Human and Environmental Well-being in Alaska's Kachemak Bay Watershed: **An Ecosystem Services Assessment**

Ellie Flaherty, Kate Kirkpatrick, Trey Snow
Advisor: Dr. Julia Wondolleck

Summary Points:

The Kachemak Bay watershed, located on the Kenai Peninsula in Alaska, encompasses several terrestrial and aquatic ecosystems that provide a range of benefits and services that are not easily quantified. This webinar highlighted methods and findings from a Master's project advised by Dr. Julia Wondolleck, which provided insights about ecosystem services valued in Kachemak Bay - using a socio-cultural, place-based, ecosystem services framework - for the Kachemak Bay National Estuarine Research Reserve (KBNERR). In addition to hearing from the students, their partners at KBNERR shared how they hope to apply their findings, and offered ideas for others interested in working with a student team in the future.

Master's projects are interdisciplinary capstone experiences that enable University of Michigan School for Environment and Sustainability (SEAS) master's students to develop solutions to pressing problems faced by real-world clients.

Summary Points:

Ellie Flaherty has experience in policy and program analysis as well as environmental compliance support, and currently works as a Research Associate for the NERRS Science Collaborative. Her professional and academic background was valuable in understanding the Kachemak Bay area's political landscape and identifying key stakeholders, user groups, and decision-makers.

Kathryn Kirkpatrick holds a particular interest in wetland restoration, fostered by various work experiences in ecological consulting, wetland banking, and independent research. This background was valuable in understanding and communicating the diverse biophysical ecosystem services present in the Kachemak Bay watershed.

Trey Snow has experience in economics and research, which provided valuable insights throughout the project's development and in navigating existing studies and literature on ecosystem services. Following his bachelor's in economics from Bucknell University in 2016, Trey spent time across the US from the Montana backcountry with the US Forest Service to an organic farm in New England.

Syverine Bentz is interested in landscape change, coastal processes, and ecosystem services. She grew up on Kachemak Bay and started as a science collaborative and discovery lab volunteer at KBNERR. She currently works in the Coastal Training Program providing workshops, training and technical assistance.

Dr. Julia Wondolleck is an associate professor at the School for Environment and Sustainability at the University of Michigan and a core team member with the Science Collaborative. She is a collaboration scholar and practitioner, and advised the project team.

Master's Projects

- *Capstone requirement for MS degree*
- *Interdisciplinary, team-based research*
- *Client focused, professional product*
- *3-6 students per team, 20-25 projects per year*
- *Public and private sector clients*
  - *Local, state, federal agencies; communities; NGOs*
  - *Private sector companies*

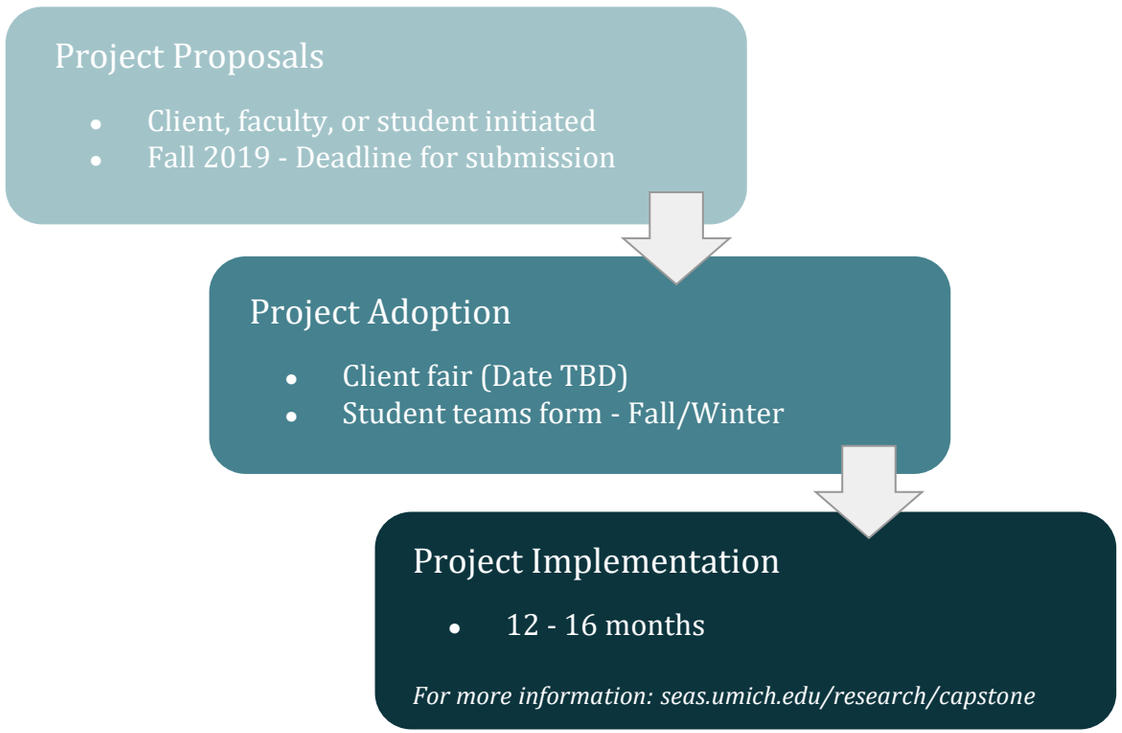
Summary Points:

Julia began the presentation by providing background on the genesis of the project, and the University of Michigan's School for Environment and Sustainability (SEAS) Master of Science program. Some key program facts and figures include:

- About 150 students are enrolled in the SEAS Master of Science program per year, with a total current enrollment of over 300;
- Specializations include policy and planning; conservation ecology; sustainable enterprise; behavior, education and communication; environmental informatics; and environmental justice;
- About one quarter of students choose to produce an individual thesis, and three quarters of students choose to work in teams of 3-6 students to complete a Master's project; and
- All projects focus on addressing real-world problems for real-world clients - mostly public sector, but a few are private sector.

Summary Points:

Master's Project Process



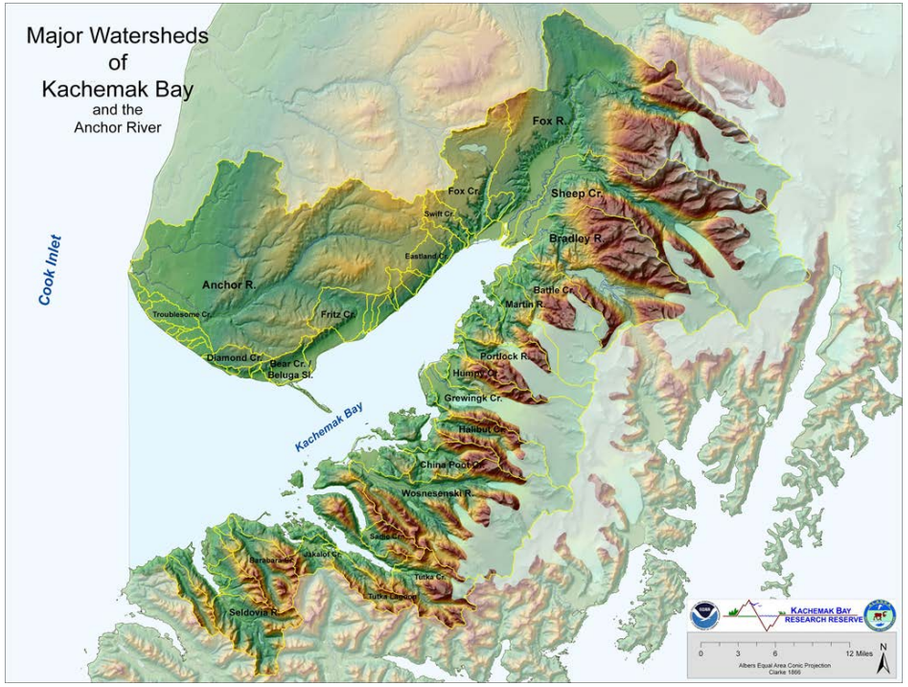
Chapter 1. Introduction

Summary Points:

Poll: Which statement best describes your experience with ecosystem service assessments?

- I'm just learning about these ideas and their applications (41.67%)
- Ecosystem service concepts inform my work, generally (50.00%)
- I use the results from ecosystem service valuation projects (4.17%)
- I have worked on ecosystem service assessments (16.67%)

Kachemak Bay



Summary Points:

Trey provided an overview of the study site area, the Kachemak Bay watershed. Some key facts and figures include:

- The Kachemak Bay area is made up of alpine and sub-alpine environments and is dominated by wetlands and forests;
- The area is home to Kachemak Bay state park;
- Over 100 species of fish, 11 species of marine mammals, and over 400 species of macroinvertebrates have been recorded within the watershed; and
- The Kachemak Bay has a 28-foot tidal range which helps to support macroinvertebrate biodiversity.

Summary Points:

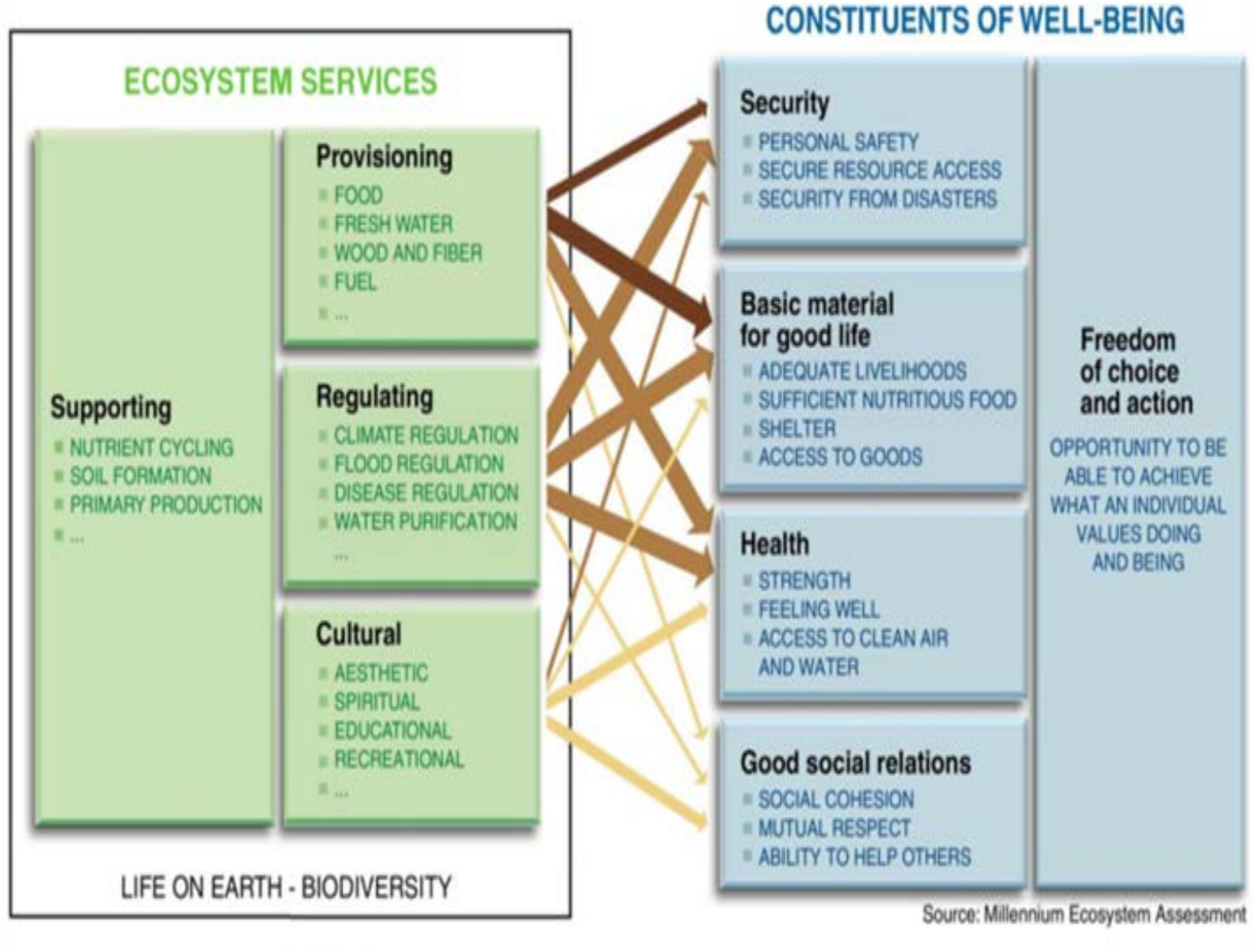
Client Goals:

Kachemak Bay National Estuarine Research Reserve

- Engage the community in research and management of the Kachemak Bay watershed
- Integrate ES framework into 5-year Reserve Management Plan
- Pilot project for NERRS

Summary Points:

Of the several different definitions of Ecosystem Services that exist in the literature, the team decided to use Gretchen Daly's all-encompassing definition in their analysis to better fit the Kachemak Bay.

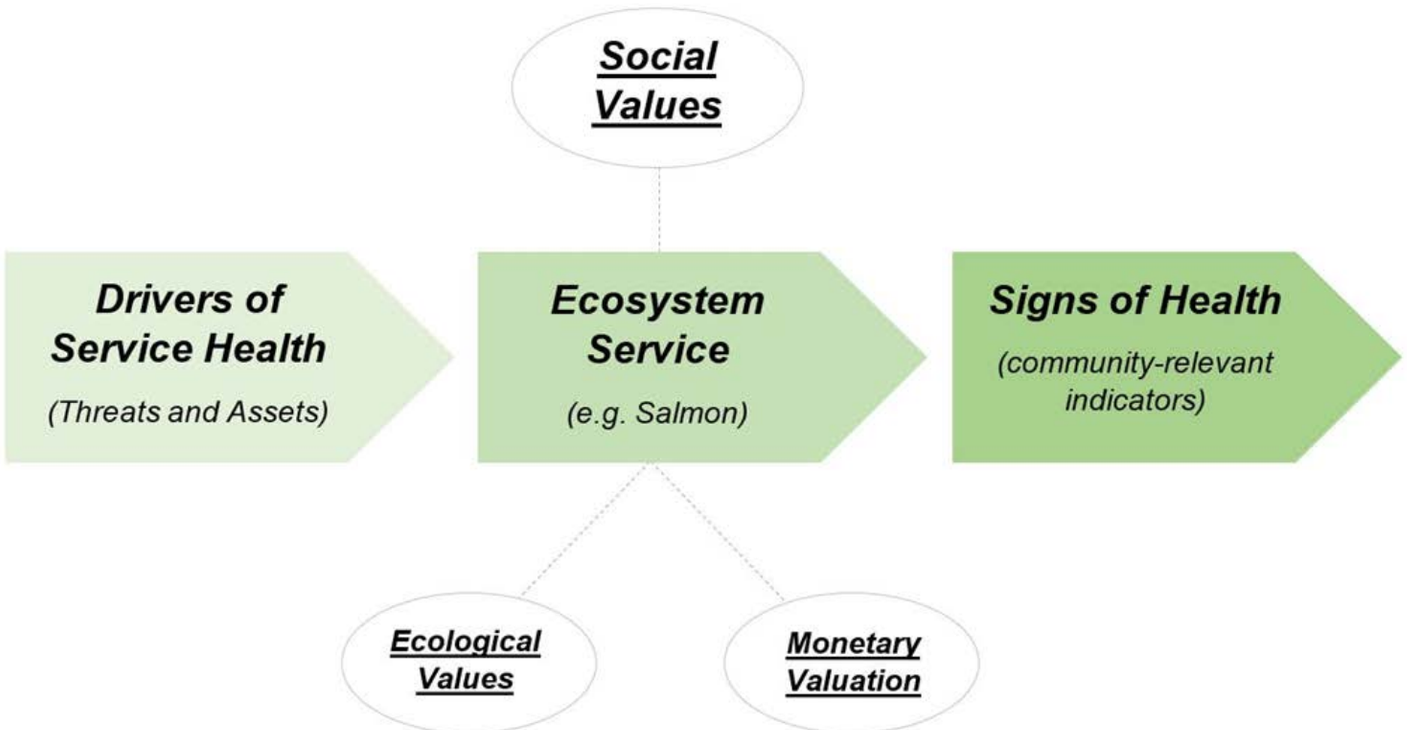


Summary Points:

This diagram is from the Millennium Ecosystem Assessment (MEA), which was funded and proposed by the United Nations. A couple of takeaways from this diagram and the field of ecosystem services, in general, include:

- The MEA report and subsequent framework aimed to connect ecosystem structures and processes - shown on the left - to elements of human social well-being - shown on the right.
- Two key questions this framework seeks to answer include: 1) How are these ecological functions and natural systems supporting human well-being and benefitting the population; and 2) How can we incorporate - or account for - the value of ecosystems to inform local, state, federal, or global decision making?

Roadmap



Summary Points:

The diagram shown here explains the team's approach to identifying and understanding what ecosystem services are valued in the Kachemak Bay area. While many previous studies have explored ecological or monetary values associated with ecosystem services, this study focused on social values. Social values represent other, non-monetary ways that people benefit from, and interact with, a particular landscape or ecosystem. The benefits that people perceive as derived from an ecosystem or landscape can be translated into socio-cultural ecosystem services.

Research Questions

Summary Points:

After identifying the socio-cultural ecosystem services that are valued by interviewees, the team worked to identify the perceived drivers of service health, as well as how these drivers impact the health and/or well-being of valued services. The team hoped to answer the following questions:

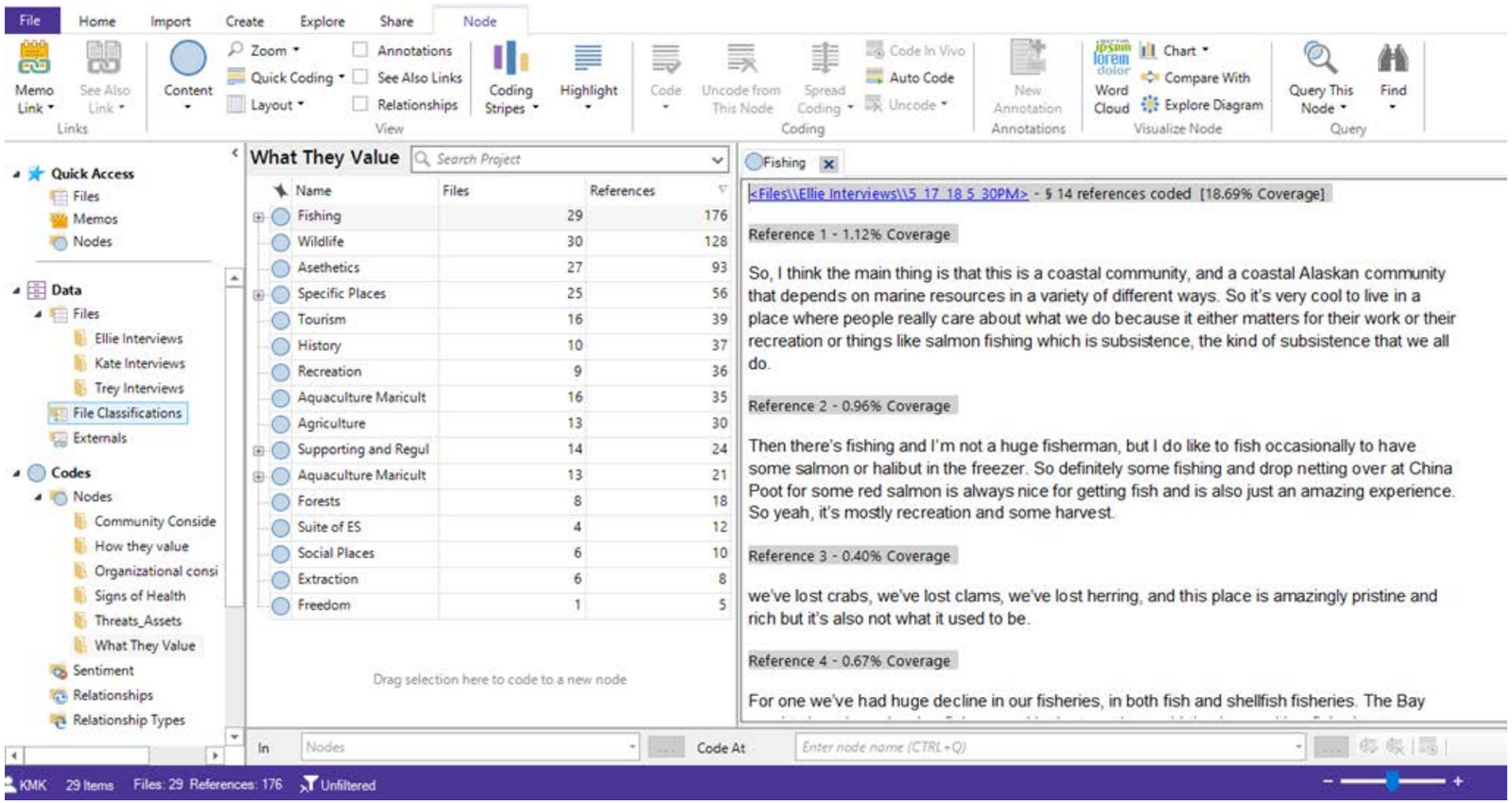
- What are the threats or assets that are positively or negatively impacting ecosystem health, and what are the perceptions of these drivers?
- How do people talk about the signs of health within an ecosystem?
- How can people tell when ecosystems are pristine, healthy, or degraded?
- How can one bridge the gap between ecosystem service literature and interview responses?

These questions sought to provide KBNERR with a list of ecosystem services valued by their community, as well as community-relevant indicators and language to help discuss and monitor these services.

Summary Points:

Methods

NVIVO



Summary Points:

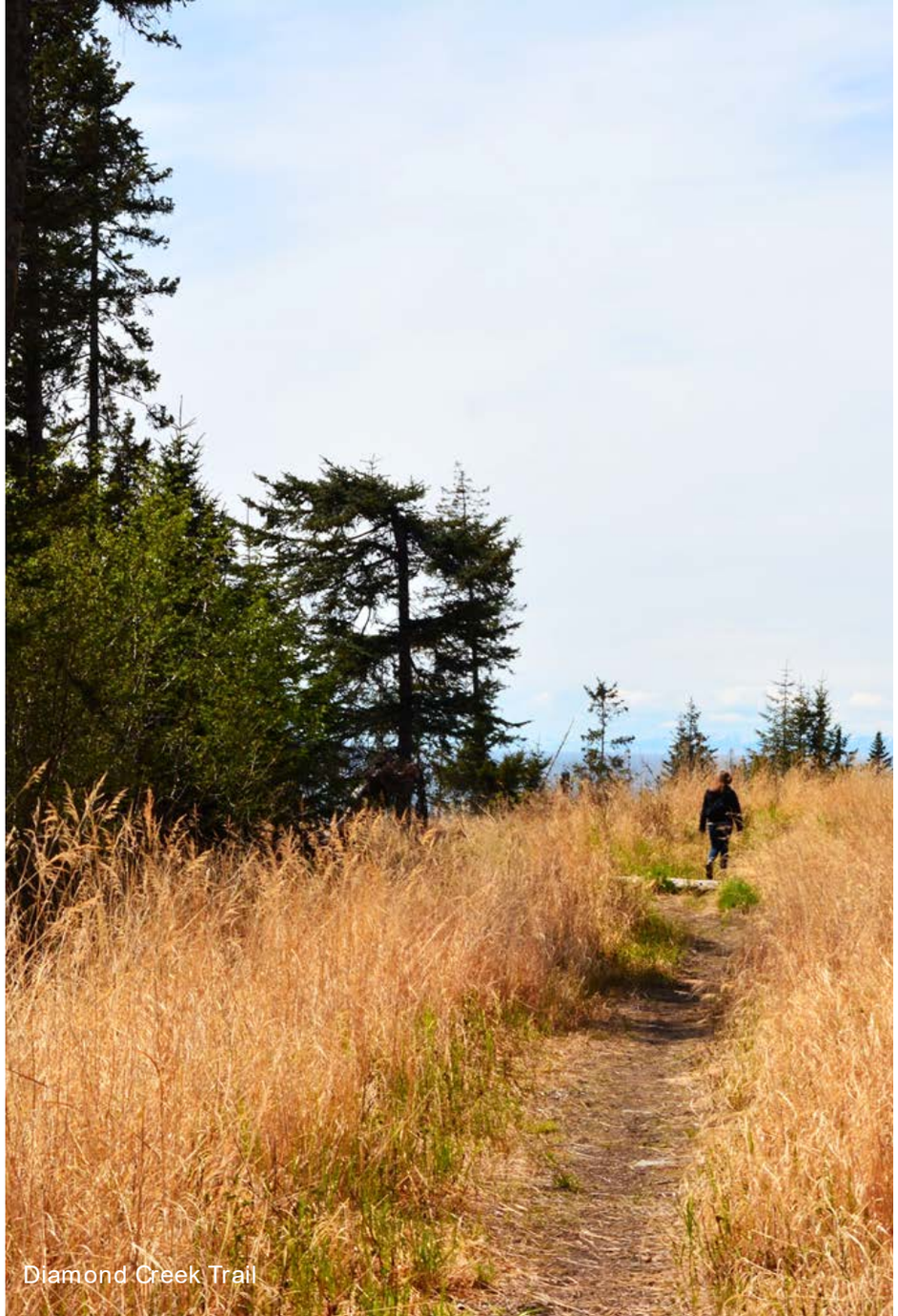
The team primarily relied on the NVivo 12 software to code and analyze interviews. Applying codes manually, the team then used NVivo to organize and catalog them, and identify recurring themes.

Terminology**:**

- **NVivo software**: A qualitative and mixed-methods data analysis software tool.

Site Visit & Interviews

- Semi-structured interviews with 31 participants.
- Sampling: Key informant and snowball.
- Analysis: Memoing, transcription, inductive and deductive coding using Nvivo 12 software.



Diamond Creek Trail

Summary Points:

Terminology**:**

- **Inductive coding**: A method for coding qualitative data in which codes are derived from the data - e.g., participants' responses are used to code the data.
- **Deductive coding**: A method for coding qualitative data in which researchers produce coding schemes prior to applying them - e.g., researchers produce a coding scheme based on literature review and define it for the circumstances.
- **Snowball sampling**: A sampling technique in which existing study subjects recruit additional subjects from among their known contacts or acquaintances.
- **Key informant**: In sampling practices, referring to the person with whom an interview about a particular organization, social program, problem, or interest group is conducted.

Summary Points:

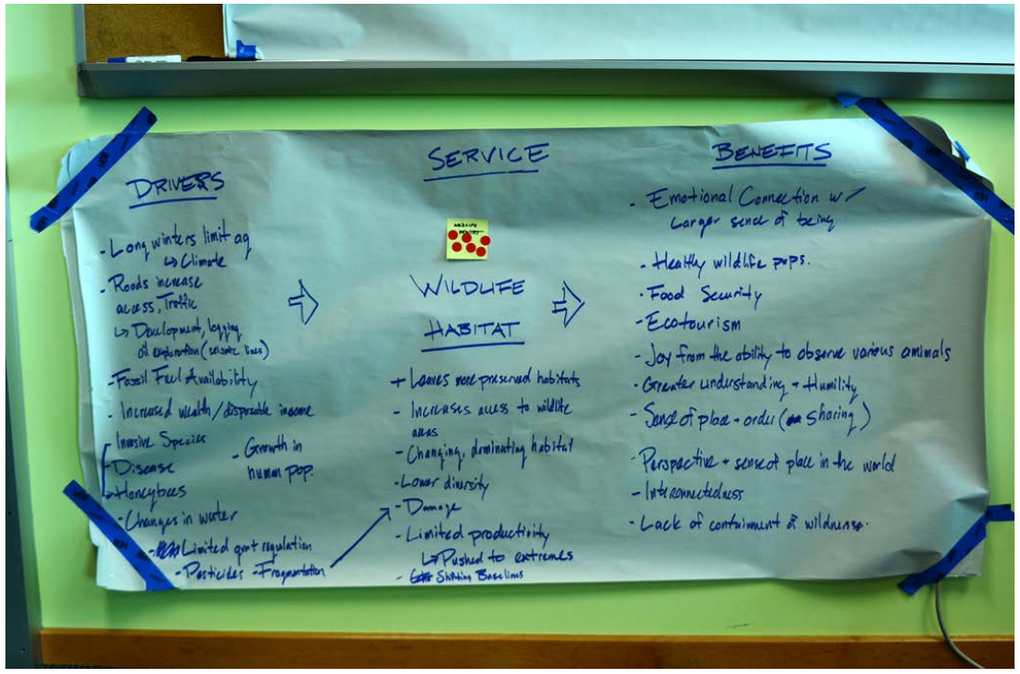
Interviews lasted one hour and captured perspectives from a range of sectors.

Interviewee Sample

Perspectives from the following were represented in 31 interviews:

- Local government
- State Government
- Federal Government
- Non-profit
- Research
- Business Owner
- Recreation
- Long-term resident
- Homesteader
- Economic/ Development
- Artist
- Ecotourism
- Conservation
- Fishing
- Education

Focus Groups



Summary Points:

The team conducted focus groups with KBNERR's Community Advisory Council. The sessions began with a brainstorming exercise that asked participants to identify their perception of benefits received from, and ecosystem services provided by, the Kachemak Bay ecosystem.

The focus group facilitator sorted participant responses into the four categories of ecosystem services presented by the Millennium Ecosystem Assessment. Participants then voted on the services they believed to be of the greatest personal or community value using red dots, as seen in the photos.

The facilitator then selected the most highly-rated ecosystem service to be the topic of additional conceptual modeling and brainstorming. At this stage, participants identified the drivers that they perceived to be impacting this service, and how these drivers impact the health, well-being, and/or availability of this service.

Summary Points:

Results

Summary Points:

Chapter 2. What the Community Values

What resources are important to you?

- *How do you interact with your natural landscape?*
- *Are there particular places/resources in the Kachemak Bay region that are important to you or your family?*
- *Describe the last time you were there.*
- *What specifically is valuable about this place/resource to you? What is its relative importance to you or your community?*

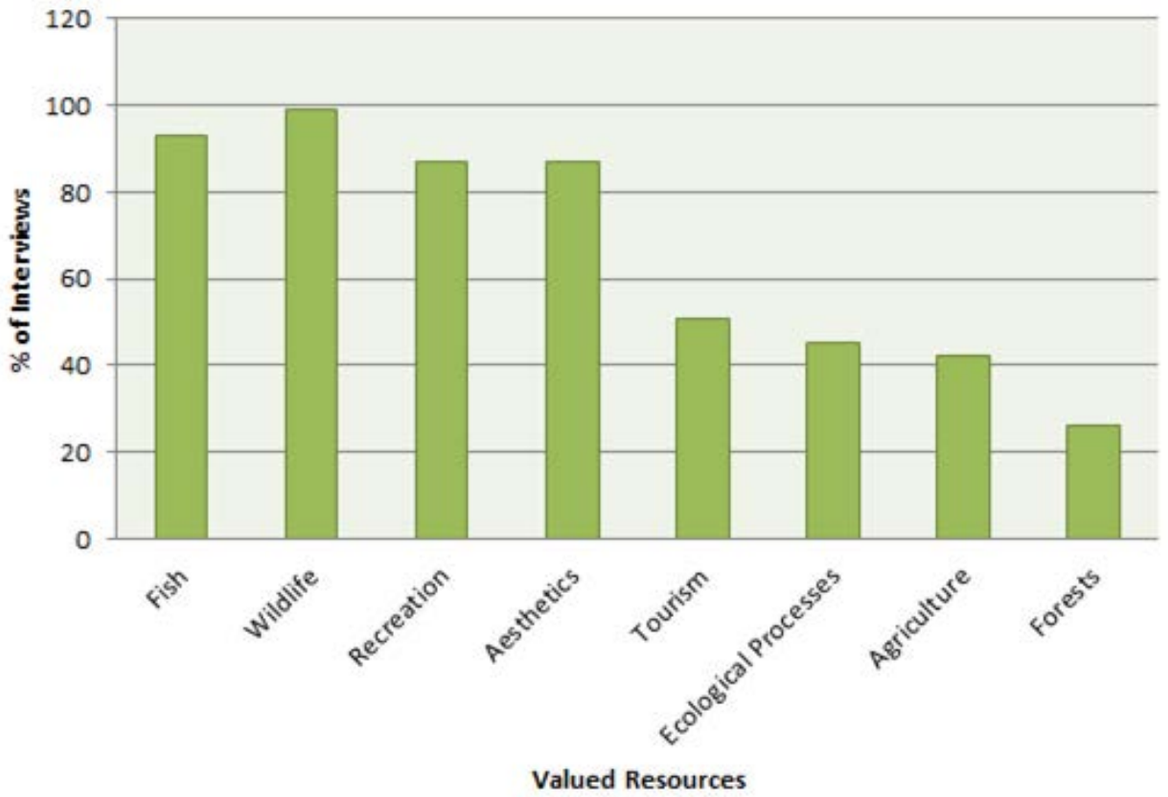
Summary Points:

The team posed this question to identify which ecosystem services were important to interviewees.

As many people are unfamiliar with the concept of ecosystem services, the team realized they needed to ask more refined questions to gain insight into which resources interviewees valued most. The example questions shown on the slide allowed the team to tease out how people interact with the Bay ecosystem, what is valued in those experiences, and then determine which ecosystem services described those interactions.

Summary Points:

Frequently Discussed/Valued Resources



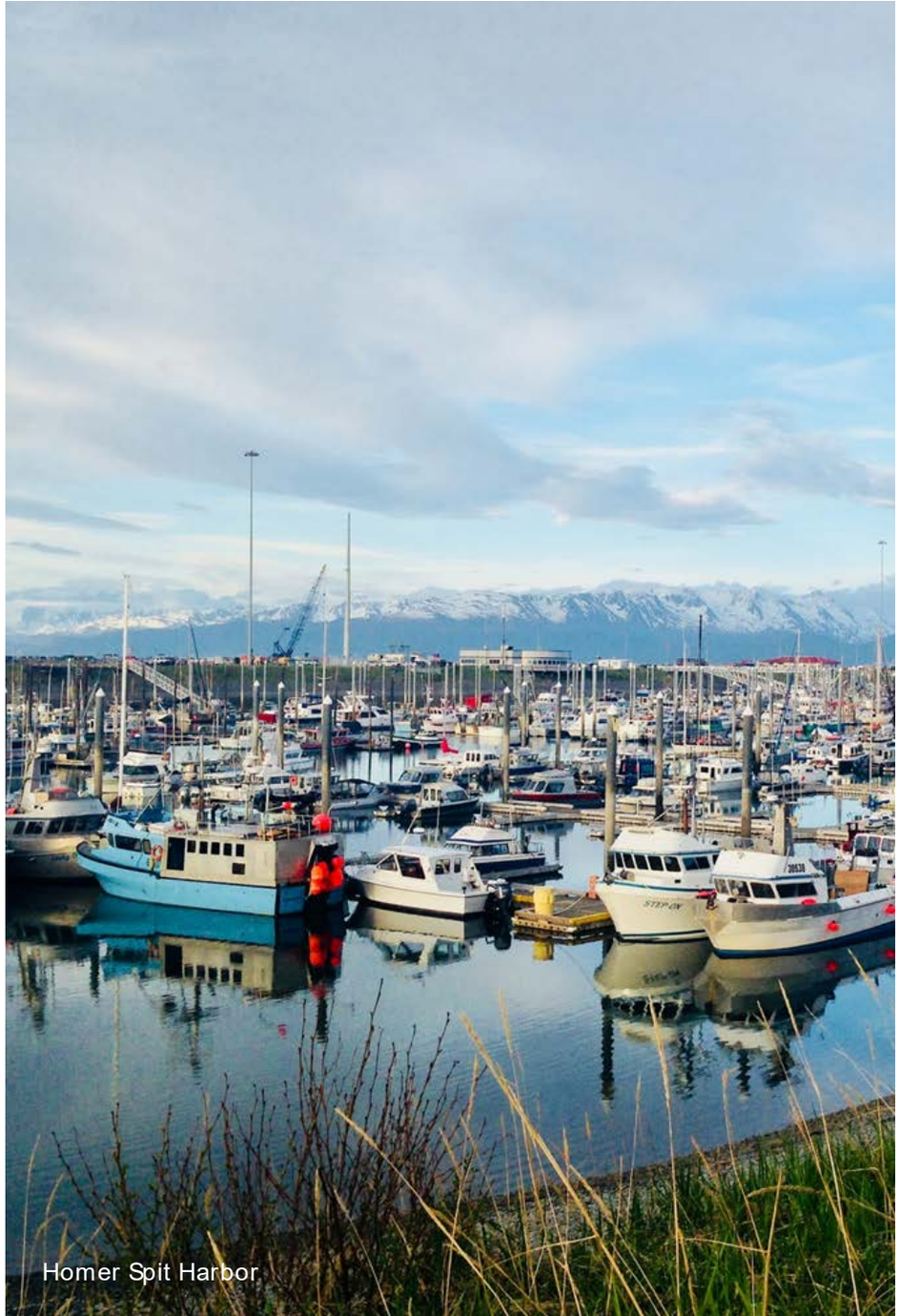
Benefits from Fisheries

Summary Points:

Each resource has many benefits, and communities value resources in a variety of ways. The following six slides give examples of the dimensions for which community valued fish as a resource.

Fish:
Economic

"[I get] ***strong economic benefits*** *[from fishing]. It's been my husband's* ***business here for 30 years*** *and 10 years before that in Kodiak. But I have also derived great benefits –* ***my kids are captains*** *because of all the sea time they had and no matter what they go off and do, being a sea captain is a great benefit."*



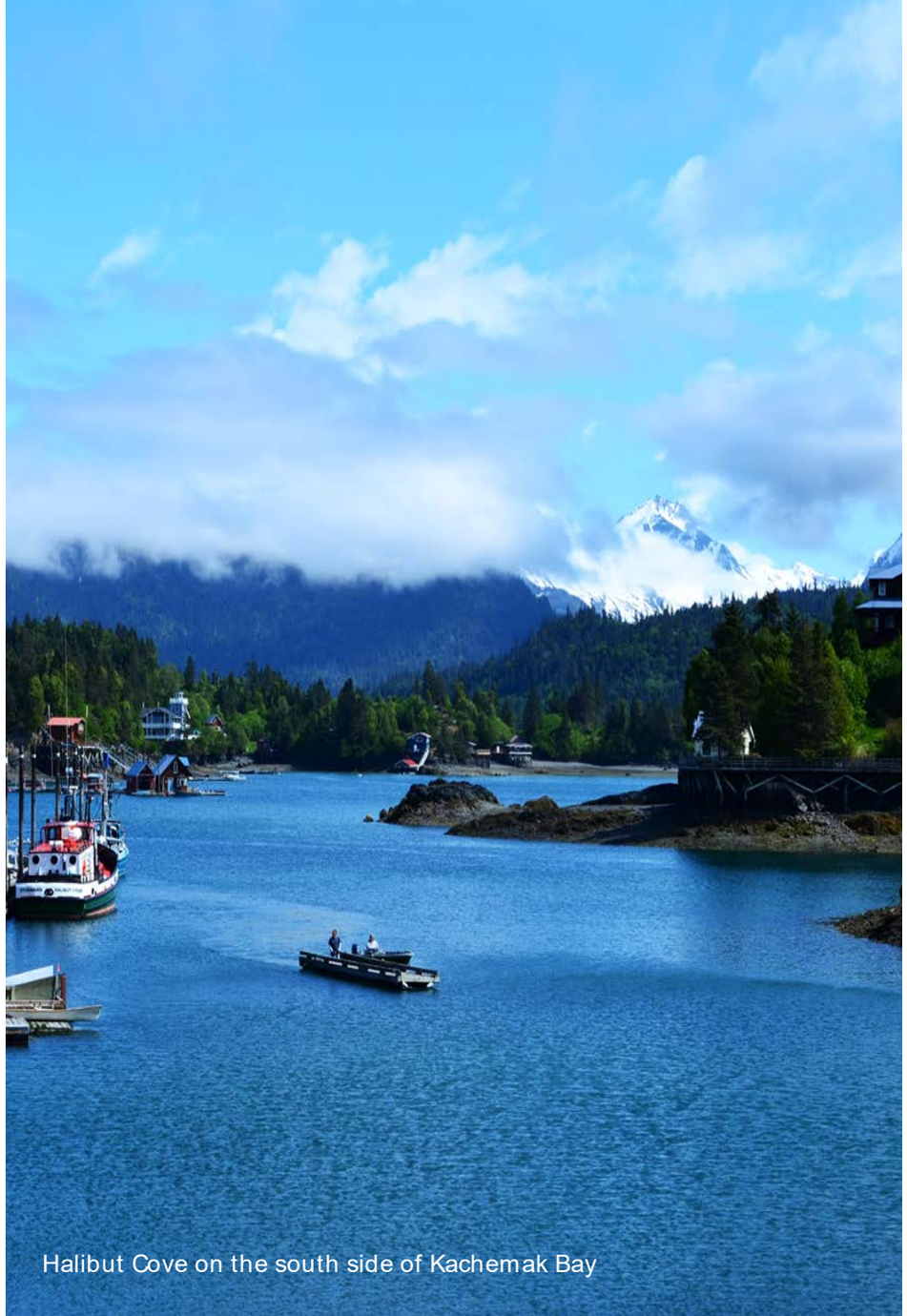
Homer Spit Harbor

Summary Points:

Many interviewees noted the economic benefits of fish, as many Kachemak Bay area residents make their living on the area's fisheries in some capacity. Fisheries-based occupations in the Kachemak Bay area range from commercial and sport fishing to ecotourism businesses and restaurants.

Fish:
Community Culture

*"I think the main thing is that **this is a coastal community**, and a coastal Alaskan community that depends on marine resources in a variety of different ways. So, it's very cool to live in a place where **people really care about what we do** because it either matters for their work or their recreation or things like salmon fishing which is subsistence, the kind of subsistence that we all do."*



Halibut Cove on the south side of Kachemak Bay

Summary Points:

Interviewees also discussed how the area's fisheries have contributed to Homer's community culture, and the area was often described as a "coastal community" or "fishing community."

Fish:
Subsistence

*"Being able to take a water taxi across the Bay and hike to a glacier or fishing…**we do more like dip-netting**. That's one thing, we're not big sport-fishermen, but we have a lot of friends that are fishermen and they drop off fish to us and then **we go dip-netting in the Kenai, and just having access to be able to harvest our own food is really important**."*

Dip-netting on Kenai Peninsula http://www.alaska.org/detail/dip-netting-on-the-kenai-elsewhere

Summary Points:

Many interviewees valued the subsistence fishing opportunities available in the Kachemak Bay watershed. Some interviewees relied on subsistence fishing themselves, while some recognized that other community members - particularly native groups - rely on subsistence fishing. Subsistence activities may include dip net fishing for salmon, or harvesting oysters and other shellfish when they are available.

Terminology:

- **Subsistence fishing**: Fishing, other than sport fishing, that is carried out primarily to feed the family of the person who is fishing.

Fish: *Recreational & Sport*

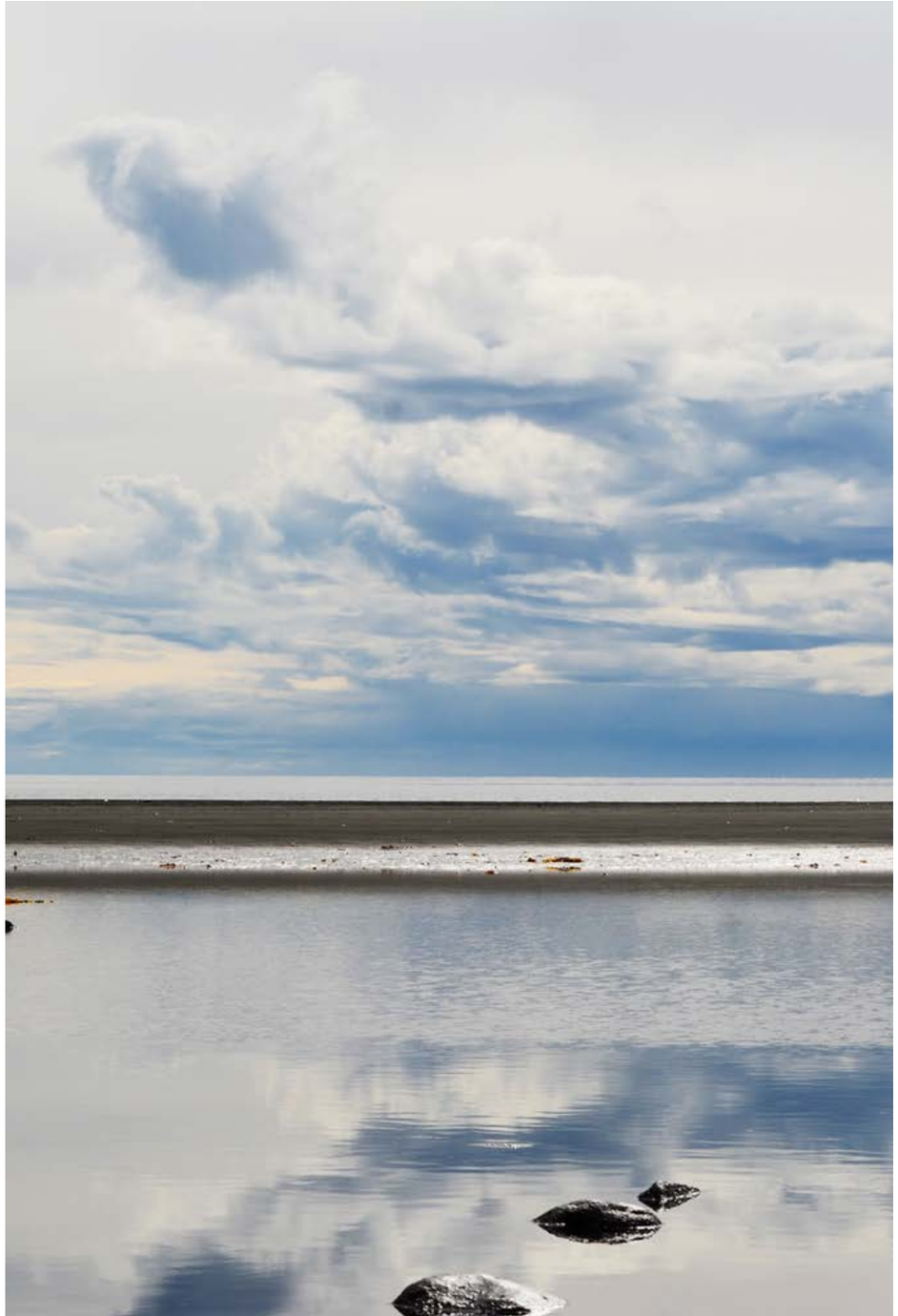
"But I know there's tourists that come down here, and we're kind of the playground for Anchorage and there's a lot of... ***people that want to come to Homer/Kachemak Bay to kind of get away from the city so they come down to fish*** *and be on the beach and go across the Bay and do things."*

Summary Points:

The Kachemak Bay area attracts many tourists because of recreational and sport fishing opportunities, which many interviewees noted as a benefit. Many interviewees also fish recreationally themselves and associated multiple benefits with the activity.

Fish: *Personal Connections*

Interviewee 1: *For years we subsistence fished on the Spit, and* ***it was a family thing****, we'd camp out the night before, get up and set the net.*
Interviewee 2: *Had a fire, had the kids there…*
Interviewee 1: *We'd eat the first fish that we caught, and we'd spend a couple nights out there and run out twice a day and do all that. So,* ***our son grew up and was like, 'Oh, it's fishing time, yay!****'*

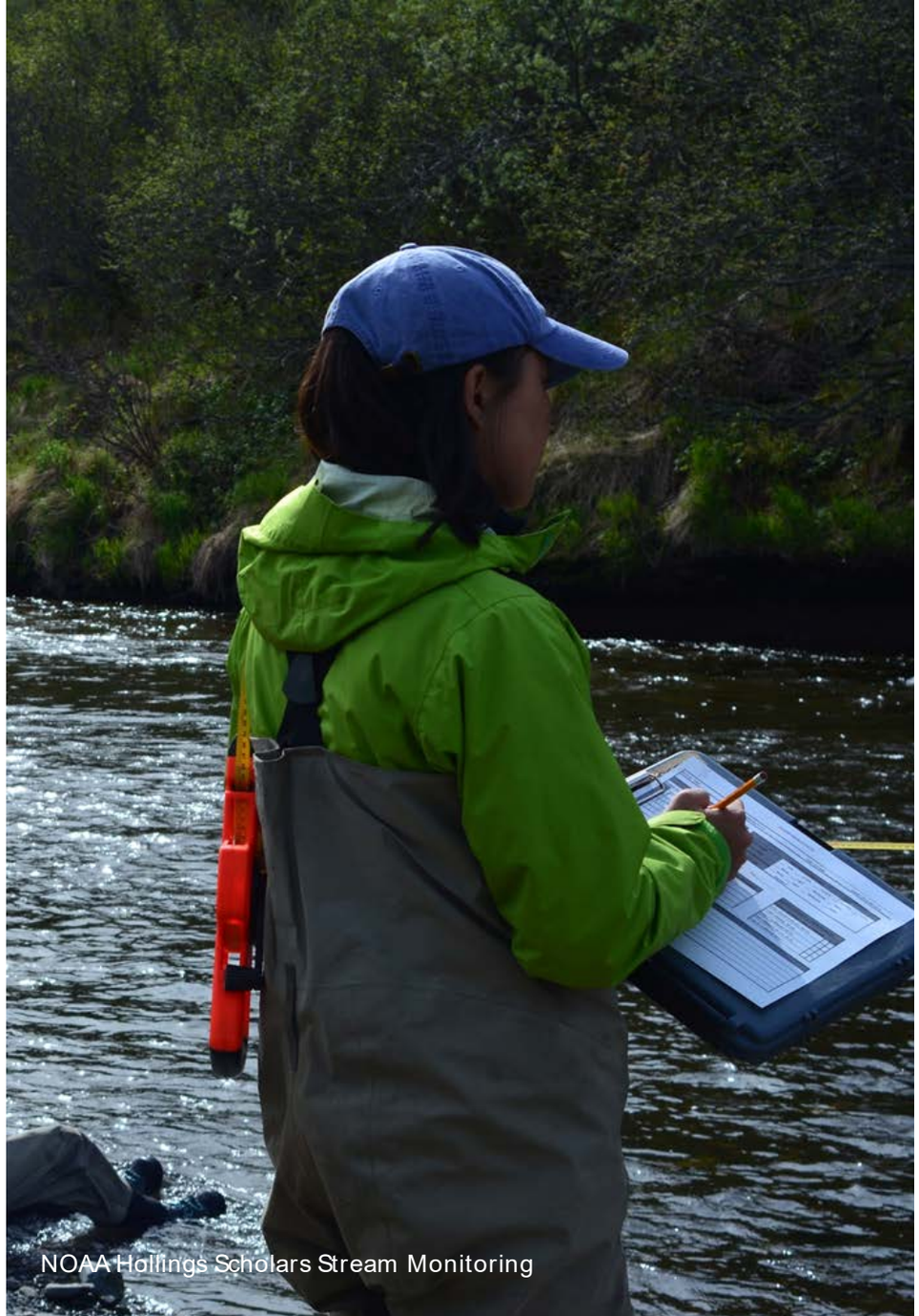


Summary Points:

Because the interviews often consisted of storytelling, many interviewees often described their personal connections to the Bay and the fisheries.

Fish: *Research & Education*

"There's a lot of streams around here and many people didn't think there were fish in them or anything to do with fish. But, ***[KBNERR], they found out that most of these streams that feeds into not only Kachemak Bay, but also Cook Inlet, all have different types of fish****... But, in the 'olden days,' a lot of people ... would take their four wheelers and just drive across these areas and wipe them out, so the fish couldn't get up them."*



NOAA Hollings Scholars Stream Monitoring

Summary Points:

Many interviewees saw opportunities for research and education as a benefit provided by the area's fisheries, as well as an asset to the fisheries themselves. Interviewees discussed the importance of research and education in fisheries management, the protection of salmon habitat, and in community education and outreach.

Summary Points:

In addition to understanding what is valued, the team also wanted to know what interviewees perceived to be threats and assets to ecosystem health.

Chapter 3. Drivers of Ecosystem Change

What are the greatest threats/assets to the Kachemak Bay?

- *What are the signs that indicate whether this service is healthy/successful?*
- *Can you describe a time that this place/service seemed degraded or threatened?*
- *What would you say are the greatest threats to this resource?*
- *What would you say are the greatest threats to other natural systems in the Kachemak Bay area?*

Summary Points:

The team asked these questions to gain additional insight into what is valued by interviewees, and understand interviewee perceptions of potential threats to the health of valued services.

Perceived Threats

To Kachemak Bay

Perceived Threat	*% of Interviews*
Increasing Development	**80**
Climate Change	61
Social Division/Conflict	**58**
Overuse/Overharvesting	**55**
Population Growth	**51**
Extractive Industries	45
Aquaculture	35
In-migration	23
Pollution	23
Public Awareness & Attitudes	19
Retirees & Second-Home Owners	16
Increasing Tourism	13

Summary Points:

Many interviewees discussed local threats, including increasing development, social issues, and overuse of resources. Interviewees provided specific examples and stories about how these perceived threats were impacting the Kachemak Bay area. Many interviewees also described climate change as a threat to the area, but they often discussed this topic as more abstract and external.

Perceived Assets

To Kachemak Bay

Perceived Asset	*% of Interviews*
Vibrant & Diverse Community	74
Common Values & Hopes	71
Effective Resource Management	71
Scientific Community & Outreach	61
Aquaculture/Mariculture	52
Engaged & Concerned Community	52

Summary Points:

The team gathered interviewee perceptions of assets to the Kachemak Bay area through conversations about perceived threats.

What are the signs that this resource is healthy?

- *What are the signs that indicate whether this service is healthy/successful?*
- *Can you describe a time that this place/service was particularly pristine/abundant/healthy/prevalent?*
- *Can you describe a time that this place/service seemed degraded or threatened?*

Summary Points:

The team also wanted to know how interviewees perceived the overall health of the places or resources they considered important, a line of questioning based on Lydia Olander's work on "benefit relevant indicators (BRI)."

Perceived Signs of Health

To Kachemak Bay

Perceived Sign of Health	*% of Interviews*
Presence and Quantity of Valued Species	81
Management Decisions	58
Biodiversity	45
Physical Size of Valued Species	20
Quality of Resources (Fish, Timber, Water)	16
Presence or Absence of Various Threats (invasive species, pollution/litter, etc.)	16

Summary Points:

Perceived “signs of health” can be useful to KBNERR in communicating and engaging with community members, as interviewee perceptions reflect their opinion on the state of the ecosystem and the quality of valued resources.

Summary Points:

Chapter 4. Perceptions of Management Decisions

How do management decisions impact the Bay?

- *In what ways do management decisions of federal, state, or local organizations positively or negatively affect valued places or resources?*

- *If you were in charge of planning and decision making concerning the Kachemak Bay area's natural resources:*
  - *What would you change?*
  - *What would you keep the same?*

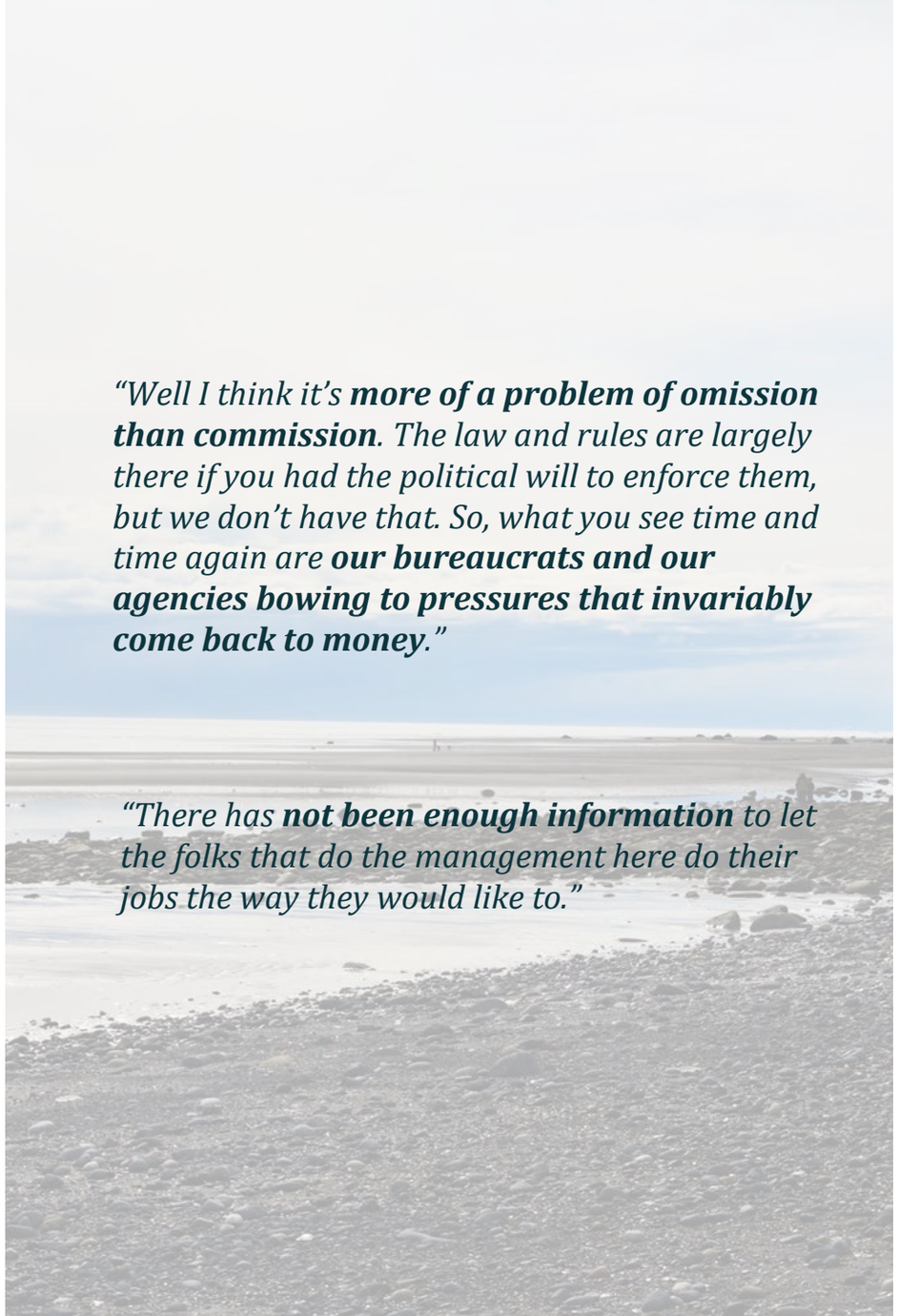
Summary Points:

These questions helped the team to further understand the ecosystem services valued by interviewees, and how they perceived management decisions and policies to be impacting available resources.

Negative Perceptions

Natural Resource Management

Management-Related Topic	***% of Interviews***
Science Gaps	51
Fisheries Management	45
Agency Budget Constraints	35
Political Influence	25
Disjointed/Ineffective Management/Policies	19
Insufficient Enforcement	9



Summary Points:

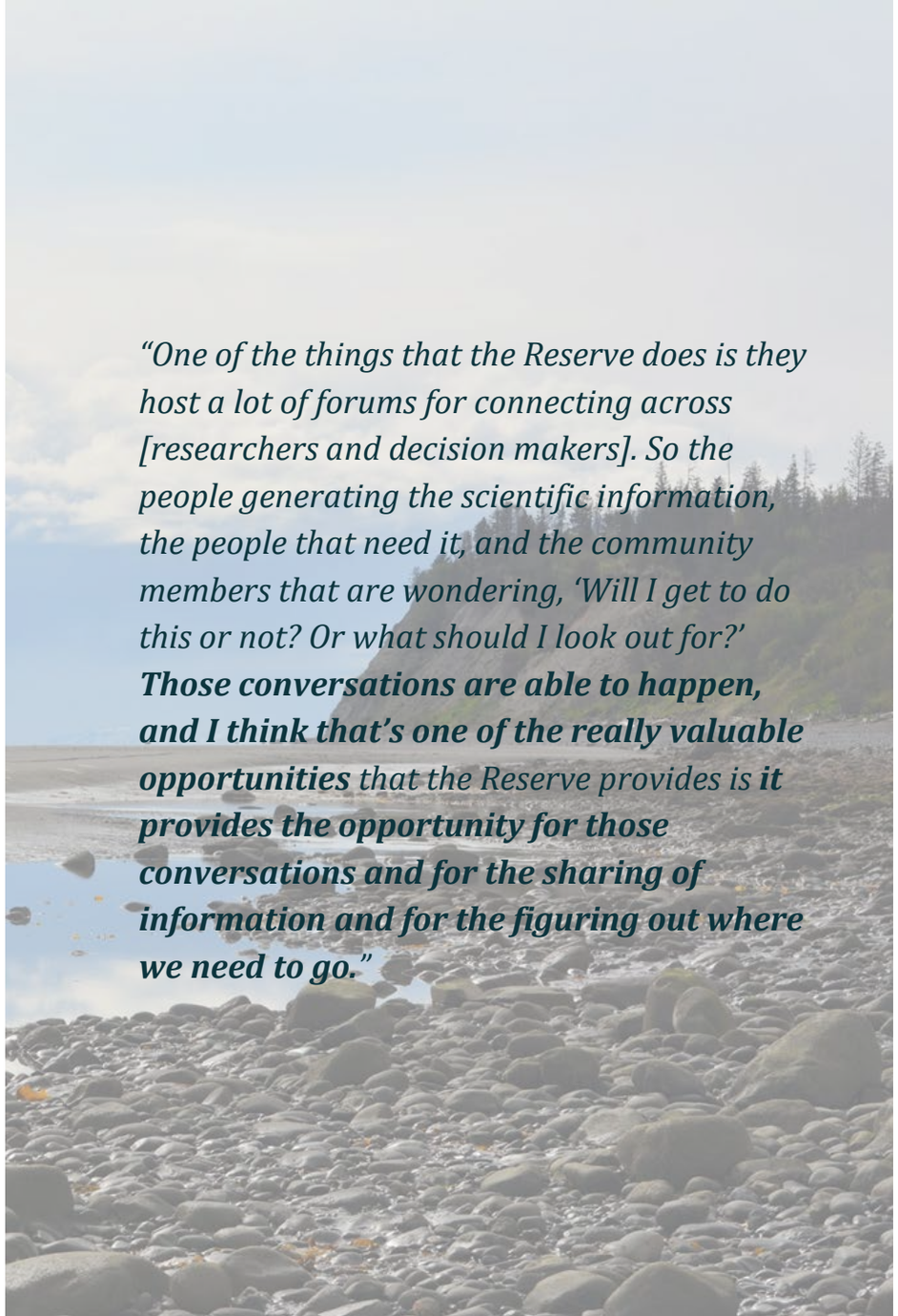
Interviewees expressed a range of negative and positive perceptions toward natural resource management, and individuals often expressed both negative and positive perceptions depending on the specific topic. The most frequently discussed aspects of natural resource management included fisheries management, hunting and harvest regulations, and land use policies.

The table displays emergent themes among interviewees that expressed some negative aspect of resource management. Some of these interviewees discussed the perception that management is often "reactive" instead of "proactive."

Positive Perceptions

Natural Resource Management

Management-Related Topic	***% of Interviews***
Federal & State Policies and Protections	58
Local Policies & Protections	29
Scientific Research	26



"One of the things that the Reserve does is they host a lot of forums for connecting across [researchers and decision makers]. So the people generating the scientific information, the people that need it, and the community members that are wondering, 'Will I get to do this or not? Or what should I look out for?' ***Those conversations are able to happen, and I think that's one of the really valuable opportunities*** *that the Reserve provides is* ***it provides the opportunity for those conversations and for the sharing of information and for the figuring out where we need to go."***

Summary Points:

Many interviewees discussed federally- and state-protected lands, zoning policies, and local research as assets to ecosystem health.

Summary Points:

Chapter 5. Ecosystem Service Analysis

KBNERR Social Value Typology

- Social value typologies
  - Cole's (2012) sixteen "social value types" to services provided by coastal ecosystems
  - Used by other NERRs (Mission-Aransas and Sapelo Island)
- Challenges applying Cole framework to KBNERR data
  - Place-based study

Halibut Cove Church overlooking Kachemak Bay

Summary Points:

The team used social value typologies (SVTs) - specifically, Zachary Cole's 2012 SVT developed for coastal areas - as tools for organizing results into an ecosystem service framework.

Some discrepancies emerged when applying Cole's framework to data collected in the Kachemak Bay area.

Terminology:

- **Social Values (Zachary Cole, 2012)**: The perceived attributes of a given ecosystem that are thought to result from a transactional concept of human-landscape relationship.
- **Social Value Typology**: A set of social values that represent human benefits provided by natural systems.

KBNERR SVT Framework

Consistent with Cole Framework

- Pristine/Natural
- Recreation
- Life-sustaining ecological processes
- Therapeutic
- Spiritual

Modified from Cole Framework

- Economic
- Access
- Culture
- Future
- Aesthetic
- Learning
- Subsistence
- Biodiversity

Original to KBNERR

Connections

- Connection to Community
- Connection to Self or Personal Identity
- Connection to Nature
- Connection to Family

Summary Points:

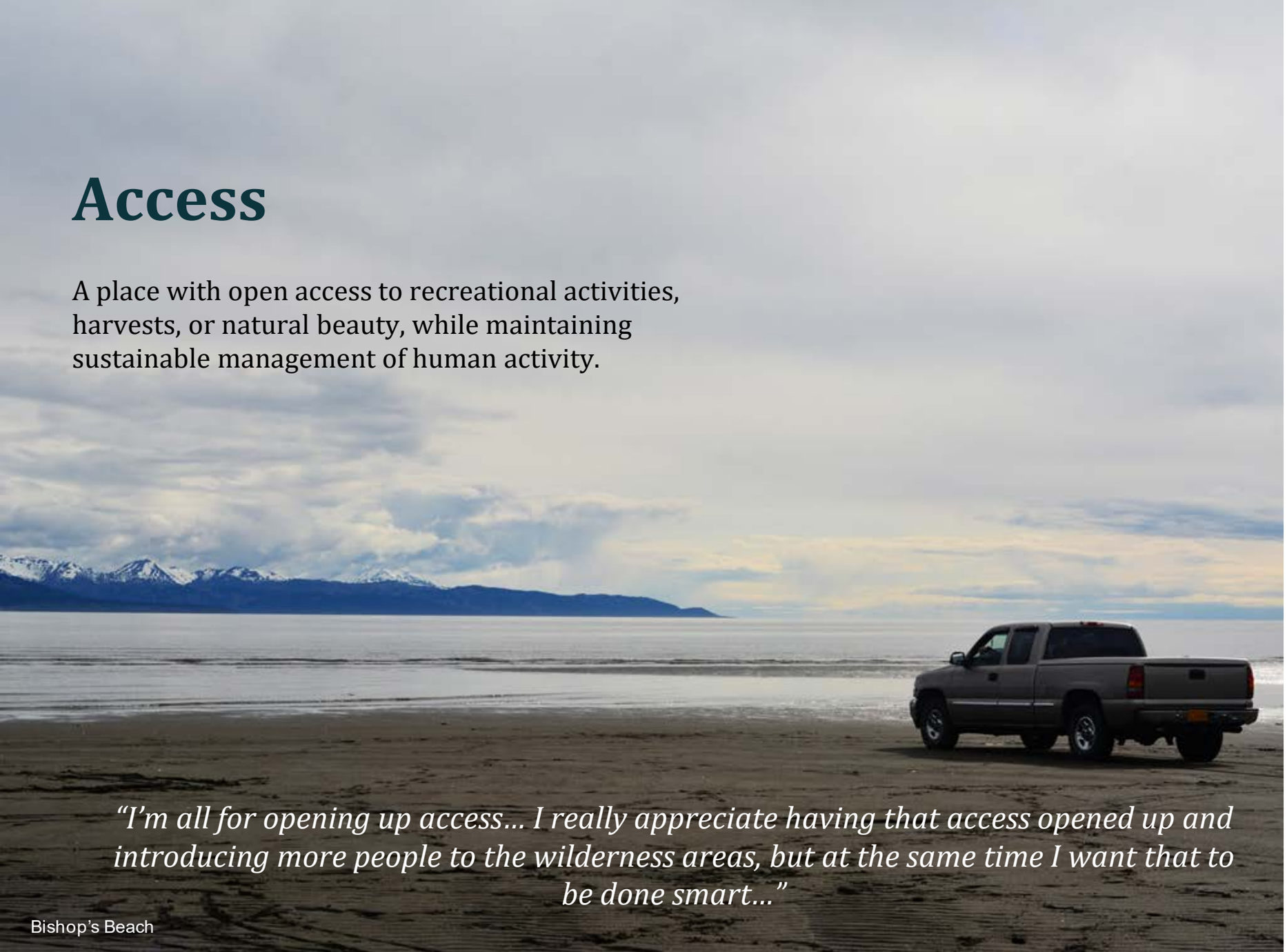
The team modified the Cole framework to respond to the identified discrepancies and more accurately capture data collected in Kachemak Bay.

Discrepancies between the traditional and modified frameworks included: 1) Value types represented in the Cole framework that were reflected differently in data collected in the Kachemak Bay area; and 2) the presence of values expressed by interviewees that were not present in the Cole framework.

The final framework is divided into three sections: 1) Values that are consistent with the Cole framework; 2) value types whose definitions have been modified to better fit Kachemak Bay; and 3) value types that were not present in the Cole framework and are original to KBNERR.

Access

A place with open access to recreational activities, harvests, or natural beauty, while maintaining sustainable management of human activity.



"I'm all for opening up access… I really appreciate having that access opened up and introducing more people to the wilderness areas, but at the same time I want that to be done smart…"

Bishop's Beach

Summary Points:

"Access" is an example of a value type for which the team modified the definition from the Cole framework. Cole defines "Access" as "Places of common property free from access restrictions or exclusive ownership/control." However, when interviewees in the Kachemak Bay area expressed this value, many did not necessarily value a complete absence of restrictions; in fact, interviewees often appreciated the ability for access to valued places or activities to coexist with regulations or restrictions that sustain valued places or services over time.

KBNERR SVT Framework

Consistent with Cole Framework

- Pristine/Natural
- Recreation
- Life-sustaining ecological processes
- Therapeutic
- Spiritual

Modified from Cole Framework

- Economic
- Access
- Culture
- Future
- Aesthetic
- Learning
- Subsistence
- Biodiversity

Original to KBNERR

Connections

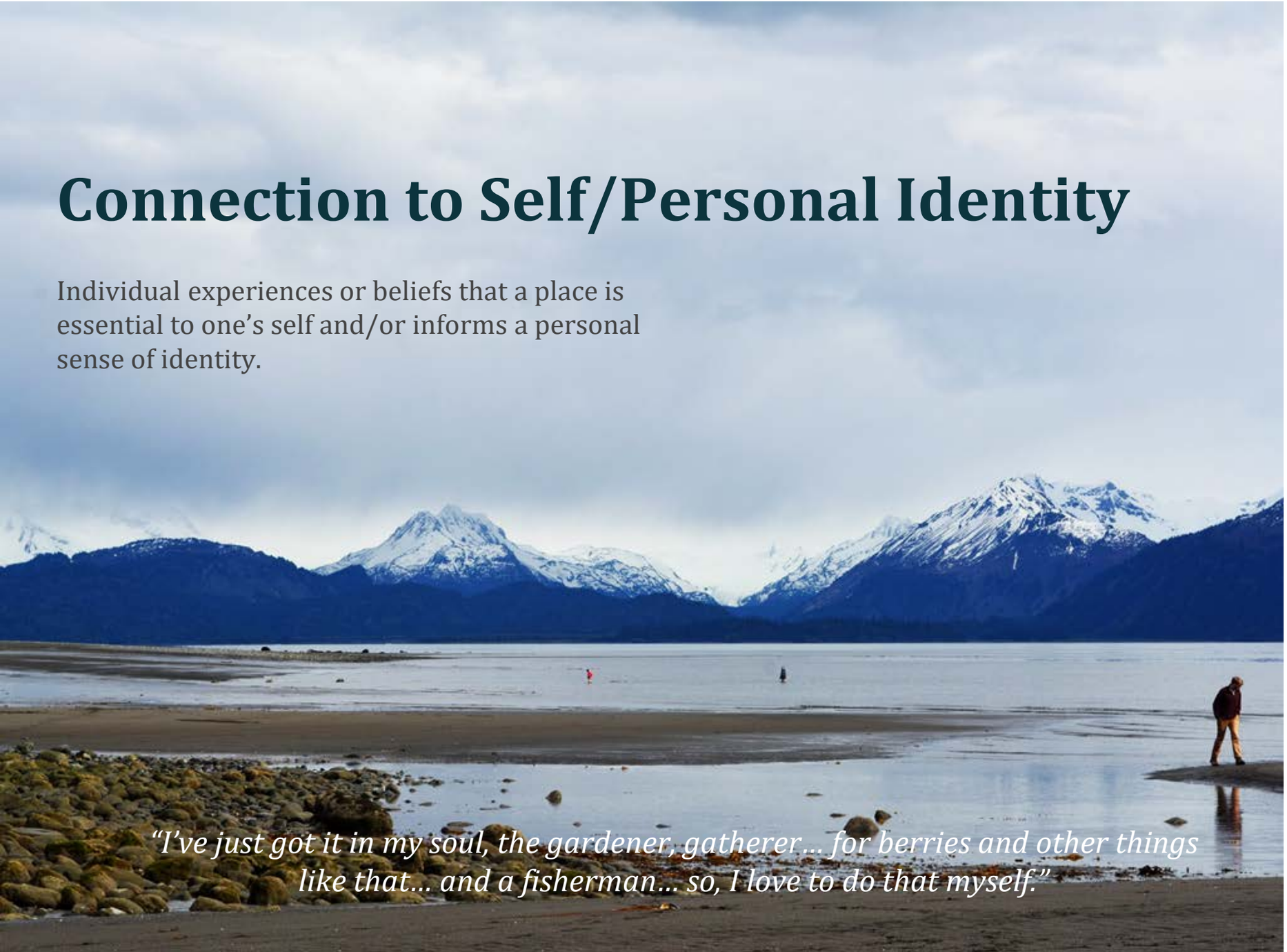
- Connection to Community
- Connection to Self or Personal Identity
- Connection to Nature
- Connection to Family

Summary Points:

The third section of the KBNERR SVT framework, Connections, describes a set of values not present in the Cole framework and original to KBNERR. These values are often subtler, more nuanced connections to family, personal identity, community, or nature that come from living and/or working in the Kachemak bay area.

Connection to Self/Personal Identity

Individual experiences or beliefs that a place is essential to one's self and/or informs a personal sense of identity.



"I've just got it in my soul, the gardener, gatherer… for berries and other things like that… and a fisherman… so, I love to do that myself."

Summary Points:

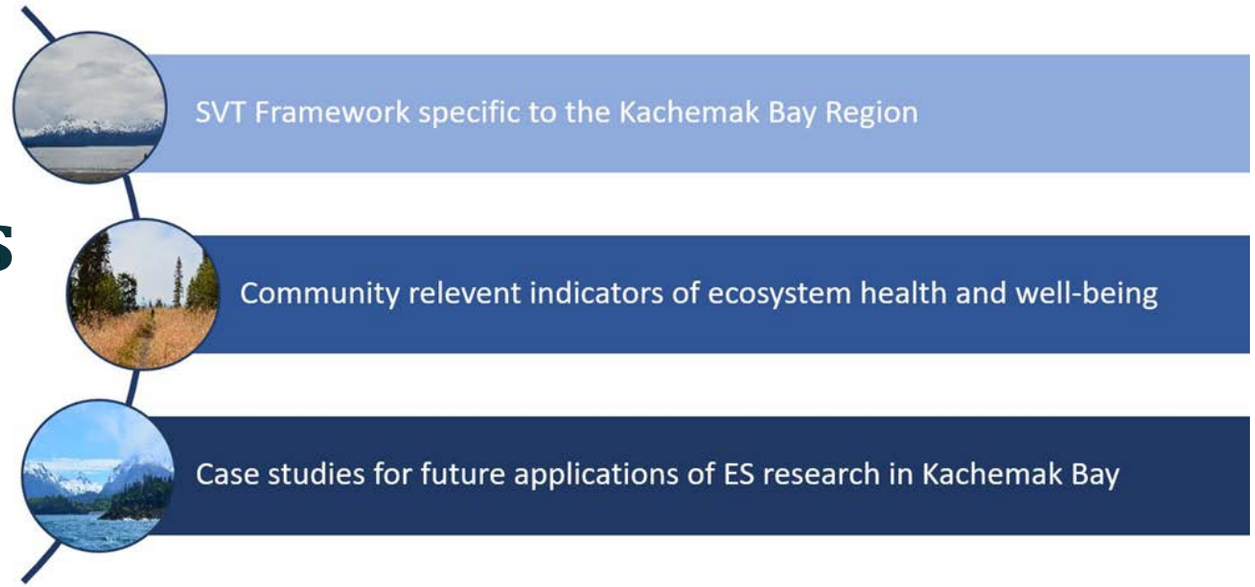
"Connection to Self or Personal Identity" captures experiences, or the belief that the Kachemak Bay area informs one's sense of self or individual identity, and is an example of one of the "Connections" values that are original to the KBNERR SVT Framework. One interviewee expressed this value type when describing how she felt her gardening, fishing, and foraging activities were "in her soul," and that living in the Kachemak Bay area allowed her to live out this part of herself.

Summary Points:

The project is a starting point for KBNERR to continue researching and applying ecosystem services in their work.

Chapter 6. Continuing ES Research

Deliverables To KBNERR



Summary Points:

Deliverables to KBNERR included:

- A final project report;
- The Kachemak Bay-specific social value typology framework;
- A list of community-relevant signs of ecosystem health; and
- Different sources and methods for applying project findings, in future work or additional research.

Indicators

Supporting Ecosystem Services	***Definition***	***Potential Indicator***
Nutrient Cycling	The storage, cycling, and maintenance of nutrients by living organisms	Mineral nitrogen Microbial biomass
Primary Production	Synthesis of organic compounds from atmospheric carbon dioxide	Oxygen emitted by primary kelp production
Habitat Formation	Biological productivity, and diversity of habitat for wild cultivated animals	Willingness to pay for the habitat of marine or terrestrial species (USD)
Erosion Protection	Presence of vegetation or shoreline that prevents major sedimentation loss or property destruction	Avoided costs of building reported during major storm events

Indicators adapted from Barbier et al. (2011), Henrichs et al. (2013), Liquete et al. (2013), Millenium Ecosystem Assessment (2005)

Summary Points:

The team provided KBNERR with several methods that can be used to further study and quantify ecosystem service valuation in the Kachemak Bay area. This table describes potential indicators that could be applied to monitor and quantify valued services and/or community-relevant signs of health. The full report details more examples of potential indicators.

Monetary Valuation

Assign monetary value (USD) to ecosystem services using surveys and other secondary economic data.

- Contingent valuation:
  - What is your willingness to pay for forest/streambank/marine habitat restoration?
- Benefit transfer:
  - What values have been assigned elsewhere? How do these apply to Kachemak Bay?

Summary Points:

Monetary valuation is a prevalent ecosystem service research area, and the team's report to KBNERR provides various monetary valuation methods and techniques that could be utilized in future projects to assign dollar amounts to the valued resources described by interviewees.

Sociocultural Valuation

Social Value Typology Quantification

- Utilized by Mission-Aransas and Sapelo Island NERRS
- Surveys (in person and online)
- Geospatial Mapping using SolVES model

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SolVES
Social Values for Ecosystem Services

Summary Points:

The final chapter of the team's report presents several methods of quantifying sociocultural data, such as surveys and geospatial analyses, both of which have been used by other NERRs in socio-cultural ecosystem service evaluations.

Sociocultural Valuation

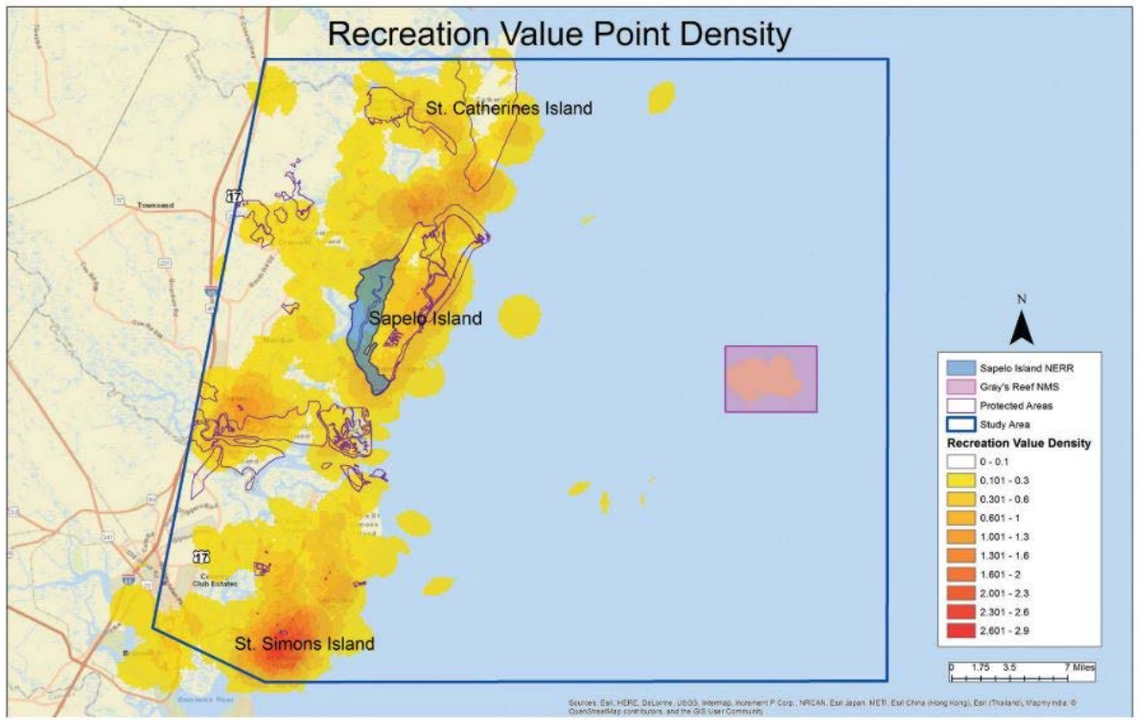


Figure 3.18. Recreation value point density.

Summary Points:

The Sapelo Island NERR applied geospatial methods as part of a socio-cultural ecosystem service study. This exercise asked participants to place a certain value type, such as “access,” on a map where they most closely associate it. The result is a “heat map” that provides a geographic context to socio-cultural values. KBNERR can apply this method to understand the geographic distribution of the values listed in the KBNERR SVT.

Table 6.7: Sample survey question on perceptions of social benefits received from the Kachemak Bay Ecosystem. Adapted from Loerzel et al. (2017) for KBNERR application.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Unsure
The Kachemak Bay and surrounding landscape contribute to the culture of my community						
My community's economy relies on the Kachemak Bay						
The Kachemak Bay and surrounding areas provide all my outdoor recreation needs						
My closeness or connection to the Kachemak Bay and surrounding area influences my sense of identity and how I live my life						
I believe I have a personal responsibility for caring for the Kachemak Bay and its resources						
I believe the Kachemak Bay and surrounding areas provide opportunities for learning and exploration						

Summary Points:

The team's report to KBNERR also provided sample survey questions, which used a Likert scale and were designed using the values included in the KBNERR SVT, that can be used to quantify socio-cultural ecosystem service valuation. The sample questions provided to KBNERR were based on a survey designed by the Mission-Aransas NERR for a similar ecosystem service valuation study.

Terminology:

- **Likert Scale**: A rating scale used to measure a respondent's opinions or attitudes. When using a Likert Scale, respondents are asked to select one multiple choice option based on their level of agreement with the statement provided.

Comments on Ecosystem Service Frameworks

- Helpful to connect human well-being to ecosystem management
  - Interview guide and focus group design in full report

- Challenges:
  - Complexity of marine and coastal definitions and valuation
  - Tourism as an ecosystem service
  - Project sample

Summary Points:

Overall, ecosystem service frameworks are useful for communicating with technical and non-technical audiences and connecting ecological and social systems. However, there are some challenges associated with using these frameworks - primarily the complexity and lack of clarity on the definitions used when describing ecosystem services.

Additionally, within the context of this project, interviewee sample limitations also posed a challenge; specifically, the team was unable to access some of the Kachemak Bay area's stakeholder groups, including several native and religious communities.

Benefits & Applications to Kachemak Bay NERR

Syverine Bentz
Coastal Training Program Coordinator
Kachemak Bay National Estuarine Research Reserve

Summary Points:

Syverine explained how KBNERR will apply the outputs from this Master's Project. Key points include:

- Identifying priority coastal management issues and knowledge gaps to inform NERR management plans and coastal training program strategies;
- Identifying new research projects and partners; and
- Exploring methods of monitoring socio-cultural data in the Kachemak Bay area to link with current biophysical monitoring programs.

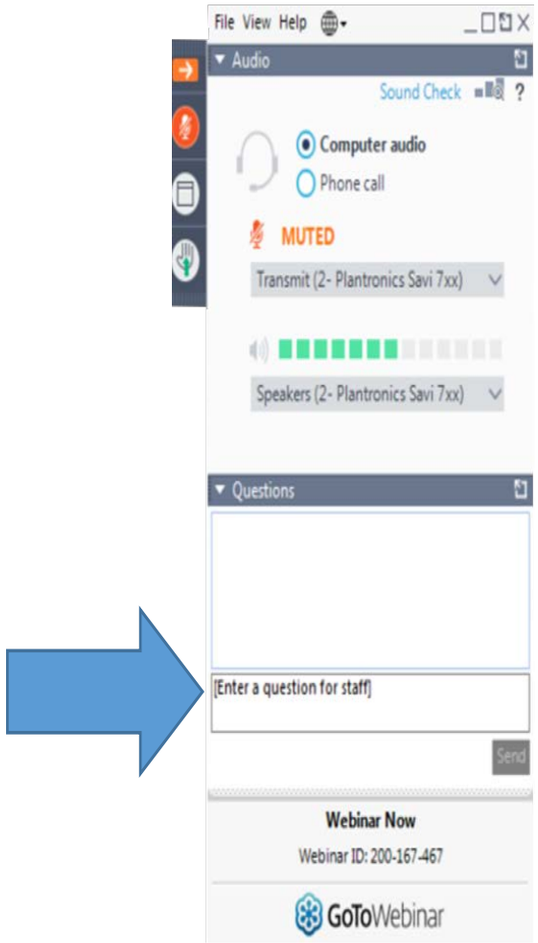
Questions:

Has this project raised the profile of the NERR with the local community?
This project provided a means for engaging with the Community Council (the KBNERR citizen and partner agency advisory board) through focus groups and interviews. This interaction helped to build awareness and understanding among the Council about ecosystem services. Going forward, KBNERR will be exploring ways to use the final report in additional community outreach efforts.

What percentage of interviewees were first nations people?
Unfortunately we were not able to formally engage native communities within the scope of this project, which is one of the limitations of the report. It is recommended that KBNERR engage these groups in future studies. While we were able to have some informal conversations with members of the native communities from Port Graham, we were unable to schedule a full interview with a representative of that community.

Have a question?

Use the “Questions” function to pose questions throughout the webinar.



Questions:

Are there any plans to place monetary value on these ecosystem services?
KBNERR would like to take a closer look at economic data and secondary economic indicators such as housing data. While the Reserve has not done much in the way of monetary research previously, they would like to expand this type of research in the future. Additionally, past University of Michigan Master’s Projects have completed economic assessments, so there is the potential for a monetary valuation project to be completed as a Master’s Project for KBNERR or other Reserves.

What are your thoughts on how the NERRS should move forward in this area of socio-ecological systems work? For example, large-scale assessments across the Reserve system are being explored right now by the NERRS. Or, should more community-based, place-based projects like yours be emphasized?
There is value in looking across the whole Reserve system as well as taking deeper dives into individual Reserves, as each Reserve is unique. Place-based case studies can test whether broader ecosystem service assessments for the whole system will be applicable to each individual Reserve.

Have a question?

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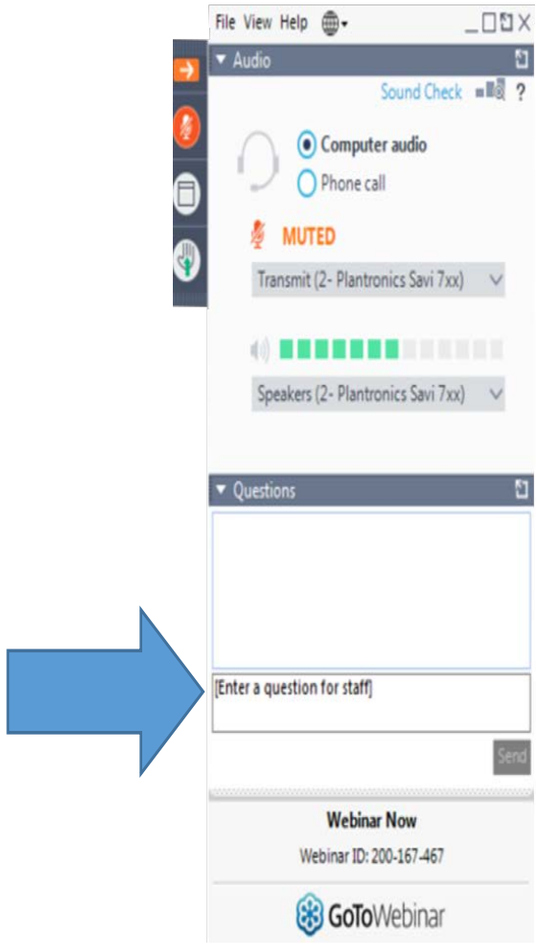

Questions:

What was the biggest surprise for you in doing this project?

1. I was pleasantly surprised how willing interviewees were to engage in hour-plus interviews. Many people were very happy and willing to share stories and experiences.
2. I was intrigued by the caution of applying “tourism in an ecosystem service framework” because the Homer economy is dependent on tourism, and I want to learn more about tourism in ecosystem service frameworks.

Do you consider biodiversity an ecosystem service?
Biodiversity is included in the KBNERR SVT framework. In Chapter 2 of the report, “What the Community Values: A Stepping Stone to Identifying Ecosystem Services,” biodiversity is discussed along with other ecological processes that were valued by interviewees, but in the framework it is considered a stand-alone service.

Thank you for joining us

Please complete the short survey at the end of the webinar

Questions:

Are there any differences between what interviewees perceive threats to ecosystem services and how the Reserve perceives or understands threats?
When Syverine and Reserve Manager Coowe Walker were reviewing the report, they found themselves nodding in agreement, and the report was a good representation of how they understand their community. In particular, they honed in on the concept of "connectivity" because KBNERR's current biophysical work focuses on "connectivity" in the ecological system, so it was interesting to see connectivity represented in social systems as well.

I'll be teaching teachers about the Hudson River watershed this summer, how do I apply what you have done with social connections and resource management? Any off-the-cuff thoughts?
An interesting starting point could be to perform a survey to understand what people value about the Hudson River. The second chapter of this Master's Project report goes into what people in Kachemak Bay value about the Bay, and the team used that as a stepping stone to identify the ecosystem services that are valued. It is very difficult to ask someone, "what ecosystem services do you value," but it is very easy to ask, "what is special or valuable about this place?" From an educational perspective you could see interacting with community members, or even children, and asking them, "what's special about this river or this place? How does it connect to you or your family?" Those questions can then be used as a stepping stone to identifying the ecological systems that are valued.