

SE Alaska Scenario Planning Workshop
Day 1 | Tues | February 21, 2012

Introductions | Bob Winfree

Susan Kasinger: WCA tribe, Lisa Etherington: NOAA, Tahzay Jones: NPS Coastal Resources, Pat Warren: Environmental Planner, Chilkat Indian Village, Don Calloway: Cultural Anthropologist (retired), John Morris: Interpretation-NPS Regional Office, Bud Rice: Environmental Protection Specialist-NPS Regional Office, Chris Nemeth: Interpretation at Glacier Bay, MaryAnn Porter: Yakutat Tribal Environmental Coordinator, Nancy Fresco: SNAP, Randy Larson: Sitka Superintendent, Cassie Hauser: MS student in TN, Don Weeks: Climate change resource coordinator in Colorado, Greg Killinger: Fish/water/soils in Tongass (planning similar workshop), Lena: SNAP, Craig Smith: Biologist at Sitka, Mike Goldstein: AK coastal rainforest center/USFS/vulnerability, Susan Budrow: Superintendent at Glacier Bay (what are we telling the visitors), Amanda McKutcheon: Klondike/Skagway (want to make cc relevant), Jessica Wilburger: data collection, Barb Schrader: USFS in Juneau (want to look at hopeful future vision), Jim Thomas: regional planner for USFS in Juneau (lots happening, including effects to yellow cedar. Chugach planning and Tongass-how will we determine desired conditions?), Chris Sargeant: SE NPS, Brandon Moynahan: data collection for SE, Steve Gray: USGS Climate Science Center (long term strategic research plans), Leilani Knight-McQueen: Tlingit Cultural Director (voice of SE tribes-long term adaptation, TEK, stories into numbers, numbers into stories), Raymond Paddock: Tlingit council-education and youth outreach, Jeff Mow and tribal members and Wrangell (arriving tomorrow).

Overview of Goals | John Morris

Educate, build capacity, process and develop scenarios

Ground Rules | John Morris

Be willing to take risks, lots of activities/agenda is fluid, try to stick to schedule, hear people, have fun, minimize distractions. If lost, ask for directions.

We are also trying to assess the process. We will be contacting you here/later to see if this is useful to you.

Agenda | Nancy Fresco

Steep learning curve for those not in webinars. After plenaries, will break into groups: coastal and interior interests. Back and forth throughout day—sessions together and in small groups. Process, create, share—cyclical process. Wrap up day on Friday to tie information together.

Plenary Scenario Planning | Nancy Fresco

Part One

- Many different types of participants—provide overview for all
- Big task: variable ecosystems, not enough information in the SE, unique issues happening here, socially diverse.
- In a large percentage of the state, change is already occurring, can no longer manage for the same goals/priorities, collaboration and knowledge sharing are necessary.
- Presentations will all be posted on shared site—agenda, webinars/etc.

- Difference between forecast and scenario planning—multiple believable and plausible scenarios. Need to be divergent—not the same future. Need to challenge our perspectives and assumptions.
- Background: scenario planning used by corporations and some non-profits. Kodak—failed to plan with scenarios.
- SNAP: now Alaska and Arctic planning. Connect planners/people with data. Useful advice about management and adaptation to climate change. Using models to answer questions people are asking. Knowledge in the room is very important—other resources online.
- Parks: Glacier Bay, Klondike, Sitka, Wrangell-St. Elias

Part Two

- Scenario planning process overview
- Circular process: orient, explore and synthesize (in workshop) and then act and monitor (after workshop)
- Central question: How can NPS preserve natural/cultural resources in the face of climate change?
 - Parks are the focus, but interested in community/other agency perspectives (Bob)
 - Preserve may not be the best word—adapt. Values are always changing. (Susan)
 - Question comes from purpose that is federally dictated—may be impossible in the future (Bud)
- Critical forces are the first task. What are the central forces? High impact and high uncertainty
- Use two climate drivers to create a “grid” of possibilities.
- Four scenarios—nested scenarios in the social/political range. How much buy in support is there from institutions or society? Create 16 stories—select 3-4 of those and describe them.
 - Trying to move beyond natural variation but in narratives bring them closer to the present (Bob)
 - Management plans often 20 years—infrastructure has lifecycle—need to take into account (Bud)
 - Will discuss how to tell stories—how to reach people and tell stories.
 - Final step—set strategies
 - robust actions. What makes sense given all the stories that are developed
 - bet the farm/shape
 - hedge bets/wait and see
 - core/satellite
 - Are different areas pursuing in different ways? Different drivers in different places. Create stories—in past we’ve focused on robust actions.
 - Long range transportation plan—integrated scenario planning. Assumption that permafrost is thawing. Hedging with roads where repair is easy. Robust-building roads that can insulate permafrost. People may chose different strategies. (Bob)
 - Strategy will vary in different groups-up to group to decide (Bud)
 - Scenario planning has occurred (Assateague). There have been instances from planning-action (Don).
 - Is NPS giving direction for how this should proceed? Left it open because wanted to know.
 - All in a process of figuring it out (Bob)

- Is this multi-scalar too? Is there a framework for region (robust)? Park scale—own issues (USFS)?
 - Funding for 4 workshops—each inventory and monitoring network—we now have 6 (Bob)
 - Now Parks/communities are asking for workshops (Bob). Kenai is doing more workshops. Teaching a process that can be used elsewhere. This is technical data-heavy but do not have to be. Funding limits what can be done (Bob).
- Case Study for SW AK network
 - Important/uncertain drivers: acidification, temperature, storms, precipitation
 - Choose storm/precipitation and acidification—use literature to gauge possible ranges
 - Review of scenarios—lists of impacts and process. How scenarios were chosen.
 - Story: conversation between grandpa and grandson
 - Implications: highlight what this might mean, what information is lacking, decide to focus on no regrets actions (listed on slide).
 - Next steps—how to keep it going once everyone leaves?

Plenary Session on Scientific Background and Climate Drivers | Nancy Fresco

- First step: decide on drivers. Need to choose drivers with high impact and high uncertainty. Wide range, impacts in all parks, avoid similar drivers, impact sectors (not just one), high likelihood, drivers that lead to critical impacts.
- Types of drivers: on slide
- Might want to choose specific driver if getting at the core of effects that matter most—temperature in general or water temperature.
- Precipitation (generally) or changes in rain vs. snow?
- Projected winter temperatures: White is above freezing. Could be dramatic change.
- Length of unfrozen season: Longer to shorter frozen season. Link to impacts that people care about.
- PDO: wildcard variable. Doesn't feed into SNAP models. Can exaggerate or dampen. Could lead to threshold shifts. Difficult to predict with accuracy. Influenced by warm ocean currents.
- Ocean Acidification: Warming waters lead to reduced survival of algae/plankton—huge impact on food webs. Threshold is unclear.
- Sea Level and Storm Surge: Land is rising here—but when might it reverse. Unclear about impacts of storms—esp. longterm.
- Survey results (27 people)
 - Importance of different drivers
 - Atmospheric: temperature shift from freezing to above, increased air temperatures, more storms
 - Hydrospheric: ocean acidification, phytoplankton concentration
 - Cryospheric: glaciers diminish, glacial outwash
 - Lithosphere: landslides/mudflows, tsunamies
 - Biosphere: forest pests/disease, crossing of tipping points, invasive plants, mature/old growth forests decline, forest fires
 - Wildlife: reduced snow cover and small mammals, harbor seals (some more imp in some areas/others)

- Fish/inverts: salmon waters unusable, fisheries decreasing, subsistence impacts
- Subsistence: species losses, community resources/subsistence, migratory routes
- Community/Tourism: relocate communities, safety hazards, damage to buildings/infrastructure, tourism lengthens, food and energy prices increase.
- Overview—select two drivers and range (less-more or 2-4 degrees)
 - Critical, high impact, high uncertainty
- How divide in groups?
 - Suggest one coastal/one interior and freshwater
 - What is the break between coastal/freshwater? Hard to separate.
 - Could there be switching after drivers are established?
 - Balance numbers and disciplines—but flexible
- Questions
 - Don't need to throw out certain changes—can be integrated into scenarios—but not as a driver. They can be assumed (ex: air temperatures).

-----BREAKOUT SESSIONS-----

Marine Group:

- Climate drivers and potential impacts worksheets
- Left some drivers off that aren't marine—could add additional drivers

	High Uncertainty	High Confidence	High Impact
Temperature		X	X
Form: Rain & Snow (changed)	X		X
Timing and magnitude of stream flow (added)	X		X
Freeze up date		X	
Length of growing season		X	X
River/stream temperatures		X	X
Sea Level rise		X	(rebound?)
Water availability (soil moisture)	X		
Relative humidity	X		
Wind speed		X	X
PDO	X		X
Extreme: Higher Temps		X	X
Extreme: Precipitation	X		X
Extreme: Storm	X		X
Ocean temperature increasing(added)		X (but not degree)	X
Ocean Acidification (added)		X	X

Which are the most important drivers? Looking for things that are high uncertainty and high impact. Which do people want to address? We also need to think about what we want the endpoints to be. Cross the drivers then ask: are they plausible, challenging, relevant and

divergent? Need to look at extremes. High confidence will be carried into all the stories (we know these things will occur)

- Timing and magnitude of stream flow — * What are the ends/extremes? *
 - Longer duration of low magnitude to shorter duration of high magnitude
 - There are different flow regimes. Might make more sense to talk about variability of flow regime over the year
 - Glacial system-high summer flow
 - No glaciers-high spring and fall flow
 - Shifted timing with low, high
 - Difficult to describe the high magnitude event—is it just greater peak flows
 - Homogenizing input vs. heterogeneous input. Input in summer (glaciers), fall/spring (non-glaciers)
 - Glacial: Low (high summer peak flows/low otherwise), high (high overall and peak flows)
 - Big difference. Glacial stream is more compelling b/c want to talk about impact, but lots of non-glacial streams
 - Look at timing of peak flow with peak flow being flexible?
 - Non-glacial (long duration, low magnitude to short duration/high magnitude), Glacial (low variation to high variation).
 - You could have both—lots of variability.
- Ocean Acidification—Maybe we aren't certain about the impacts. We have confidence that it is happening, but magnitude/impacts unsure.
 - Superintendent level/mgmt level—this is gaining traction-people are interested in it.
 - Intensity is really important—what will this look like? Potential impacts.
 - Endpoints
 - Good/Bad or Bad/Really Bad
 - Low: .01 pH to High: .04 pH (this came from SWAN)
- Extreme Events: Storms
 - Could use status quo/increase.
 - Need to think about magnitude and frequency
 - *Low: little change in frequency/magnitude, High: significant/high increase in frequency and magnitude*
- PDO
 - Warm/cold phase or frequency?
 - Influence could be brought into ocean temperature
 - When bring in the social/political –becomes important
 - Related to currents/upwellings/etc... many impacts—could have big impact on nutrient availability
 - Are we linking to biology or oceanographic effects?
 - Temperature and PDO may be a valuable pairing. Lower to higher impact on temperature.
 - This might put too much attention on temperature effects.
 - Masking effect may be really important to capture
 - Flips will allow very different futures
 - PDO includes impact on ocean temperature—if we don't use it could be a problem

- Endpoints: potential: cold/warm, timing, predictable/unpredictable, more frequent/less frequent flipping.
 - Could also tie to increase/decrease in thaw days
 - *Low: low frequency (slower), middle: STATUS QUO, high: high frequency (increase)*
- Ocean Temperature
 - Slower increase in temperature to larger increase in temperature
- Extreme Events: Precipitation
 - Do we want to consider? Could integrate with extreme storm events?
- Ocean currents or upwelling might be a good one to bring up
 - Driving force is current
 - Increased temps are with decreased upwelling
 - This is a separate issue from ocean temperature—oceanic fauna nutrient provision
 - Need to define ends of this spectrum. Really important to include.
 - Currents are tied to temperatures—difficult to separate. Also wind/inflow. Near-shore impacts are most important.
 - Large currents driven by salinity—but not the driver of the upwelling. How to create range for upwelling?

Terrestrial Group:

- Miranda Terwilliger – NPS, Wrangell-St Elias National Park
- Steve Gray – USGS Anchorage
- Jim Thomas – Forest Service
- Barbara Schrader – USFS
- Jessica Wilbarger – NPS, Klondike Gold Rush
- Amanda McCutcheon – NPS, Sitka Historical Park
- Kris Nemeth – NPS, Glacier Bay
- Mike Goldstein – UAS and Forest Service
- Craig Smith – NPS,
- Pat Warren – Chilkat, NSN
- Susan Kasinger – WCA tribe
- Leilani Knight-McQueen- Tlingit Environmental Planner

- + Bob Winfree – NPS
- + Bud Rice – NPS
- + Nancy Fresco – SNAP
- + Lena Krutikov – SNAP

Question 1: What is the outcome of this process?

Q: Overall plan for the SEAN network, then break out into specific plans for each park? – (Jessica)

A: Actually, a report with recommendations, as we have no authority to tell NPS what to do. Go through priorities and identify needs. How authorities will use this remains to be seen. – (Bob)

Question 2: Weather vs Climate?

A: Weather – variability from month to month, year to year. What this exercise is concentrating on is the average over long periods of time.

Step 1: SELECT & RATE DRIVERS – “high level changes in climate”:

High uncertainty:

1. Extreme Events – Precipitation – important
2. Extreme Events – Storms – important
3. Precipitation
4. Water availability – changed to “seasonality of water flow” by this group
5. PDO – certain that it does occur, but timing is highly uncertain

Relatively certain (any of these could be chosen as an assumption):

- Increased temperature – important
- Increased growing season – important
- Increased length of ice-free season – important (more important to this region than the growing season)
- Extreme Events – Temperature – important

New Driver:

- Seasonality of water flow – high uncertainty, important (lots of effects)

Another question regarding overall precipitation changes vs extreme events in precipitation.... Followed by lengthy discussion about the difference between extreme events of *precipitation* and extreme events of *storms*.

List effects, try to backtrack to drivers?

- Foods – subsistence – how we gather, when we gather, what we gather... Impact on cedars, impact on food/fish, berries, predictability (Leilani)
- Variability of the timing of events – asynchronization of phenology/abnormal weather events (Amanda)
- → Decreasing predictability, increasing variability
- → Increase of extreme events could be an assumption behind our two chosen drivers, especially since it has a 95% confidence (already happening)
- → Ecological tipping points?

Step 2: CHOOSE THE TOP 3 DRIVERS (from the above 5 drivers rated as “uncertain”):

1. Extreme weather events → lump together precip and storms extreme events
2. Seasonality of water flow → captures temperature, precipitation, and linked to a lot of important effects... but, what would the end points be?
3. PDO → “a certain uncertainty”, climate change could also change the PDO. PDO can also be considered when choosing endpoints rather than choosing it as a top driver.
4. Precipitation → determines whether we have glaciers or not. “Southeast Alaska is precipitation-driven.” Snowpack is affected by precipitation. What we don’t know is how much of it will fall as snow vs rain and when.

→ Let’s consider PDO an amplifier instead of a driver. (Nancy)

STEP 3: CHOOSE 2 DRIVERS & SELECT RANGES for each of the chosen drivers.

1. -20% ← Extreme Weather Events – storms/*precipitation* → +50%
2. historical flow/timing ← Seasonality of Water Flow – *temperature/snow* → hmm, this side is more difficult... more winter flow, earlier runoff, more water throughout the year or not, (though this is really different depending on whether there is a glacier or not) “abnormal flow rates and timing”, “asynchronous”, “anomalous”

----- Day 2 | Wed | February 22, 2012 -----

Video: What Scientists Do

Insights/Ideas

- Every park will be different—different critical drivers
- Hope to reinvent in smaller communities
- Need to put some on hold—integrate them later on
- Drivers terrestrial/marine are similar—but different scenarios
- Divergence is really important—to be able to see possibilities
- Yesterday a lot of science—still trying to think about relevance

-----BREAKOUT SESSIONS-----

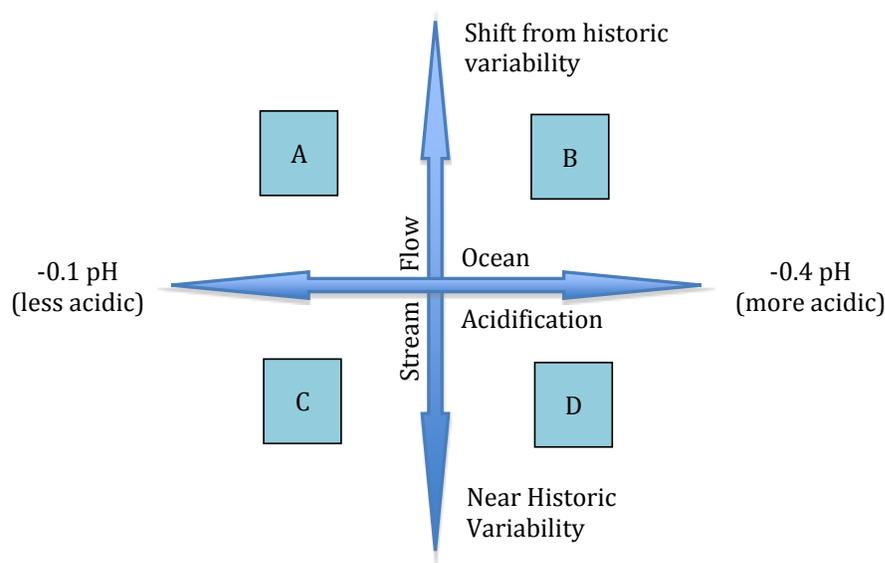
Marine Group:

- 4-5 critical drivers: PDO, stream flow, ocean temp/currents, extreme events, ocean acidification
- Next step—pick a couple of drivers for matrix
- Which of the five is most important?
 - Simplify timing/magnitude of stream flow
 - Low: status quo, High: more extreme events or change in magnitude each month.
 - Need to capture timing component.
 - Not the same type of arrow—not low to high

Tried several matrices:

- Stream flow x Ocean acidification
 - Stream flow = challenge because not well defined
 - Stream flow = can these local effects/impacts not be captured at this scale?
- Ocean acidification x Extreme storm events
 - “crosses are not working” – difficult to add___
- PDO x Ocean acidification
 - Concern that didn’t really know how much about PDO or its impacts
 - We don’t know about isostatic rebound and its impact on earthquakes
- Next step: decide which to develop further

CROSS: Stream flow x Ocean acidification:



Four Emergent Scenarios

A = low acidification + high shift in natural stream flow (+ cool PDO) = **“Cluster Flood”**

- Biological
 - Mismatch with life stage events (recruitment/spawning)
 - Different volumes of water/different times
 - Salmon coming up, smolts missing bloom
 - Decrease in overall productivity
- Social/Cultural
 - Can't assume same fishing patterns—increase in turbidity
 - People may move to cities because they cannot depend on resources
 - Potential for higher flooding-safety issue
 - Loss of cultural resources
 - Impact on rafting companies
- Infrastructure
 - Need to build new bridges
 - Erosion of trails
 - Less stable hydropower potential
- Glaciated:
 - Glacial dams bursting—increase in flash floods
 - Broaden the flow—more spring and fall—whole magnitude may raise in the middle
 - Longer periods of turbid water-decrease the productivity
 - More flow later in the year
- Non-glaciated:
 - Less high peak in the spring
 - Lower summer flow

- Higher fall flow b/c of greater rains
- Flow later in the year
- Temperature (cool/warm) has a huge impact—lots of different animals, cool (snowpack to protect plants)
- Freshwater—stratification patterns. Reduction in melt—lower plankton blooms
- Herring other fish—more variability—can't recover from a crash
- Most of SE parks are heavily glaciated—do we need to focus on this?
- PDO off for A (masking acidification-dampen variability), on for C (high acidification)—look at compounding events.
- PDO
 - Greater impact on temperature than precipitation
 - Cold PDO: masking, more similar to historical, moderated stream flow, higher salmon, more snow, more productive
 - Warm PDO: less advantage for productivity, more rain, more flashy events, drying of system, increase in fire frequency
- Another thing to toggle: uncertainty/variability—simplifying habitat
- Defining stream flow end points:
 - Change about the mean of peak flow
 - Higher or lower variability from the current hydrograph
 - Difference between glacial/non-glacial systems

B = high acidification + high shift in natural stream flow = **“Bad News”**

- Increase in invasives
- Reduction in salmon and fish
- Loss of food web diversity
- Decrease in land/marine mammals, birds
- Loss in habitat structure
- Increase in disease
- Cultural losses
- Social pathology increase (commercial, tax base, culture, tourism decrease)
- Stranding of marine mammals

C = high acidification + status quo in stream flow = **“Trying to do more with less”**

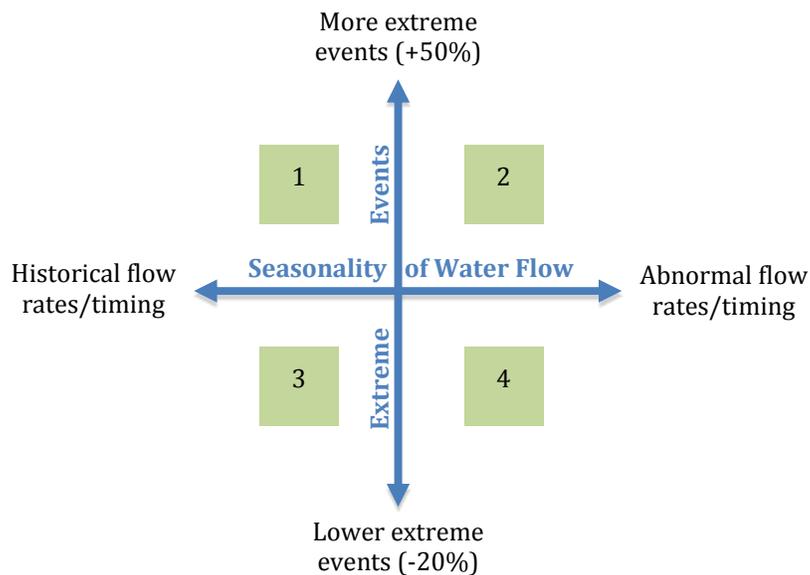
- Higher acidification is driving the scenario
- Lower ocean productivity
- Less fish available
- More competition for fewer resources
- Decrease in sound absorption (noisier)
 - Change management of cruise ships
 - Larger impact on marine mammals
- Decrease in large mammals
- Increase in desire for subsistence in NPS
- Gradual and difficult to see = lack of awareness/delayed perception
- Change in bird populations
- Loss in habitat complexity—shellfish impact
- Visitation might be stable—bigger cruise ships

D = low acidification + status quo in stream flow = **“Acceptable losses”**

- Moderate reduction in salmon and smaller biomass
- More variable in effects—less predictable
- Shift in available food—all marine populations
- Lower carrying capacity for all life forms—less life

Terrestrial Group:

CROSS: **Extreme Events (weather, storms, precip) x Seasonality of Water Flow**



Four Emergent Scenarios

1 = historical flow rates/timing + higher extreme events = **“Yo-yo Snow & Blow”**

- Episodic events = reduced resources
- floods
- forest blowdown
- Extreme **fluctuation** in fisheries/wildlife - depends on species = which are able to adapt? Some might flourish or become more stable? (Fluctuation vs destruction)
- More snow = deer die off? But then recover in subsequent years.
- Big flood = wipes out salmon, invertebrates. But then recover in subsequent years.
- Structural damage to facilities/infrastructure (historical/cultural)
- Transportation disruptions
- Heavier snowfall events (=avalanches) - large snow loads & blizzards
- Heavier rainfall events (=floods)
- More snow = grows glaciers at higher elevations? - not really “stable”, rather continued retreat of lower elevation glaciers while upper elevation glaciers get

thicker (as temperatures increase, warmer air masses bring more moisture = more snow at higher elevation, more rain at lower elevations)

- More snow = more successful small rodents (subnivian)
- Slight increases in river and stream temps
- Salmon population unaffected
- Little opportunity for human adaptation (too yo-yo)
- Less focus on preservation and health bc people too focused on responding to immediate disasters (compared with "ID crisis")

2 = abnormal flow rates/timing + much more extreme events (+50%) = "**Disaster Zone**"

- natural disasters/catastrophic events more frequent
- floods
- fire – highest fire risk of 4 quadrants
- drought
- glacial dams fail or develop
- landslides
- avalanches
- blizzards
- earthquakes
- forest pests
- forest blowout
- riverbank erosion (with trees getting cut down)
- water availability affected
- tourism affected
- movement or loss of species/migration affected
- berries affected -> which affects bears
- River and stream temps
- Drastic loss of salmon – local extinction

In Scenarios 1&2 = one or a few years could have a drastic impact on a single species, which could cause a major change, just based on the response of one population – that has a domino effect. (Craig)

People confuse subsistence and food. If we are to adapt, maybe we need to start the process of how to merge tribes? (Leilani)

Q: Movement of different animals... can you adapt the culture? In our area, there are lots of moose, but the native people won't eat moose. (Miranda)

A: Seafood includes fish, seaweed, gumboots. etc. It is the tradition to eat only seafood for 1 year (after what***), so if seafood were compromised, that would really affect us (Leilani).

3 = historical flow rates/timing + lower extreme events (-20%) = "**Calm Before the Storm**"

- calm/moderate weather
- people attracted to area = more visitors/tourism
- increase in invasive species (species move north and up in altitude)
- glacial retreat continues
- more conflicts for use of resources

- increased tourism = economic boost
- Slight increases in river and stream temps
- Salmon population unaffected
- More opportunity for human adaptation as changes happen at a more steady pace

4 = abnormal water flow rates/timing + less extreme events (-20%) = “**SE Identity Crisis**”

- flooding
- drought
- disrupted fisheries
- glacial loss/gone at lower elevations
- coastal salinity issues
- habitat change, food availability
- Increased coastal access, more fjords
- Vegetation and wildlife changes --- changes may be slow and steady ---habitat shifts of *mobile* species. Shift in species composition.
- Yellow cedar die
- Subnivian animals decline
- More fire
- Vegetation migration from south
- Wetlands impacted
- Riverbank erosion, houses lost
- Watershed loss -> cisterns, small ponds
- Insects and disease
- Ecological tipping point
- Decreased tourism or shift to Hubbard?
- Different marketing?
- Change is more predictable

In the biosphere... change will be more apparent because it's a steady, gradual slope rather than huge fluctuations of the other scenarios. Loss of rainforest *identity* = culturally, ecologically, economically, etc.

Kris notes: all of a sudden our drivers don't seem so divergent anymore. Also, since they are both grades of *variability*, difficult to figure out the combined effects.

General assumptions/certainties for all quadrants:

- Warmer (may be either dampened or amplified by the PDO)
- Slight increases in precipitation (5-16% for SEAN parks based on SNAP projections)
- PDO fluctuations

Other considerations:

- PDO damping, then amplifying the effect of climate change.
- River and stream temperatures increase, but glacial feeding could make temperatures decrease. Also affects nutrient influx. → taken out of general assumptions, but make sure to emphasize this in each of the quadrants.
- What about glacier response?? (Kris) A: Depends on: Marine proximity, Elevation of the glacier, whether it is a tidewater glacier (Bud)

As glaciers retreat, several things could happen:

- New species (veg and animal) move into newly vacated areas
- Could open new routes that were previously uncrossable

----- **Plenary Session: Back Together Again** -----

Discussion

- Terrestrial group—worried that drivers might mesh into each other—hard to differentiate.
- Marine group— Acidification seemed to overwhelm other factors.

Presentation: Social and Institutional Drivers | Don Calloway

* How do we organize ourselves to adapt to the changes that are coming?

- List of social-political drivers, most important:
 - Institutional response (no response/fragmented to institutional coordinated response to climate change)
 - Social concern (broad understanding/heightened urgency to widespread indifference/competing concerns)
 - Climate change high concern—but d/n motivate for voting
- EXAMPLES
 - Kivalina
 - Fluctuation in subsistence use by year/availability
 - Deering
 - Subsistence = function as community—not as individuals, *cultural core* for native communities
 - Profound adaptation
 - Buckland
 - Sharing networks could be destroyed if need to be moved
 - Exxon-Valdez heightened friction when decision-making authority taken away
 - Newtok
 - Less sea ice—more intense storms off open sea
 - Challenge to deliver fuel—waste disposal, flooding of water sources
 - Challenge of coordinating institutions—no central organization
 - Total cost to relocate Newtok = \$50-100 million
- Summary
 - Bureaucracy: Institutions present serious obstacles to adaptation.
 - Federal planning as “random acts of kindness”
 - Relocation – 180 other communities need to relocate.
 - What is the impact on cost of living, culture and sharing networks?

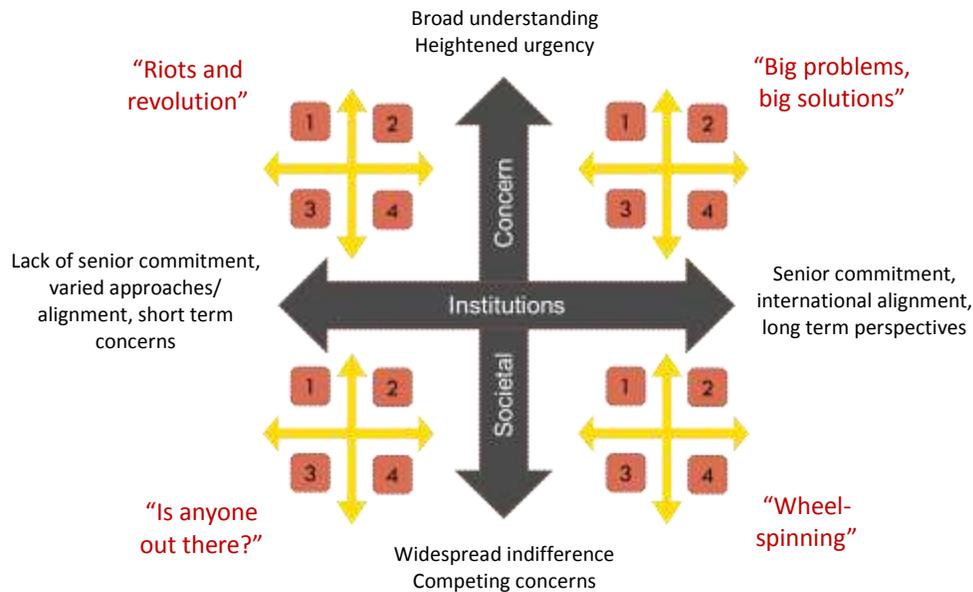
NEXT STEP: Nested Scenarios

Each working group:

1. Places developed scenarios into crossed matrices: Degree of Societal Concern x Nature of Leadership,
2. Fleshes out the scenarios within a sociopolitical context,
3. Each member votes on which nested scenarios are the most exciting/compelling,

4. Develops narratives of what the world looks like (for 2-3 nested scenarios) to present a “story” rather than list of details. Need to have concise way to handle it.

Degree of Societal Concern x Nature of Leadership



Marine Group:

Discussion

- Worst-case scenario with no one doing anything about it (Don C: B in “Is anyone out there?”)
- Drawn to Riots/Revolutions—people engaged and want to work—not relying on institutions
- Need societal support to get institutions moving
- Some changes might motivate some more than others—keystone species vs. glaciers
- Big solutions—ability to make change
- Out there—how do we move to big solutions?
- High-low concern—what does it look like—how can we motivate them?
- Acceptable losses—challenge to interpretation—how do we make our case in this situation?
- AK may be closer to riots/revolutions b/c of high cost of energy—specific to Alaska
- What looks like short term—what is closest to reality?
- Key variable: nature of leadership—societal concern is high and a lot of real impacts
- Want to show nuance and climate futures
- Vertical: local concern, horizontal: larger scale concern

SELECTED NESTED SCENARIOS:

1. Bad News in Big Problems, Big Solutions (10 votes)
2. Chaos in Riots and Revolutions (10 votes)

1. Bad News in Big Problems/Big Solutions

- High effort to green operations—green certification
- Climate-tours increase
- Federal capacity focused on FDR approach—restore fish habitat/aquaculture
- Increase outreach programs with personal perspective—build awareness and take advantage.
- Collaborative efforts are the status quo—more efficient and landscape scale mgmt
- High focus on community participation
- Increase hydropower efforts

2. Chaos in Riots & Revolution: Grassroots Recovery

- Community growth—smaller communities relocate
- Resource abundance really unpredictable—economic impacts
- Fuel scarcity and increased cost
- Rely more on imports (fuel/food)
- More marine protected areas and focus on renewables
- Demand for adaptive co-mgmt
- Increase in global water demand (opportunity)
- Invasives up

Describe this world in 2030:

- Development pressure in bigger cities—loss of rural community membership, higher gas prices
- More competition for fishing resources
- Boom and bust of resources (unpredictable resources)
- Increase in restricted areas—more critical habitats
- Reliance on outside imports—increase food costs
- Creating more marine protected areas
- Pursuit of alternative energy (tide/air power)
- Loss of identity, self-reliance and sense of intact community
- Increase in restoration efforts
- Increase demand for co-management
- Global water demand is up
- Potential coastal management plan
- Increased mineral/energy development
- Increase in invasives

Major Impacts to the Bioregion:

- Loss of history and sense of pride/tradition
- Loss of communities in general
- Decreased habitat quality
- Seasonal tourism less predictable (Change in traditional recreation opportunities)

- Flooding and erosion increase—may influence habitat

Implications for Management:

- Need for restoration
- Increase in hatcheries/aquaculture—potential loss in income (not wild caught)
- Increase in lawsuits
- Increase in demand for adaptive co-management
- Planning needs to account for threat to infrastructure
- Conflict in mandates
- Increase in maintenance costs—how to prioritize limited resources
- Dated policy and mandates-increased rigidity
- Need for increased landscape and international management
- Need for coordinating agency
- Subsistence Vs. tourism-increased visitation
- Increase in resource extraction management
- Increased visitation
- Increase in civil disobedience
- Increase in emergency response
- How to assign value and prioritize?
- How to keep up with research needs?—scenario planning needs continual updating/revision
- New technologies—access/use/etc...
- Funding to respond
- Monitoring needs, but no funding

Terrestrial Group:

Discussion

- People’s immediate concerns often supercede larger environmental concerns.
- Current economic condition in the US is probably in low end of “social concern” – household security and economic security is a bigger concern for people.
- Agencies and governments often react to immediate events... “Yo-yo” would perhaps promote more of the same? Or maybe the events happen to frequently/rapidly for the government or people to react to all of them?
- Sometimes people just do it themselves when they don’t see leadership stepping up to help.
- Wheel-spinning = government agenda not synchronous with societal concerns. (e.g., Obama administration green agenda did not resonate with society at the time). Common to ALASKA → Local communities say ‘we know how to do this best’ while federal/state agencies are trying to tell communities what to do.
- Kris – what about a positive future? Big Problems, Big Solutions? (broad understanding, heightened urgency + senior commitment, international alignment)
- “Calm before the storm” nested in “Is anyone out there?” → plausible, and problematic because climate change creeps up without planning or adaptation in place. Can’t ignore a disaster, but you can ignore incremental change.
- “Southeast Identity Crisis” = another example of incremental change.
- “Disaster zone” nested in “Wheel-spinning” → different communities with different disasters so no cohesive societal concern. Government deals with immediate disasters but not with underlying steady change.

- Barb—I'm actually surprised with the level of commitment from the federal government. **These dialogues are NOT being held at the community level.
- Miranda—competing concerns, e.g., Tea Party and Occupy Wall Street

SELECTED NESTED SCENARIOS::

1. Southeast Identity Crisis in Is Anyone Out There? (12 votes)
2. Disaster Zone in Big Problems, Big Solutions (10 votes)

1. Southeast Identity Crisis in Is Anyone Out There?

Describe this world in 2030:

Political/Social/Economic:

- What's happening now will continue. No major disasters, and no one can directly link these changes to climate change. Our political atmosphere will continue, i.e. competing concerns.
- Big economic drivers could make climate change drop out of the picture... other political concerns overshadow concerns of climate change.
- Thrust for smaller gov't continues. Agencies are not funded to deal with issues lower than national security. Some agencies dissolved.
- Increased corporate control. Corporate influence increases. Multinational corporations are the dominant interest in local communities.
- With great corporation influence and less federal influence, communities will be more responsible for social services (including environmental issues)?
- Corporations in SEAN specifically = logging (biofuels), tourism, fisheries, mining.
- Adaptation is not happening (Is Anyone Out There?)
- Higher fuel costs and less ability to supply

Major Impacts on the Bioregion:

- Increasing temperatures
- Reduced flows
- Retreating glaciers
- Hibernation for bears shorter
- Salmon and fish = low productivity
- Vegetation shifts – including yellow cedars which advance north and up
- Habitat loss – changes in habitat – more disturbance to younger
- Habitat loss forces wildlife populations to adapt or move.
- Reduced habitats include wetlands, riparian zones, alpine & old growth forests.
- Areas vacated by deglaciation creates habitat for deer and new vegetation.
- Potential wildfires
- Wetlands and muskegs (35-40% of landscape is wetlands) – lower water tables
- Increased incidence of peat fires = affects habitat, berries
- Changes in wildlife populations, habitat, fisheries
- Tree die off in riparian areas (around streams) from disease, pests, etc., exposes streams to sun, results in warmer stream temperatures = affects fish
- Dying forests create poor salmon and other fish productivity
- Deer population shifts

- Loss of glaciers – in 20 years, Tracy Arm will not have glaciers, but Glacier Bay will still have the tidewater glaciers. Example:: Portage Glacier = huge visitor’s center built, but now you can’t see the glacier from the visitor’s center!
- Biomass productivity? (logging?)

Issues Facing Management:

- Pressure to reduce the size of federal government will force consolidation of agencies and less capacity overall (what they refer to as “streamlining”). Also, as agencies merge, potential for merging disparate interests = institutional chaos, inability to manage climate change. Administrative distraction...
 - e.g. fisheries: FWS, NOAA
 - e.g. climate: USGS, NWS
- Competition for fish resources between commercial fishing, sport fishing, and subsistence needs intensifies.
- Agencies and communities need to adapt to changing tourism patterns/demands. Shifting tourism ... NPS is a tourism agency.
- Lack of education about science, environment, climate change.
- Impacts of loss of subsistence means and TEK. Loss of native culture.**
- Fuel costs and economic conditions produce challenges for Alaska ferry system. (SE transportation plan).

2. Disaster Zone in Big Problems, Big Solutions

(other group = see Nancy’s notes)

Next Step: NARRATIVES

“We imagine a future world...”

“When I’m an elder, the world will be...”

1. Explain what drivers were selected and why
2. List assumptions/certainties that are true for all 4 futures
3. Describe an example with impacts – biophysical, cultural,
4. Suggested adaptations

----- Day 4 | Thurs | February 23, 2012 -----

Futureflix Movie: “Making Climate Change History”

Discussion

- Social political implications were easier to think about
- Susan—although it’s been easier in our groups to talk about the social/political aspects rather than the science, it is much harder in real life to implement the social/political changes
- Implications are also scary—especially for superintendents
- Q: Would it be easier to draw out the official future first—then identify range of possibilities? A: Yes, a lot easier.
- Another option would be to start with current conditions—what are you dealing with now?

- Also might be good to know where people's expertise lie—look at people's knowledge (pre-assessment)—help to identify gaps
- Climate change is interdisciplinary—need people with expertise in lots of fields
- How to take this thinking pathway back to the park. How do we go back to our parks and keep thinking this way? (Susan)
- NSF Tipping Points article— Almost impossible to overcome the stovepipe funding by discipline. Need funding to allow for multiple disciplines. (Don C)

NARRATIVE PRESENTATIONS

Marine Group:

Chaos Scenario in Riots and Revolutions

This group chose to tell the story through a series of Facebook posts. In the story a marine reserve was established and new technologies (jetpacks) were used. There was an additional post about aquaculture in waters adjoining the park and responses from community members. Another post discussed ice harvest and its impact on seals, emergency response and safety.

→ Jeff Mow and Tahzay Jones (see Jeff Mow's email)

Bad News in Big Problems, Big Solutions

This story was told as proceedings from a workshop on climate change adaptation. Update on a new distribution network, habitat restoration, climate change impacts on tourism and energy conservation.

→ See file from John Morris

Terrestrial Group:

Southeast AK Identity Crisis in Is Anyone Out There?

Story told as a children's book about climate change: Ranger Ray and the Raven. Mismatch between historic SE Alaska and current—discussion between raven and ranger—discussion of changes: loss of glaciers, Tlingit movement to Juneau,

→ See email from Amanda

Disaster Zone in Big Problems, Big Solutions: Best of a Bad Deal

This story was told as a narrative between Jennie and B. Gladd. Discussion of movement of village and impacts of fire. Discussion of climate change tourism, increase in bison and adaptations to change.

→ Get file from Nancy

Presentation: Implications and Management Applications | Jeff Mow

- What are the implications of a scenario? How do we take these stories and get to what management actions to take as a result?
- Doing it on regional scale now, have done on Park scale. Struggle with how to integrate into management decision making.
- History and values embedded in National Parks—what is our job? Managing as natural systems/tourist destinations—how does this change in the face of climate change?

- Vignettes of primitive America no longer possible
- What are the important management actions now? At NPS we don't think of our missions evolving very much...
- Need mgmt tools with different levels of uncertainty and controllability
- Rehearsal to avoid management surprises
- **Q:** Is it time to revise the Organic Act? **A:** The Organic Act is written very broadly, but it is our adoption of it as an agency that has implemented it as a narrow thing.
- How to be more flexible/more portable in the face of climate change –even with actual structures, buildings, facilities.
- You need to articulate clearly why you won't go over the management lines. A lot of people think those lines can't be crossed – limiting.
- Don—Vail Agenda (1991) = real attempt to involve communities in park mgmt, without the involvement of local communities. I believe without it, the park service is involved with a management of a *virtual reality*. Need to establish rapport with surrounding stakeholders and actors. You'll need to be adaptive with actions and policies. *The idea that parks are insular is counterproductive.**
- Change the current style of management of 20-year forecast “bibles” to more flexible, evolving plans.
- What are the actions that are common to all in terms of managing the parks?

Examples:

- Kenai Fjords flooding example: flooding not associated with rain or weather. – glacial melt/runoff. Happened in 2009, then again in 2010, 2011... now it is the new normal and part of the Park's management plan.
- Southwest AK network
 - Common drivers across networks (use acidification/storms)
 - Slide with implications and responses
 - Jarvis order to consider climate change at all levels

Climate Change Education Partnership (NSF, CSU, NPS, FWS):

Phase 1: What are parks and refuges doing to communicate climate change to the public? How to elevate the discussion in communities as well as to visitors?

- Place-based learning
- “Climate cafes”

Phase 2: How do you implement what you found out about how to get public involved?

- Youth involvement
- Integrate climate change into day camp
- Kenai watershed forum (KWF)

Case Study: *Asatague Island National Seashore climate change scenario planning (Maryland)*

What did park mgmt walk away with from that process? Interview with Trish Kicklighter (2011):

- Incorporate scenario planning into ongoing General Management Plan (GMP) process
- Roll out a public outreach for scenario planning
- Need to monitor groundwater – new protocol
- New Rules (no regrets actions): 1) no new pavement on the island 2) new infrastructure on the island must be portable

What are the robust/"no regrets" mgmt actions that apply to all of the impacts on your lists? As opposed to "hedging your bets" or "betting the farm" = "**Best Practices Management Actions Common and Applicable to All Scenarios**" = see back of the CC Response Program sheet that Jeff Mow handed out.

Comments/Questions

- 1) What climate projections/**quantitative data** were used in the scenario planning and management decisions (at Asateague)? -Chris
- 2) **Research needs:**
 - Evaluate your resources and evaluate how your actions are faring.
 - What are you going to track/monitor in order to validate this process?
- 3) Need to weave **administration and budget** into these action/mgmt plans. --Susan
- 4) **Education** alone will not change human behavior. -Amanda
- 5) Role of **interpreter** changing from less of a presenter to more of a facilitator of discussion and participation. -John
- 6) Formal approach to **risk assessment** (high end statistics). Basic premise: we all hold the same values, but we weight the values very differently. Value trees ← → Risks -Don

NEXT STEP in the workshop: Implications and Options

---BREAKOUT GROUPS---

Marine Group:

Nested Scenario 1: Clusterflood (Chaos in Riots & Revolution)

Management Actions

Natural

- Setting up co-management structures for harvested/non-harvested species (protocol, plan, set thresholds, allocation issues) Working group—what are local challenges? Need to think about transaction costs
- Exploring invasive management options and prioritizing actions
- Proactive planning around aquaculture planning
- Consider designated wilderness in planning
- Increased coordination between agencies/communities/local governments/federal government/state
- Proactive Park level leadership in coordination at a local level

Cultural

- Increased outreach and education to communities
- Risk assessment for vulnerable cultural resources & recovery plan
- Document oral histories and make accessible
- Assessment and management of newly recovered cultural resources

Facilities

- Designing more energy efficient and adaptable infrastructure
- Utilizing renewable energy resources
- Address climate change in new infrastructure development

- Risk assessment of existing infrastructure
- Promoting telecommuting for reduced infrastructure footprint
- Reducing fixed costs for Park

Social & Economic

- Proactive water rights planning
- Participation in the travel industry/travel planning (also research need)
- Explore ongoing value-based decision making or co-learning processes

Interpretation and Education

- Redevelopment of interpretation and education programs
- Need to bring the future to the table
- Interpret changed conditions and values (loss of glaciers)

Visitor Protection

- Increased need for visitor protection resources and communications
- Increased concerns about liability and how to respond (new technology)
- Protecting new cultural/natural resources that are exposed

Research Needs

- River gauging data
- Long term acidification monitoring
- Comprehensive baseline social surveys of skills bank, household income, sharing networks and subsistence with economic indicators (Baseline economic and social surveys with focus on subsistence)
- Infrastructure risk/vulnerability assessment
- TEK in defensible framework
- Monitor either harvest or escapement and ecosystem diversity
- Monitoring primary/secondary productivity
- Presence and distribution of invasives
- Robust atmospheric monitoring in usable form for Park management
- Revisit the vital signs for the Park

Other Issues

- Prioritization with budget constraints
- Increased lawsuit costs
- New risks for visitors and employees

Nested Scenario 2: Bad News Group (Bad News in Big Problem, Big Solutions)

Management Actions

- Biological, manual control of invasives
- CCC investments for resource protection
- Geothermal development
- New fuel, e-tax structure
- Broad collaborative
- Emphasize interdisciplinary skills
- Remote control tourism
- Extreme sports
- Non-consumption ecotourism

Research Needs

- Baseline investment
- Cultural and social science monitoring
- Invasive species detection
- Effective messaging for education
- Teaching scenario planning
- More remote monitoring
- Water is a big deal
- Social cultural data not been collected for a long time
- No coordination between agencies

Terrestrial Group:

Nested Scenario 1: Disasters Mastered (Disaster Zone in Big Problems, Big Solutions)

Natural Resources

- Loss of commercial renewable resources (salmon, timber, ...)
- Loss of low elevation glaciers
- Major ecological shifts
- New species due to range expansion
- Increase in invasive species and decrease in diversity and creates potential health issue
- Increase in forest pests

Cultural Resources

- 1) Historical/Architectural
 - Historical resources damaged or lost
 - Loss of infrastructure (washouts, etc) – communities lost/relocated
- 2) Subsistence
 - Loss of subsistence resources (salmon, berries, ...)
 - New subsistence species/resources (bison, deer, fish, cougar, elk)
 - Loss of seasonal subsistence patterns
 - Failure of community networks

Facilities

- Washouts of transportation
- Loss of potable water
- Shifting and new extraction opportunities
- Shifting in transportation networks, patterns, access
- Need to explore other energy resources
- Change in tourism/marketing

Interpretation and Education

- A need to respond and stay relative
- Need for more emergency response teams
- A need to reframe the way we do interpretation → civic engagement
- Increasing conflicts between user groups as resources decrease
- Different communication efforts (alerts, hazards,...)
- Increased wildlife and human conflicts
- Change in visitor use/permitting/commercial uses

Human Health

- Increased epidemic (West Nile, Malaria, Bird flu, parasites)
- Need for social services, health clinics, health responders...
- Empty cupboards

Important Management Actions?

- Create flexible, integrated disaster response teams
- Increase monitoring to target disaster forecasting
- Build preservation corridors of integrated ecosystems
- Create other corridors, but that requires collaboration with other agencies
- Initiate and leverage citizen science to counterbalance funding losses.
- Stockpile emergency resources in case of disaster.

Research and Information Needs?

- Improved hydrology, water balance forecasting techniques
- Government = effective, transparent, real-time feedback
- Streamline interface with all government agencies
- Look internationally for models of climate change adaptations (Nancy makes the point that climate change concerns vary greatly regionally based on what changes are expected on the landscape.
- Be proactive about managing changes across ecosystems.
- Collaboration & sharing data *across boundaries*.
- Data integration
- Evaluation and feedback.
- Comprehensive inventory of natural disasters at the local level.

Other Issues?

- Cost of new research in economic crisis?
- Increased reliance on increasingly-vulnerable global networks
- Need broad base of low-tech solutions as well as high-tech solutions

Nested Scenario 2: Denial Daze (Southeast Identity Crisis in Is Anyone Out There?)

Natural Resources

- Increased berry production
- Salmon reduction
- Sedimentation stream/riverbeds
- Receding glaciers
- Shifting balance of muskegs

Cultural Resources

- Erosion of traditional sites
- Sub conflicts over wildlife uses
- Sub impacts = conflicts over regulations
- Timing of fish runs/bird migrations off
- Longer season for hiking trail use

Facilities

- Potential ice dam releases, flooding facilities
- Innovation in modes of tourism
- Primary visitor attractions diminish

Interpretation and Education

- Continued disconnection of people from nature
- Continued ...?
- Lower water volume = conflicts bw subsistence and recreational uses

Important Management Actions?

- Assess the need for fire and flood plans
- Mitigate natural degraded habitat
- Increased collaboration between tribes and government
- Refer to climate change when making plans
- Emergency op plans for fire, glaciers, fjords, ...
- Proactively protect, e.g., roads/trails away from sensitive spots
- Reduce cost by more energy-efficient utilities/opportunities
- Revitalize programs to cover recreation shoulder seasons
- Vulnerability assessments for culturally-sensitive sites
- Monitor stream flow, forest health, glacier positions/mass, monitor land cover change
- Risk assessment for glacial outburst floods and emergency planning
- Conduct culturally-sensitive subsistence harvest surveys to ensure access
- Raise awareness at a local level of climate change impacts, community forums
- AFE Southeast
- Adjust regulations to address sub needs, seasons, bag limits
- Evaluate capacity to adjust to changing demands

Research and Information Needs? Other Issues?

-----Plenary Discussion with both groups----

Common Issues:

- TEK in planning
- Co-management
- Invasive management
- Cooperation at local level
- Budget issues
- Value-based management
 - How to make hard decisions?
 - Values are changing—need a transparent decision process

Discussion:

- Planning for emergencies and disasters
 - Vulnerability and risk assessments (cultural resources/infrastructure)
 - Emergency preparedness teams
- Staff with multi-interdisciplinary skills
- Many types of monitoring
 - Importance of water monitoring and stream flow
- Parks as living laboratories
 - Potential problems with wilderness areas

Comment [LK1]: I missed these notes when I left for class, and Corrie doesn't have them either. I have the large sheets from the conference here, I should be able to fill in this information from there.

Comment [LK2]: Likewise, if we want to beef up this section, I can match up common issues, management actions, and research needs from the large sheets. Common to both Marine and Terrestrial groups, that is.

- Collaborative process: fact that communities are at the table
 - Can tell which are from the communities/which from the parks—community perspective is important
 - Appreciate getting people to the table
 - Cultures are represented on the table—maybe they will be more integrated eventually
 - Need communities to be able to provide direction
 - Problem with rules and redtape
 - Partnerships are going to be a bigger issue
 - Need to develop deep relationships and build trust
- Importance of place-based education and collaboration between groups
- Value-based decision-making
 - MMS: used process—brief conversations with stakeholders with interest in decision-making. Tried to elicit “value tree” and trees had the same values with different weights. Iterate values through alternatives that represent values of communities.
 - In legislation—document what is supposed to be preserved for each park (see ANILCA)
- No regrets actions might not be enough if trending in one direction
- Social impacts are important—are people prepared—how can we engage them in the process?
 - Have we captured this?
 - Involve communities, consider their values
 - More language and implementing of what the culture in SE AK means—importance of subsistence lifestyle-how to integrate? Unique to here.
 - Rely heavily on other communities—interconnected
 - Perhaps the networks are driven by the place where they are embedded.
 - Are all the stakeholders here?
 - Missing: tourism industry (which industry), fisheries?, logging?, ATIA (Alaska Tourism), other landowners in AK (SeaAlaska, tribal groups, etc.), Parks Canada, climatologist... list can get really large. How do you do this?
 - ½ Park, ¼ other agencies, ¼ community members—about a dozen different disciplines. Dynamic participation. ¼ from community is mixed: native communities, tourism/recreation, others...
 - List of participants with email addresses on the website so that folks can connect
 - Local interagency collaboration and more of the right people would be in the room at a local setting—figure out a tool that fits
 - Success for state agencies: invited to all workshops and so far no state people have come
 - NPS restricted in ability to do surveys/assess values/etc...

----- Day 4 | Friday | February 24, 2012 -----

WHERE DO WE GO FROM HERE?

What are we trying to accomplish and how are we going to accomplish it?

- Make informed decisions with the least regrets possible.
- This is a process – we are trying to develop as a tool to help our thinking.
- Secretarial Order since 2010 for NPS to analyze climate change impacts for long-term planning and decision-making.
- Cultivate dialogue and participation approach versus didactic one-way teaching.

How can we use this?

This depends on you:

- Scenarios and output of scenario planning used as a reference for parks, communities, etc to identify plausible future conditions.
- Should we develop an interactive website just for CCSP???

Keep in mind:

- Desired future conditions have to be tempered with reality = plausible.
- Some resources will change regardless of our efforts.
- NPS' role = "brokers", not "environmentalists"

Next Steps:

- We will make an attempt to assess this process.
- Keep lines of communication open! Follow-up webinar?

Products: Formal reports and educational/interpretive products:

- Products will be available on the SNAP website—technical report, presentations, ... but what kind of less formal products would you like to see? → 2-page flyer, posters of narratives,
- Final report: notes = week, webinar = 2-3 weeks, feedback, draft report = month or two. Webinar during week of March 5-10?
- **Q:** The last few days have been more about the process/approach and less about actual outcomes for specific parks. One key tool would be to provide a concise, readable manual on the process. Much more encouraged by this approach coming out of it than I was coming into it. I was a non-believer coming into it. The dissatisfying part of where we are right now, is that we know the extent that it can succeed, but we need the right tools to utilize it. Trying to apply this step-wise process later on (scaled down) would be difficult without guidelines. + Templates for applying this process on a smaller scale.
- **A:** Don Weeks – there is a manual we've been developing based on 10+ workshops and all of the lessons learned. Primary authors = Matt Rose, and Jonathan Starr (GBN), reviewed by CCSP training team. Final steps... should be ready in the next month.
- Kris—we used SNAP projections to develop a 2-page CC brochure for Glacier Bay last summer, it was very well received. *Build some useful tools for K-12 teachers to use in the classroom. **
- Develop a comprehensive climate change curriculum for Alaska parks. These can include these narratives and stories, but we need to be careful that those narratives are accompanied by information, or they can be misperceived as a projection (rather than a scenario).
- Educational outreach effort from UAF/SNAP?? [See USGCRP cc curriculum = globalchange.gov, CSC/LCC is making an effort too].

- Downsize powerpoint presentations for tribal councils or governments to use. – Leilani Focused on how climate change will affect the culture.
- Seems like we're trying to sell a huge program
- Baseline information... (Pew research, climate change = to see attitudes about climate change).

CLOSING THOUGHTS/FEEDBACK

What can we do?

- In the big picture, what we can do as individuals is small. In the NEPA context, we consider effects as cumulative.
- Scenaric thinking, as “what if” questions, long-term thinking, even for “small” decisions.
- Need to consider climate to make informed decisions and take *informed* risks.
- Consider climate change in value analysis and developing alternatives.
- We can use this scenario planning *right now*.
- Move away from finger-pointing and learn how to talk to each target audience about scenario planning (Jeff suggests using corporate examples of scenario planning.)
- Move away from mitigation and focus on adaptation to changes that are already happening. –Leilani
- Elevate examples of success, examples of application when ‘selling’ cc scenario planning process. We are all ambassadors to take this information back to our communities and agencies.
- Create a facebook page for NPS CCSP! But who?
- Too many different workshops and programs with a similar goal? Will that make our voice weak if too spread out?
- Story needs to be repeated, but need to be careful that the story is the same. If stories have conflicting information, could be counterproductive. You'll get very different stories at different scales, but we shouldn't see that as a threat to the overall message –Corrie. Present how you got to those stories, and then present the stories themselves.
- Need to COORDINATE. How to incorporate and keep this same message. Build in the continuity by having the same people attend the same variety of meetings/workshops.
- Get artists involved? Art, theater, music to incorporate these narratives.
- Amanda— Maybe each one could just be seen as a different stakeholder viewpoint, that together creates a basis of a broad base of viewpoints. Values slightly different, viewpoints different = same message.
- Brendan— Apply same idea as what we've done here, have different groups come to conclusions and then find commonality between those outcomes. What we did here needs to keep growing. NPS represents a large group of stakeholders, so it's important to hear all of their views.
- We are all concerned about the same basic issues/values and have common goals.

FINAL FINAL COMMENTS

- Why aren't things happening faster?
- Stay positive and hopeful.
- “I don't believe in hope without endeavor.” –John's quote from Ahn Sang Su Chi. Cannot hope for change unless we're willing to step up and make it so.