Outline – Short Communication Draft 10/6/11

Introduced House Mice, Burrowing Owls, and Ashy Storm-Petrels: a case of hyperpredation from SE Farallon Island, California.

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Target journal: Biological Conservation

Introduction:

-Discuss general challenges of seabird conservation and species recovery

-Discuss adult survival as key parameter for most long lived seabirds, particularly procellarids

-Brief of review and examples of facilitation of predation through indirect effects and predator interactions: hyperpredation

Hyperpredation refers to an enhanced predation pressure on a secondary prey due to either an increase in the abundance of a predator population or a sudden drop in the abundance of the main prey. This scarcely documented mechanism has been previously studied in scenarios in which the introduction of a feral prey caused overexploitation of native prey.

-This paper tests the hypothesis that **introduced house mice facilitate hyperpredation by Burrowing Owls and indirectly cause the decline of Ashy Storm-petrels on the Farallon Islands**

-ASSP – conservation concerns, life history, population declines – and recent trends assessment, general nesting biology

-BUOW-species of special concern, migrant (two band recoveries in CA from BC), natural history as a wintering species in California (i.e., migrant BUOWs overwinter commonly along the West Coast and on the Channel Islands), and they are frequently found on ships at sea during fall migration. Their occurrence on the Farallones in the fall has probably always been a natural phenomenon. There are no records of oversummering (May 20-Aug 26) or breeding on the Farallones. Discuss BUOW diet from BNA account and other publications.

-Mice-history of introduction – (Russian Mice) , ~250 year occupation, – no there species of rodents exist on SEFI

Methods:

-BUOW surveys

-Previous (and current?) pellet examinations (Mills, Sara Chandler potentially)

-Phenology of ASSP from 40+ years of monitoring on SEFI

-ASSP Predation data from wing walk surveys – discuss limitations

-Previous mouse trapping data (PRBO, compiled by USFWS – Irwin)

-Mouse density surveys from IC

Results:

-Abundance of Mice from trapping (IC)

-Timing figures showing:

Owl Abundance, ASSP abundance, Mice abundance (in same figure to explain the phenology of all species and relative abundances of ASSP and mice. No overlap between ASSP and mice when owls arrive, overlap between ASSP and mice after pop crash)

Owl predation on ASSP, showing absolute and relative magnitude compared to gulls

ASSP in owl diet

Discussion:

-This system is an example of hyperpredation: mice allow BUOW abundance to remain high through the fall; then, just as the mouse population crashes ASSP become readily available.

Many other examples in literature… pigs, eagles and fox on Channel Islands (Animal Conservation (2001) 4, 307–318), rabbits, cats and birds on islands (Journal of Animal Ecology (2000) 69, 154±164), mites, aphids and midge (Biological Control, Volume 57, Issue 3, June 2011, Pages 246-252), infectious disease (PLoS ONE 3(6): e2307. doi:10.1371/journal.pone.0002307).

-Relative impact of BUOW as ASSP predator, on an individual level (i.e. the huge effect of a single owl on the population – 775x greater than an individual gull)

-Predation from BUOW is a major concern for this ASSP population – effect of reduction in adult survival for such a long lived species. In addition to potential negative impacts from ocean productivity/climate change.

-Eradication of mice will eliminate an abundant food resource for owls as they arrive during fall migration before ASSP arrive back to the colony in large numbers. Removing mice form this system will likely reduce the carrying capacity of the island for owls and eliminate their ability to overwinter. But discuss potentially substance on insects, probably by fewer owls.

-Example of one species of conservation concern preying on another. Like Golden eagles and foxes on the Channel Islands (clarify differences between conservation concern and endemic + internationally recognized as threatened (birdlife)