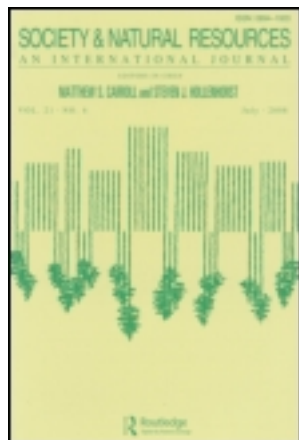


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Society & Natural Resources: An International Journal

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/usnr20>

Human Dimensions of a Fishery at a Crossroads: Resource Valuation, Identity, and Way of Life in a Seasonal Fishing Community

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Published online: 22 Dec 2010.

To cite this article: Ryan Kelty & Ruth Kelty (2011) Human Dimensions of a Fishery at a Crossroads: Resource Valuation, Identity, and Way of Life in a Seasonal Fishing Community, Society & Natural Resources: An International Journal, 24:4, 334-348, DOI: [10.1080/08941920903476814](https://doi.org/10.1080/08941920903476814)

To link to this article: <http://dx.doi.org/10.1080/08941920903476814>

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Human Dimensions of a Fishery at a Crossroads: Resource Valuation, Identity, and Way of Life in a Seasonal Fishing Community

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Bristol Bay, Alaska, is the largest sockeye salmon fishery in the world and one of the last sustainable salmon fisheries in the United States. Proposed development of Pebble Mine at the headwaters of Bristol Bay's salmon-producing rivers introduces the potential for major changes in the natural and social environments. A study of one seasonal fishing community indicates that community members value natural resources, their identity as fishers, their community, and their way of life. They think Pebble Mine poses unacceptable risk to these things they value, and are therefore generally against the mine and associated development. The perception of risk contributes to cultural stress and adversely affects community members' well-being and quality of life. This study establishes a baseline on fishers' attitudes toward and experiences with the natural and social worlds in this seasonal community, and applies identity theory to examine and explain the relationship between people and the environment.

Keywords Alaska, Bristol Bay, competing resources, identity, integrated ecosystem assessment, Pebble Mine, seasonal fishing

Bristol Bay, Alaska, is the easternmost arm of the Bering Sea, about 200 miles southwest of Anchorage. The watershed's nine major rivers and their tributaries are divided into five commercial fishing districts,¹ which together comprise the largest commercial sockeye fishery in the world. A fishery-related economy has been the region's mainstay since the first salmon cannery opened in 1883 (Visit Bristol Bay [VBB] 2008). Coho, chum, pink, and king salmon and also herring are fished commercially in Bristol Bay. Bristol Bay produces 20% of Alaskan salmon, roughly one-third of the fishery's gross earnings, and is the largest Alaska fishery in terms

Received 22 January 2009; accepted 8 July 2009.

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of the number of permit holders (Alaska Commercial Fisheries Entry Commission 2008). In the summer of 2004, 7,657 people were employed in fish harvesting and 4,193 in fish processing (Dunfield et al. 2007).

This fishery is managed to maintain healthy stock and sustainable annual returns, supporting commercial, recreational, and subsistence fishing and generating over \$250 million annually. In 2007 the total catch for the Bristol Bay commercial salmon fishery was 31.5 million fish (Sands et al. 2007). In 2008 commercial and recreational salmon fisheries in California, Oregon, and Washington were closed for the first time in the history of these fisheries, leaving Alaska with the only open wild salmon fisheries in the country.

Mineral deposits were discovered on state-owned land at the headwaters of several of the rivers feeding Bristol Bay. The Pebble Mine Corporation secured mineral rights for the Pebble deposit and 153 square miles of associated resource lands in 2007 (Northern Dynasty Minerals LTD 2008). Pebble Mine (hereafter, Pebble) is thought to be the second largest ore deposit of its type, containing an estimated 74 billion pounds of copper, 87 million ounces of gold, and 4 billion pounds of molybdenum (Northern Dynasty Minerals Ltd 2008). These mineral resources have an estimated value of \$300–500 billion (Bluemink 2008; Pebble Partnership 2008a).

While the exact nature and scope of proposed mining activities at Pebble are not finalized, likely options include open-pit mining at Pebble West and underground mining at Pebble East (Pebble Partnership 2008b). The Pebble West pit could be up to 2 miles (3 km) wide and several thousand feet deep and could generate up to 2.5 billion tons of waste material (“Fishing for Molybdenum” 2007). Discharged tailings would likely be stored in two artificial lakes, the larger of which would be enclosed by a 740-foot-tall (230 m) and 4.3-mile-long (6.9 km) dam—larger than the Three Gorges Dam in China (“Fishing for Molybdenum” 2007; Renewable Resources Coalition 2008).

Copper, mercury, cyanide, and other chemicals and heavy metals used in and generated as by-products of mining can be toxic to fish and wildlife and interfere with behavior and reproduction (Eisler et al. 1999; Eisler 2000; Hansen et al. 1998). While the Pebble Partnership has stated its commitment to protecting Bristol Bay fish and wildlife (Pebble Partnership 2009), mining has a poor environmental track record. A study comparing predicted (using environmental impact statements) and actual water quality for 25 modern, large, hard-rock metal mines found that while 100% of the mining projects predicted compliance with water quality standards, 76% exceeded water quality standards in releases to either surface or groundwater (Kuipers et al. 2006). In most cases, adverse impacts to water quality were caused by failed mitigation.

Development associated with Pebble has the potential to introduce change to the region’s human communities at unprecedented scales and rates. It is estimated that the project will increase the population by nearly 50%, providing 2,000 jobs during the project’s 2- to 3-year construction phase and 1,000 high-skill, high-wage operations jobs for 50–80 years (Pebble Partnership 2008a). Access to the region’s remote communities, which is currently achieved only by plane and boat service, will increase. Infrastructure options being considered include 86–104 miles of controlled-access road connecting the mine to a new or expanded tidewater port on Cook Inlet and a parallel concentrate pipeline (Northern Dynasty Minerals Ltd 2008; Pebble Partnership 2008c).

Context of the Study

The National Environmental Policy Act (NEPA) requires an environmental impact statement (EIS) for federal agency actions “significantly affecting the quality of the human environment,” and many states impose similar EIS requirements for state actions (NEPA 1969). In Bristol Bay, the Alaska Department of Natural Resources, Office of Project Management and Permitting, is requiring an EIS as part of the mine permitting process it is coordinating. By the end of 2007, developers had invested about \$225 million in data collection and synthesis as a contribution to the Pebble Mine Project EIS (Pemberton 2007). State and federal agencies are providing guidance to the developers for the environmental data collection effort that includes hydrology, air and water quality, fish and aquatic resources, wildlife, wetlands, traditional knowledge, subsistence uses, demographics, and economics (Alaska Department of Natural Resources 2007).

This article complements these efforts by documenting the human dimension of one fishing community in the region. It provides the first social–psychological data on fishermen’s attitudes toward themselves, their community, natural resources in the region, and the potential impact of development associated with Pebble, applying identity theory to explain the importance of fishing to community members.

Identity Theory

Social psychologists routinely examine identities as a crucial aspect of human experience. Identities provide individuals with a sense of self that connects them to other people and to their environment. The term *identity* refers to “parts of the self, internalized positional designations that exist insofar as the person participates in structured role relationships” (Stryker 1992, 23). An alternate conceptualization defines identities as “who or what one is, to the various meanings attached to oneself by self and others” (Gecas and Burke 1995, 42).

Identity theory contends that individuals have multiple role identities: one for each role they occupy (Hogg et al. 1995; Stryker and Serpe 1982). A person may identify as a parent, friend, teacher, salesperson, and any number of other roles—including fisher. To make sense of their multiple identities, people order them hierarchically based on the likelihood that a particular identity will either be engaged or motivate action in a given situation (Stryker 1992; Stryker and Serpe 1994). The ordering of identities in this hierarchy is achieved through attaching an identity salience (or level or meaning) to each of the identities that comprise the self (Stryker 1992).

Research Questions

This study is an initial attempt to document the human dimension of fishing communities in Bristol Bay and the potential impact of mineral development on these fishers and their communities. It is motivated, in part, to make explicit the attitudes, behaviors, and way of life of a rural fishing community caught in the contest over competing resource uses. Identity theory provides a framework for examining several key questions. First, how important is a fishing identity to these individuals relative to other identities they possess? Next, what does a fishing identity mean to these individuals? Finally, how does one’s fishing identity relate to one’s attitudes toward

the health of one's fishery and one's community? These questions represent a subset of questions examined by this study. In addition, this work examines how people value and use the resources in this area, as well as their assessment of the condition of natural resources in the Nushagak Fishing District and surrounding area. This study assesses fishers' perceptions of the level of impact that the proposed development of Pebble will have on natural resources, their livelihood, their communities, and their way of life. This work is exploratory and intended to present a theoretical framework and set of empirical questions that can be used more broadly in future research in this area.

Methods

Nushagak Beach

This study focuses on the seasonal fishing community of Nushagak Beach in the Nushagak Fishing District of Bristol Bay, 6 miles south and across the Nushagak Bay from Dillingham, Alaska. Each year fishers, their families, and crews arrive in mid June to set up camp and prepare for the season. In mid July they board their cabins, ferry their gear across the bay, and return to their "regular" lives. No one lives there year-round.

Survey Design

Data were collected in the field during the 2007 commercial fishing season using standardized surveys, key informant interviews, and participant observation. Paper-and-pencil surveys were administered to all members of the fishing community 18 years of age or older. Ninety-eight surveys were distributed, of which 50 were returned and complete enough for use in analysis. Those who participated are a representative sample of the fishers in this community.² The primary reason for nonresponse of surveys appeared to be conflict with fishing duties, since many who did not return surveys were eager to speak with the researchers about their experience as they mended nets, worked on their cabins, or picked fish from their nets.

Key informant interviews were conducted with 10 permit holders representing nearly 200 years of combined fishing experience (range 10–35 years) in the Nushagak District. Structured questions focused on general attitudes toward fishing and the fishery, identities, the community, environmental values, and development (including Pebble). Discussion of items beyond these broad themes occurred as individual fishers raised issues of personal importance related to the fishery, or to the Nushagak community more specifically. The authors also joined more than a dozen boats while fishing as participant observers, during which time broad themes that emerged during key informant interviews were further examined. Qualitative data from interviews were transcribed and combined with field notes from participant observations and organized thematically for use in support of quantitative data.

Key Variables

Fishing identity was measured using several measures. First was a global measure that asked respondents to what extent they agreed or disagreed with the statement "Fishing is an important part of who I am as a person." Response categories used

a 7-point scale ranging from *disagree strongly* to *agree strongly*. Categories were collapsed to create a dichotomous variable (presence or absence of reported fishing identity) to test for group differences in attitudes across numerous natural and social resource variables. Two additional questions were asked to get different perspectives on the robustness of fishing as an important identity. First, the salience of social identities can be assessed using the degree to which a particular identity connects one to others. Respondents were asked to rank their top three identities with respect to how many relationships and activities each identity fosters. They were given numerous choices (e.g., father, friend, religion, student, work role [e.g., teacher, lawyer, carpenter]), as well as options to write in additional identities in order to perform this ranking. Second, to examine the relative importance of community members' social identities, respondents were asked to rank order the identities that would produce the greatest sense of loss if they were no longer present. Respondents were given the same list of identities from which to choose as in the previous question.

A number of questions were asked to examine attitudes toward natural resources, perceptions of risk, and connection with their fishing community. Respondents were asked how much value they placed on various natural and social resources in the area (air, water, wildlife, fish populations, natural landscapes, traditional culture, and community togetherness³). These were measured using a 7-point scale from extreme low to extreme high value. Measures of natural resource health included the same indicators using a 7-point scale ranging from *very bad* to *very good*. Perceptions of the impact of a nonsustainable fishery on income, life satisfaction, way of life, relationships with others important to respondent, ability to provide food, and connection with the natural environment were obtained using a 5-point scale ranging from *extremely negative* to *extremely positive*. Respondents were also asked specifically what impact Pebble, if approved, would have on water quality, air quality, fish populations, wildlife populations, and wilderness/natural landscapes. They were provided a 7-point scale ranging from *very harmful* to *very beneficial*. Respondents' attitudes toward Pebble were assessed using a global measure asking their level of support for the mine and providing a 7-point scale using *strongly disapprove* to *strongly approve*. Finally, respondents were asked to rank order the most important reasons that they fish. A dichotomous variable was constructed to capture those who have stronger social ties/motivations for fishing versus those who had a stronger monetary motivation for fishing. Those who ranked "money" ahead of "to be with friends/community" received a zero, and those who ranked "friends/community" ahead of "money" received a one. Analyses include descriptive statistics of this community, as well as tests of means and regression.

Results

Demographics

In 2007 the Nushagak Beach fishing community consisted of 98 adults and 15 minors. This study used survey and interview data from 50 fishers including 24 captains (permit holders) (48%), 20 crew (40%), and 6 others (12%) working as shore support. Mean age was 36 years, 88% are male, and years of experience fishing at Nushagak Beach ranged from 1 to more than 30 years. Crew members had an average of 5½ years of experience, compared to captains' average of 12 years. Education was

distributed bimodally with 38% having a high school diploma or equivalent and 30% with a bachelor's degree. With very few exceptions these fishers worked other jobs for the 11 months of the year when they were not fishing. Their occupations were as varied as biologist, sheep shearer, metal worker, teacher, rail road worker, lawyer, and independent businessman.

Perception and Valuation of Natural Resources

More than three-quarters of respondents viewed the health of the fishery as good (54%) or excellent (28%); 14% considered it fair and 4% poor. No respondents said they thought the condition of the fishery was extremely poor. Community members had a strong environmental ethic, with 88% of respondents agreeing (and none disagreeing) with the statement, "We have to take care of the land and sea or they will not provide for us." Fishers overwhelmingly indicated strong valuation of the natural environment of the Nushagak fishing district and their community at Nushagak Beach. More than 96% of respondents valued fish populations, water quality, air quality, and Alaska's wilderness and natural landscape. The highest value was placed on fish populations, with 71% indicating extremely positive valuation. Wildlife populations were valued slightly less, with the two highest value categories selected by 85% of respondents. Most fishers (92%) agreed with the statement "I want future generations to enjoy the fish/fishery," and 71% felt, "We should restrict development in some coastal areas so that future generations will be able to have natural environments." Only 6% of the fishers felt that "The health of the salmon fishery is only important if you fish." Community togetherness is also valued by these fishers, with greater than two-thirds placing it in the two highest valuation categories.

Fishing at Nushagak Beach

When asked what proportion of their livelihood in 2007 depended on the salmon fishery in the Nushagak Fishing District, a majority (53%) of fishers indicated that between 0 and 24% of their livelihood depends on commercial fishing. Crew members (65%) are nearly twice as likely as captains (35%) to be located in this lower quartile. The data show a pattern of lower proportions of fishers in each quartile as they increase in percentage of livelihood represented by fishing. As a percentage, captains have higher representation than crew members in each of the three highest quartiles, indicating that these older, more seasoned fishers depend more on the revenue they generate through fishing than do the younger, less experienced crew members.

In ranking their top three motivations for fishing at Nushagak Beach, money was the most frequently selected primary reason (48%), as well as the overall most important reason when aggregating the top three motivations (88%). Being with family and friends was the next most important motivation (30% primary, 72% in aggregate), followed by opportunity for adventure (14% primary, 58% in aggregate) and being with nature (16% primary, 41% in aggregate). Fun, subsistence, and cultural tradition were selected less frequently.

When asked why they fished at Nushagak Beach, fishers' responses were bimodally distributed, roughly mapping onto those with less experience and more seasoned fishers. Those with 3 or fewer years of experience tended to reply that they fished

at Nushagak Beach because that is where they could get a job. For those with 4 or more years of experience, responses indicated a combination of monetary and social benefits:

To make money, spend time with family and friends and enjoy the fishery and livelihood.

Our family set net operation is part of our life. Plus it provides significant cash for us and our kids.

For many, fishing at Nushagak Beach connects families and community members.

Family got us started when I was a baby and family, more than money, keeps us coming back.

I fish here because I started here and I enjoy my relationship with this community.

When respondents were asked, “If the fishery were no longer able to support subsistence and commercial fishing, how big of an impact would this have on each of the following for you?,” the biggest potential impacts of an unsustainable fishery include loss of connection with the natural environment in the area (76%)⁴ and reductions in overall yearly income (74%). The next most affected outcomes of a collapsed fishery included negative effects on life satisfaction (62%), relationships with others important to me (57%), and way of life (56%).

Fishers were also asked, “Why is the salmon fishery in the Nushagak Fishing District important to you.” A minority (10%) voiced purely transactional attitudes of making money or that it was just summer work. All other survey and interview responses spoke to a more complex interpenetration of lifestyle, culture, tradition, and connections with family and the environment. Examples of these attitudes include:

It’s a way of life. I get to see and spend time with friends. It’s an example of non-corporate, non-industrial, artisanal resource harvest that’s increasingly rare in the U.S. It promotes authentic, work-based community. It provides food for peoples’ tables, and it earns me an income.

To keep the last great wild salmon fishery alive. To have a livelihood to support my family. To have a place to go to spend time with family and friends doing something we love.

It is valuable to me to be part of a traditional—in the sense of Western white culture—resource harvest. I value the local natural environment and “wilderness.”

Common themes emerge around natural beauty, sustainability, solidarity of community, and a simpler, qualitatively richer way of life. Nushagak Beach and the activities fishers perform there reconnect fishers to the environment, to each other, and to themselves.

Identity

More than three-quarters of respondents (78%) indicated that they agreed that fishing is “an important part of who they are as a person,” with 16% agreeing strongly. Only 12% stated that fishing was not an important part of who they are, and 10% were neutral. When asked to rank the salience of several social identities, family-related identities (e.g., father, son, and wife) were by far the most salient (Figure 1).⁵ Next to familial identities, commercial fishing represented the highest total proportion of identities across the top five most salient identities ($n = 30$), followed by one’s identity as a friend ($n = 28$). Social identities connected to recreational activities (e.g., hiking, hunting), religion, and work role were also relatively high, with 24, 19, and 19 respondents selecting these identities for all five ranks of salience respectively. Respondents reported fishing identities with much greater frequency and with higher salience than identities related to their nonfishing work roles.

When respondents were asked which identities connect them to the most people, commercial fisher was the identity with the greatest number of respondents ranking it in the top three most socially connective identities (Figure 2). The comparison between commercial fishing and work role indicates that one’s work holds a larger proportion than fishing of the highest ranking for connectivity, but fishing has a larger proportion of combined first and second rankings, as well as a larger proportion of all three rankings for social connectivity. As one would expect, family identities are less salient using this measure since families tend to be small relative to other social networks. Friend as an identity remains strong and has one of the highest numbers of respondents, identifying it as the number one most connective identity. Religion was identified by the most people as the primary (nonfamily) social

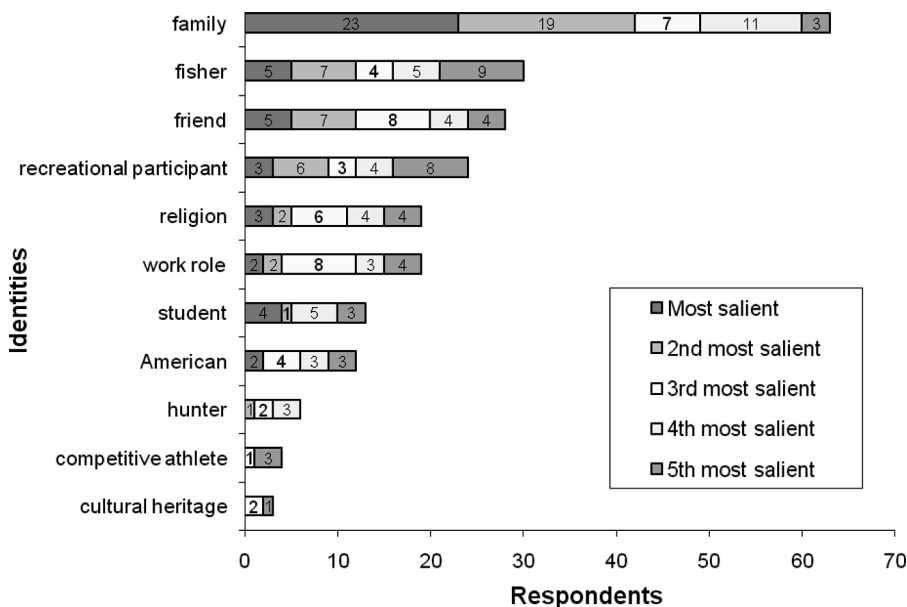


Figure 1. When asked to rank the salience of several social identities, family-related identities were by far the most salient, followed by fisher, and one’s identity as a friend. Respondents reported fishing identities with much greater frequency and with higher salience than identities related to their non-fishing work roles.

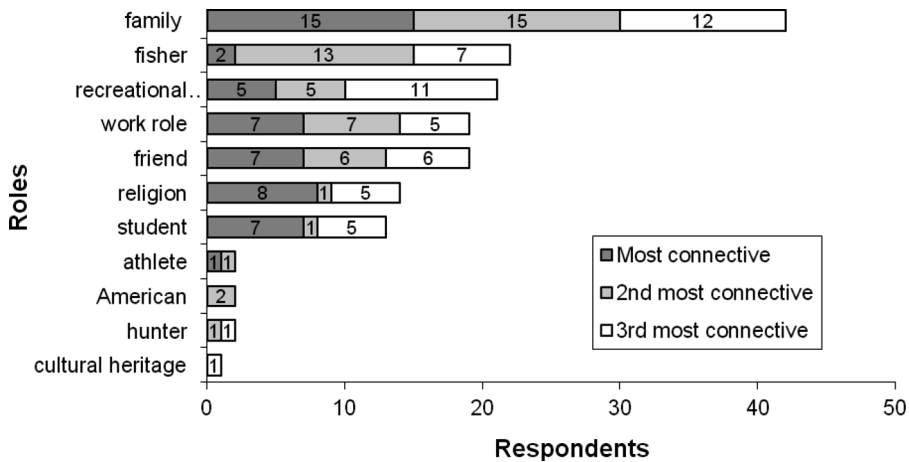


Figure 2. Stacked bar graph showing which roles connect respondents to the greatest number of relationships and activities. Commercial fisher was the identity with the greatest number of respondents ranking it in the top three most socially connective identities.

connector, though its total connective strength across all three ranks was less than friend, work role, participation in recreational activities, and commercial fishing.

Fishers indicated that family identities had the highest amount of loss associated with termination of identities ($n = 62$). Friend was a distant second ($n = 18$), followed by religion and fishing identities ($n = 13$), with respondents reporting more primacy on religion ($n = 5$) than fishing ($n = 2$). Work ($n = 10$) and recreational ($n = 10$) identities also garnered relatively high levels of total loss, although neither identity was selected as the most important by any respondents. Taken together, the three measures of social identity salience demonstrate that family and fishing emerge as the most important identities, along with religion, work role, recreational activities, and friend.

Regression analysis was conducted to determine which factors are most important in explaining the emergence of a fishing identity. Fishing identity was regressed on age, proportion of livelihood derived from fishing (in quartiles), number of years fished, whether one was a captain or crew, and whether monetary profit or community ties were stronger motivations for continued fishing ($r^2 = .41$, $p < .001$). Fishers with a greater proportion of their livelihood from fishing are more likely to have a strong fishing identity ($\beta = .429$, $p < .01$). Two additional predictor variables approached significance in this model: whether one was a captain or crew ($\beta = .252$, $p = .056$), and whether monetary profit or community ties are stronger motivations for continuing to fish ($\beta = .241$, $p = .053$). These beta values suggest that those who are captains and who place greater emphasis on community ties over monetary profit as a motivation for continued fishing have stronger fishing identities than do crew members and those who focus more on pecuniary benefit over social benefits of fishing.

Tests of means comparing those who report having a fishing identity and those who do not showed several significant differences across the natural resource and social variables examined (Table 1). Those with a fishing identity value wildlife populations ($t = -3.192$, $p < .01$), traditional culture ($t = -2.556$, $p < .05$), and community togetherness ($t = -3.840$, $p < .001$) at significantly higher levels than those

Table 1. Group differences in attitudes on natural and social resources between respondents with and without a fishing identity

	Fishing identity		No fishing identity		<i>t</i>
	Mean	SD	Mean	SD	
Resource valuation ^a					
Water quality	6.57	.689	6.36	.674	−0.866
Air quality	6.46	.650	6.09	.831	−1.548
Fish populations	6.76	.597	6.36	.674	−1.864 [†]
Wildlife populations	6.41	.725	5.27	1.737	−3.192**
Wilderness/natural landscapes	6.49	.768	6.18	.751	−1.161
Traditional culture	5.89	1.075	4.64	2.292	−2.556*
Community togetherness	5.95	.941	4.27	2.054	−3.840***
Impact of collapsed fishery on ^b :					
Overall yearly income	2.03	.843	2.36	.809	1.185
Life satisfaction	2.21	.864	2.73	.647	1.858 [†]
Way of life	2.26	.850	2.82	.405	2.114*
Relationships with others important to you	2.45	8.91	2.45	5.22	0.025
Connection with natural environment in this area	1.92	.941	2.55	.522	2.099*
Perceived impact of Pebble Mine on ^b :					
Water quality	1.84	.958	2.50	1.179	1.847 [†]
Air quality	3.05	1.053	2.90	1.197	−0.399
Fish populations	1.89	.966	2.20	1.398	0.811
Wildlife populations	2.14	1.004	2.60	1.174	1.253
Wilderness/natural landscapes	1.78	.886	2.30	1.160	1.529
Informed about Pebble Mine ^c	2.39	6.79	1.60	.699	−3.272**
Support for Pebble Mine ^d	1.71	1.088	2.50	1.841	1.748 [†]

Note. Significance indicated by [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

^aHigher values correspond with higher valuation.

^bLower values correspond with perceptions of greater negative impacts.

^cHigher values correspond with being better informed.

^dHigher values correspond with greater support.

without a fishing identity. Additionally, the difference in group means for valuation of fish populations approached significance at $p < .05$ ($t = -1.864$, $p < .10$), suggesting higher valuation among those with a fishing identity than those without.

Those with a fishing identity also reported significantly greater negative impacts of a collapsed fishery on their life satisfaction ($t = 1.858$, $p < .10$), way of life ($t = 2.114$, $p < .05$), and their connection with the natural environment ($t = 2.099$, $p < .05$) than those without a fishing identity. Those with a fishing identity believe the mine represents a greater water quality risk than those without a fishing identity ($t = 1.847$, $p < .10$). Examination of the means across all variables in this category indicate that, on average, respondents in both groups feel that the mine is a threat to all natural resources (including fish populations). Those reporting that they do

not identify themselves as a fisher are significantly less likely to report being informed about Pebble ($t = -3.272$, $p < .01$) and more likely to support the mine ($t = 1.748$, $p < .10$) than those who have a fishing identity.

Opinions on Pebble Mine

When asked their level of support for the proposed Pebble development, 80% of respondents indicated disapproval, with 59% disapproving strongly. No respondents were neutral on this question. Twenty percent of respondents were mildly supportive, and a few wrote that the development of Pebble would not negatively affect the physical or social environment, or may even add stability to the region by providing another source of employment. The vast majority of respondents (more than 80%) thought Pebble would have a harmful impact on Alaska's wilderness and natural landscape, water quality, fish populations, and wildlife populations. Respondents were a little less sure of the impact of Pebble on air quality, with 60% saying it would have a negative impact and 38% predicting a neutral impact.

Some defined their concern in primarily personal terms:

The Pebble Mine has the potential to disrupt or harm Bristol Bay salmon runs in ways that could shut the entire fishery down. Pebble Mine will negatively affect my income, way of life, relationship with other fisherman, and my identity as a fisherman.

Others expressed a more collective concern for the environment and the people who depend on harvesting its natural resources.

In the narrow sense of my income and day to day activities, [developing Pebble] will have little or no effect. But part of my quality of life is knowing that people can still harvest the land's resources in Alaska, and can do so in wilderness That would be harmed by the mine. And our yearly fishing in Nushagak could end and I would miss this very much.

Also:

The Pebble Mine will wipe out a tradition that has been going on for centuries. I am less concerned about how it will affect me than I am about how it will affect the Run, the natural stability of the area, and the many communities reliant on it.

The consensus sentiment of intolerable risk posed by Pebble in the Nushagak Beach fishing community was summarized by one seasoned captain: "There is a possibility that something could go wrong and destroy the fishery. No matter how small that possibility is, it's not worth the risk." Fishers in this community have deep, complex relationships with the physical and social environment at Nushagak Beach, and the value they place on these resources and their connection to a way of life far outweigh the risk associated with mineral development at the headwaters of their fishery.

Ninety-two percent of fishers disagreed with the statement, "I would be willing to give up fishing in order to get a job with the development or operation of Pebble Mine," with 73% disagreeing strongly. Only one respondent agreed with this statement.

Discussion

Identity theory provides a useful framework for understanding how community members experience the fishery. Stryker and Serpe (1994) found that hierarchical salience is predictive of which identity will take precedence and motivate attitudes and behavior. Our findings support this—identity stratifies people's perception of the resources and development and can be used predictively. Those who self-identify as fishers will place higher value on natural resources and perceive greater risk from development of Pebble. They are also more likely to be informed about Pebble and less likely to support it.

Identity theory also posits that greater commitment to an identity will result in an increase in that identity's salience (Stryker 1980). The greater the number of social ties and emotional investment, the more committed one will be to maintaining (and invoking) that identity (Stryker 1992). One reason fishing enjoys a clear advantage over most other competing identities may be its positive effect on other highly salient identities, like family and friend. Repeatedly, we heard from fishers that one of the things they enjoy about fishing in this community is the connection to their families and friends. In a community without electricity, computers, phones, and televisions, the intimacy of interaction is not mediated or interrupted by the hectic pace of modernity and its trappings. There is time both to visit and to work hard in a cooperative environment, all in the context of incredible natural beauty. Future research should more robustly examine which factors predict the intensity of identity.

Given the importance of fishing and the Nushagak Beach community to these fishers, it is not surprising that they value the natural resources that support the fishery—clean water, air, wilderness, fish populations, and wildlife. One might also expect that stakeholders vested in the extraction of one natural resource (e.g., salmon) would be critical of other competing extractive uses (e.g., mining). Indeed, this was the case. Fishers expressed two major concerns related to development and operations associated with Pebble: It would directly harm the fishery, and it would cause consumers to question the quality and safety of salmon from Bristol Bay. Several community members mentioned the disastrous affect of the *Exxon Valdez* oil spill on the market for Bristol Bay salmon in the early 1990s, and speculated that upon learning of a major mining operation in the watershed, consumers would perceive Bristol Bay salmon as tainted and stop buying them. "Someday Pebble Mine pollution will show up in our wild salmon and the reputation of wild salmon will tumble, accurate or not the price will tumble with it."

Accordingly, fishers' views of the Pebble Mine development were predominantly characterized by cautiousness and fear connected to impacts on water quality, fish, and other natural resources in the area. They draw clear connections between healthy natural resources and the way of life they enjoy as fishers at Nushagak Beach. Our data indicate that fishers at Nushagak Beach overwhelmingly view Pebble as posing an unacceptable level of risk. Fishers also indicated some level of inevitability citing the state of Alaska's track record of approving mining proposals, and the power and influence of the mining corporation versus the local stakeholders in the fishery and other (nonmining) natural resources in the area.

Identities are self-conceptions that individuals construct based on the structural role positions they occupy (Hogg et al. 1995). In addition to the negative financial impacts, fishers indicated that a fishery collapse, from either depleted stock or loss of economic market for their product due to perceived fish contamination from

mining, would negatively affect life satisfaction, relationships with significant people in their lives, connection to the natural environment, and way of life. These broad social-psychological impacts may be explained by the literature on role loss. Undesired role loss can cause distress, anxiety, alienation, and sadness (Engstrom 2005; Kiecolt 1994; Thoits 1983). A threat to the fishery is a threat to a highly salient, role-based identity: fisher. Since fisher is a highly salient identity, identity theory would predict that those with this identity will be motivated to act in ways that protect this identity and the role on which it is based.

Conclusions and Implications

The community members of Nushagak Beach do more than benefit economically from the Bristol Bay fishery—they fish for the way of life it represents. In addition to their economic livelihood, fishing in Nushagak contributes to community members' self-concept, connection to nature, strength of social ties, and valuation of natural resources. There is growing recognition that preserving the watermen's way of life and preserving their culture are important goals in and of themselves (Acheson 1988; Upton 2003; Wasserman and Womersley 1997). The implication of these findings is that seasonal fishing community members should be recognized stakeholders, and their social and cultural voices should contribute to the decision-making process as the Pebble Mine proposal moves forward. A second conclusion of this study is that identity theory is a useful framework for understanding the relationship between individuals and nature in particular contexts. Future research should couple role identity with sense of place to assess whether fishermen would be happy fishing elsewhere or whether valued role identities are place specific.

Notes

1. Togiak, Nushagak, Naknek-Kvichak, Egegik, and Ugashik districts.
2. This assessment is made based on publicly visible data on race, gender, age, and fisher type (captain, crew, shore support) for this community.
3. "Togetherness" was used in this survey as a substitute for solidarity after cognitive interviews with fishers and members of the Bristol Bay Native Association who thought it better matched the language level needed for this study.
4. Percentages include responses of *negative* and *extremely negative* impact on each item.
5. Some of the disparity in relative salience of identities between familial and other identities is an artifact of combining several discrete response categories to construct the "family" category. Thus, there were many more opportunities for respondents to select a family identity than the other identities listed. Since the total would exceed 100%, these results are presented as number of responses per category.

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