Human-Environment Relationships

**Robert R. Lauth**

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Changing climate in the Bering and Chukchi seas can affect the distribution and abundance of fishes, crabs, and marine mammals that are central to the culture and livelihood of rural Alaska fishing communities. The NOAA Alaska Fisheries Science Center (AFSC) conducts an annual continental shelf bottom trawl survey of groundfish and invertebrate resources in the eastern Bering Sea, and in 2010 expanded its annual survey to the northern Bering Sea (NBS). In 2012, AFSC is planning to conduct the same survey in the Chukchi Sea. The NBS and Chukchi Sea bottom trawl surveys are part of a comprehensive AFSC Loss of Sea Ice Research Plan, the primary purpose of which is to study the impacts of climate change and the loss of seasonal sea ice on fishes, crabs, marine mammals, and subsistence fisheries of western Alaska fishing communities. Survey results are presented for baseline data collected from the 2010 AFSC standardized bottom trawl survey, providing a benchmark for understanding the current status of the biological community in the NBS. Continued survey efforts in the NBS, and the addition of the Chukchi Sea starting in 2012, represent a new time-series on demersal macrofauna for each area. Long-term monitoring of the NBS and Chukchi Sea are essential for assessing, quantifying, and predicting climate change effects on the distribution, abundance, and ecology of marine animals. Moreover, these survey time-series are valuable to the Alaska fishing communities for managing and protecting marine resources vital to their culture and livelihood.

## The Alaska Subsistence Fisheries Database

Theme 1 • Human-Environment Relationships

**Terri Lemons**

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Management and regulation of subsistence fisheries in Alaska are organized by 11 management areas. In most of these, subsistence salmon harvests are monitored annually through household permits, harvest calendars, or post-season household surveys. The Alaska Subsistence Fisheries Database (ASFDB), designed and maintained by the Division of Subsistence of the Alaska Department of Fish and Game, is a central repository of the results of these annual harvest monitoring programs, organized by management area and by community of residence of fishery participants. Data include annual estimates of harvests by species, and estimates of participation in the fishery based on permit returns or household surveys. Limited data on other subsistence fisheries, such as non-salmon fish and marine invertebrates, are included in the database if available from annual programs. Presently, the ASFDB is being redesigned for online access and searches. The database is a key tool for tracking changes in subsistence fisheries harvests in Alaska and for other analyses. The database supports the production of an annual *Alaska Subsistence Salmon Fisheries Report* as part of the Division of Subsistence Technical Paper Series.

The poster will describe the contents of the database and the features of the online version. Some general patterns and trends in Alaska subsistence fisheries based on analysis of ASFDB data will also be presented.

## The Political Ecology of a Fishery in the Eastern Aleutians

Theme 1 • Human-Environment Relationships

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The community of King Cove, Alaska, is nestled in the heart of area M, a controversial intercept fishery that has been impacted in social, economic, and political ways since the implementation of the limited entry permit system in the early 1970s. The Aleut people have been active participants in the salmon fishery and other global economies such as furs and cod fishing throughout history. They are dependent on the salmon fishing industry and actively contribute to the regulation of the area resources at multiple scales while also looking to the future and the availability of other economic options.

The privatization of fisheries and the demand for resource development leaves the Aleut people in a unique position, which could impact the social fabric of the communities in the area. It builds on research and writing done at Idaho State University for my graduate degree in anthropology and local knowledge gained from growing up in King Cove. However, instead of taking a strict anthropological approach to the issues, this paper is being developed using a mixed methods approach and incorporating a political ecology lens. This new look will draw from well-known political ecologists such as Robbins and West and also from Alaska researchers such as Lowe, Reedy-Maschner, and Carothers.

## Successes of Fisheries Management in the Canadian Western Arctic through Documentation of Local and Traditional Knowledge

Theme 3 • Indigenous and Rural Knowledge and Communities

**James Malone and Max Kotokak**

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The management of freshwater and marine fisheries in the Inuvialuit Settlement Region (ISR) and the Gwich'in Settlement Area (GSA) has been largely successful through the collection and incorporation of local and traditional knowledge (TK). Over the years, several fisheries management issues have been identified by TK. As a result, both management planning and identification of research priorities in both the ISR and GSA have benefitted and multiple fisheries management plans have been developed. This presentation analyzes two examples of fisheries management strategies in the ISR and GSA that have been successful due to the incorporation of TK. The first example is the recent development and signing of the Integrated Fisheries Management Plan (IFMP) for Dolly Varden (*Salvelinus malma*) in the North Slope area of Yukon and the Mackenzie Delta. The IFMP has incorporated TK on Dolly Varden populations and trends, which aid us in determining the causes and effects of shifts in harvest pressure and environmental stochasticity. This is to ensure that there will forever be opportunities for the Inuvialuit and Gwich'in people to harvest Dolly Varden in a sustainable way. The second example is the synthesis of Dolly Varden TK in a report that has been recently prepared by T. Byers. In April 2010, a workshop was held in Inuvik where several Inuvialuit and Gwich'in participants verified the TK that has been documented by multiple authors and compiled by Byers. These examples highlight how a set of potential threats to Inuvialuit and Gwich'in fish harvests like declining Dolly Varden stocks and climate change can be addressed through TK collection and incorporation.

## An Interdisciplinary Investigation of the Changing Relationship between Longline Fishermen and Cetaceans in Alaska

Theme 1 • Human-Environment Relationships

**Megan Peterson**

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Increased fishing effort in Alaska throughout the 20th century expanded anthropogenic influences on the marine environment. Interactions and competition with other apex predators is a logical product of increased human utilization of marine resources in subarctic waters. This evolution of the human-environment relationship is exemplified by cetacean depredation on longline fisheries. In Alaska, depredation occurs when killer whales (*Orcinus orca*) or sperm whales (*Physeter macrocephalus*) remove fish from longline gear, damage fish, or damage fishing gear during hauling operations. Depredation events by killer whales and sperm whales are increasing in subarctic zones in frequency, geographic extent, and severity. Killer whales and sperm whales generally target high-dollar longline fisheries such as sablefish (*Anoplopoma fimbria*) and Pacific halibut (*Hippoglossus stenolepis*). Depredation has negative consequences for both the fishermen and the whales. Fishermen incur losses in reduced catch and increased operating costs, and whales are at greater risk of entanglement and vessel strike. The objective of this project is to investigate trends in cetacean depredation in Alaska and to determine how depredation is changing fishing practices/resource use in the Gulf of Alaska, Bering Sea, and Aleutian Islands. This project merges social research methodologies such as semi-directed interviews, written surveys, and participant observation with quantitative analyses of NMFS survey and fishery observer data. Results from this study will establish baseline data on the socio-ecological and socioeconomic impacts of cetacean depredation and will address associated human-environment relationship transitions.

## **An Emerging Fishery: Documenting Changing Use and Harvest Patterns in Subsistence Salmon Fishing in Three North Slope Communities**

Theme 1 • Human-Environment Relationships

**Brittany Retherford and Lisa Slayton**

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Subsistence activities in Point Hope, Wainwright, and Point Lay, Alaska, are focused primarily around hunting caribou and marine mammals, and fishing has also traditionally been a component of the seasonal round. Fishing during summer months is done at cabins or camps, or along stretches of beach areas near town, often opportunistically while hunting or after work hours. It is also considered a recreational activity for some individuals, and fish caught provide variety to the subsistence user's diet. Historically, whitefish and other non-salmon species have been commonly caught, and more recently residents of all three Chukchi Sea villages have reported catching an increasing number of salmon, particularly pink salmon, though some chums and kings as well. Several factors are explored to understand this increase, including a possible growing salmon population, community socioeconomic shifts, and changes in personal diet preferences and gear availability.

This poster will display research conducted in 2009 and 2010 as part of a collaborative effort with the ADFG Division of Commercial Fisheries that aims to better understand local traditional knowledge of past subsistence salmon fishing, and to document emerging and/or changing uses and harvest patterns.



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