AYK Working Group

Co-Leads: Katie Howard & Daniel Schindler

45 Working Group Members Representing Knowledge Holders from:

- Kuskokwim Bay
- Kuskokwim River
- Yukon River (lower, middle and upper)
- Norton Sound
- North Slope
- Academia
- Federal and state management agencies
- Environmental and fisheries non-profits
- Tribal organizations
- Intertribal fish commissions
- Fishing industry

How we are approaching this task

- Our process
- Possible explanations of salmon declines in AYK
  - Spawner health
  - Freshwater harvest (commercial and sport)
  - Freshwater predators
  - Marine predators
  - Freshwater conditions for eggs and juvenile rearing and migration
  - Marine food limitation (competition, ocean carrying capacity)
  - Climate change
  - Marine harvest (bycatch; Area M; illegal, unreported and unregulated fisheries)
- Other research priorities
  - Management under uncertainty
  - Integrating traditional and western knowledge and approaches in fishery management
  - Database coordination
  - Need for holistic, life cycle approach
  - Impacts to salmon people

Spawner Health

Example Questions:

- Are diseases or parasites in migrating adult fish reducing spawner quality and abundance?
- Are warming waters increasing stress and mortality in migrating spawners?
- Does consumption of discards from pollock processors increase the incidence of Ichthyophonus in migrating salmon?
- Are declines in size and sex ratio reducing escapement quality, leading to population declines?
- If warmer water temperatures are causing significant pre-spawning mortality, which species are being impacted and at what locations?

Freshwater Harvest

Example Questions:

- Is there evidence of unobserved harvest mortality (e.g. large fish that are entangled in nets but drop out and do not survive migration)?
- Are current spawner-recruit relationships used to set escapement goals still valid in light of new theories about where mortality may be occurring (i.e., fresh vs marine waters)?
- Is there any downside (related to future recruitment) to focusing harvest on "Jack" Chinook salmon?
- Can we improve the resolution of stock/population specific identification and subsequent harvest?

Freshwater Predators

Example Questions:

- Are changes in predator abundance or distribution reducing FW survival of juvenile salmon?
- Are any predator populations increasing?
- Are the migratory and predatory behaviors of freshwater predators changing in a way that increases their use of salmon smolt?
- How could climate change affect land-based predator populations/ diet?

Marine Predators

Example Questions:

- Are increasing numbers of marine mammals causing changes in size/age distributions of AYK salmon?
- Are AYK salmon smolts experiencing increased predation from marine species? Where?
- Why are marine predators showing evidence of starvation?
- How do we disentangle the relative impact of different predator communities?

Freshwater conditions for eggs and juvenile rearing and migration

Example Questions:

- Are changes in habitat productivity and capacity reducing fitness and abundance of smolts leaving watersheds?
- Salmon spawning activity cleans gravel and improves incubation conditions - is there any evidence that the reduced number of spawners has decreased incubation success?
- Is the spread of beavers into new areas changing the quality and quantity of habitat for salmon?
- When AYK pink salmon abundance declines, are coho smolt moving towards other prey and impacting those populations?

Marine food limitation (competition, ocean carrying capacity)

Example Questions:

- Is competition with hatchery pinks and chums reducing marine survival of AYK salmon?
- Are available salmon prey abundances/quality changing?
- What is the role of increasing abundance of Bristol Bay sockeye salmon in food availability for other species and stocks?
- Are wild Norton Sound pink salmon being impacted by competition with sockeye, hatchery pinks moving north, or other pink salmon stocks in their marine distribution?

Climate Change

Example Questions:

- What are the interactions between climate change and other potential causes of decline?
- What are the impacts of increasing presence of salmon in the high Arctic on resident non-salmon species?
- How has climate change impacted salmon habitats in freshwater and marine waters?
- How does reduced shore fast ice impact salmon populations and marine survival?

Marine Harvest (bycatch, Area M, IUU)

Example Questions:

- Is bycatch in US federal fisheries causing declines of AYK salmon?
- Are interceptions in state fisheries causing declines of AYK salmon?
- Are foreign IUU (illegal, unregulated, unreported) fisheries contributing to declines of AYK salmon?
- How much unreported/unobserved bycatch is there?
- Are bycatch impacts underestimated in the new era of marine heat waves and reduced reproductive capacity of spawning adults? (are impacts greater than a simple accounting of the numbers of fish caught that would have otherwise returned to the rivers?)

Other Research Priorities

- Management under uncertainty
  - How do we build salmon management systems that are more resilient, responsive, and equitable?
  - How can we assess trade-offs in different management strategies, given uncertainty in data and knowledge, that incorporates different values by all stakeholders?
- Integrating traditional and western knowledge and approaches in fishery management
  - How do we move away from single-species management to considering the bigger picture?
  - How can we better integrate traditional and western ways-of-knowing in decision making?
- Database coordination
  - How do we build a defensible and collaborative database that the public supports?
- Need for holistic, life cycle approach (how research is done)
  - Gravel to Gravel: need more collaboration and integration across salmon life stages, across regions, and across individual studies and organizations to provide a holistic perspective on drivers of decline
- Impacts to salmon people
  - How does low abundance/smaller size of salmon impact salmon dependent communities, public health and cultural relationships to salmon?
  - How does restricted harvest on salmon impact other subsistence foods in subsistence networks?

Next Steps

- Continued discussion of potential drivers of salmon declines
- Discussion of other research priorities
- Discussion of how to prioritize/rank all the research needs
- Summarize existing knowledge and data gaps
- Co-leads collate and synthesize the information provided by WG members and the public into AYK WG draft report
- Draft report is reviewed and edited by WG members, and the organizations and communities they represent, prior to submission to the TF