Skills Check 2 Answers:

Problem definition Group 1[a]:

What are optimal actions for DEP, IFW and partners to take within a year, and up to ten years, following non-molecular monitoring efforts to confirm eDNA detections of aquatic invasive species (AIS), like *N. minor*, in Sebago Lake to protect its ecosystem integrity and water quality and to prevent AIS spread to other waters, with special concern for connected waters? The working group selected 10-year time frame given uncertainties regarding invasion dynamics, management effectiveness and budget constraints.

Problem definition Group 2[b]:

Montana Fish, Wildlife and Parks has direct experience with bighorn sheep pneumonia epizootic events that have affected conservation and public enjoyment of bighorn sheep. The agency currently has no tools for evaluating whether taking actions to proactively prevent similar events will produce more desirable results. Wildlife managers and biologists need risk assessment and decision analysis tools to help prioritize and allocate resources to identify and manage the risk of major disease events. These tools need flexibility in their implementation so that decisions about bighorn sheep management and conservation remain local and community-based. Management actions and tools should be implemented with a monitoring program in a way that will reduce uncertainty and risk in the future.

Problem definition Group 3[c]:

The 2012 Deer Management Plan for NYSDEC stated that the agency should "encourage various strategies to reduce harvest of young (≤1.5 yr old) bucks in accordance with hunter desires" and that "objective criteria" should be used to evaluate these strategies (Big Game Management Team 2011). This part of the plan was created because some hunting groups requested that the agency implement additional mandatory antler restrictions, requiring that bucks have a designated number of antler points to be legally harvested, with the goal of reducing harvest of young, small-antlered bucks and thereby potentially increasing the number of older, larger-antlered bucks subsequently available for harvest. Other hunters voiced concerns that this regulation would limit their freedom to harvest any buck of their choice. Based on this direction from the Deer Management Plan, our problem statement was to "develop a decision framework that uses objective criteria to evaluate optimal strategies for reducing harvest of yearling bucks, including mandatory antler restrictions.

Problem definition Group 4[d]:

The stakeholder and decision maker group (hereafter group) drafted the problem statement as: "to develop a transparent and inclusive decision-support process that can reduce key uncertainties over time to inform the shared prioritization of resource investments focused on the Bay-Delta, with the goals of supporting the recovery and long-term viability of important taxa, improving related ecosystem processes, and improving the water supply and reliability for the state of California through enactment of new species-specific actions". The group identified the spatial extent of the problem as subregions based on Chinook salmon and delta smelt within the Bay-Delta from Sacramento to Vernalis, including the Yolo Bypass, and the San Francisco Bay (Fig. 1). The group agreed upon a multigenerational temporal planning horizon, and a temporal grain of an annual time step to summarize DSM monthly outputs because prioritization decisions occur annually

a: Sepulveda, Adam J., Christine E. Dumoulin, Denise L. Blanchette, John McPhedran, Colin Holme, Nathan Whalen, Margaret E. Hunter et al. "When are environmental DNA early detections of invasive species actionable?." *Journal of Environmental Management* 343 (2023): 118216.
b: Sells, S.N., Mitchell, M.S., Edwards, V.L., Gude, J.A. and Anderson, N.J., 2016. Structured decision making for managing pneumonia epizootics in bighorn sheep. *The Journal of Wildlife Management*, *80*(6), pp.957-969.
c: Robinson, K.F., Fuller, A.K., Hurst, J.E., Swift, B.L., Kirsch, A., Farquhar, J., Decker, D.J. and Siemer, W.F., 2016. Structured decision making as a framework for large-scale wildlife harvest management decisions. *Ecosphere*, *7*(12), p.e01613.
d: Peterson, J.T., McCreless, E., Duarte, A., Wohner, P., Hamilton, S., Medellín-Azuara, J. and Escriva-Bou, A., 2024. Prototyping structured decision making for water resource management in the San Francisco Bay-Delta. *Environmental Science & Policy*, *157*, p.103775.